WisBLOCK

Click Code Connect

Design your IoT solutions

A modular platform to create LPWAN IoT systems intuitively and without compromise.

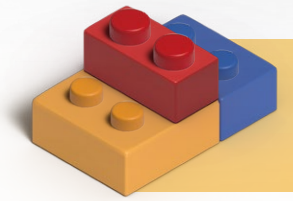
WisBlock Catalog

WisBLOCK

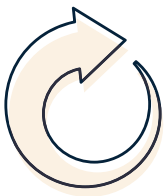
WisBlock is a modular platform that makes long-range communication, low-power IoT prototyping easier through a push-and-plug system of modular hardware, backed by ready-to-use software examples and tutorials for each of the available modules.

In a small size of just 30 x 60mm WisBlock combines a MCU, LoRa® communication, up to 4 on-board sensors and IO or communication extensions. WisBlock solutions can be coded with the easy to use entry level Arduino™ IDE or PlatformIO extension for Atom or MSVC. The Arduino™ framework offers a wide range of libraries that are ready to use. For larger projects WisBlock solutions can be created as well with professional IDE's like the Segger Embedded Studio or Keil.

WisBlock consists of WisBlock Base, WisBlock Core, WisBlock Wireless, WisBlock Sensor, WisBlock Interface, WisBlock Display, WisBlock Extra, WisBlock Storage and WisBlock Power.

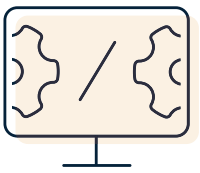


What are the advantages of using WisBlock?



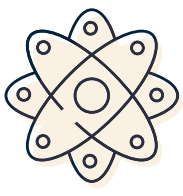
Clean prototype

From prototype to final product, WisBlock's modular approach allows you to develop your IoT solution with the same building blocks.



Low-code programming

WisBlock supports RUI3 to simplify the IoT application development cycle, and helps you create a very low-power application, extending the battery life.



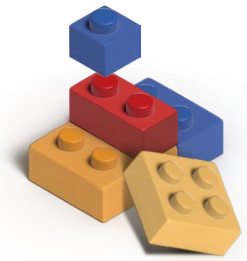
Cater to markets

The ever-growing line of WisBlock modules ensures that whatever industry you are in, we have the required modules.

WisBLOCK

A new way to develop and produce IoT products faster

1 CLICK



Push-and-plug hardware modules:

WisBlock's modular approach solutions are built like clicking blocks together to realize your ideas, which makes it easy to implement low power wide area network (LPWAN) into your IoT solution. Using industry-grade connectors WisBlock is applicable for rapid prototyping, development of solutions, final product and mass production.

2 CODE

Two major options to create custom firmware:

RUI3 API

RAKwireless Unified Interface (RUI) is introduced to give you the capability to develop your own custom firmware on the MCUs we support, going beyond the default AT command firmware embedded on RAK products.

Open Source

Arduino framework and our Arduino BSP packages provide a free and widely available programming environment. Our open-source Board Support Packages provide you with the comfort of the FreeRTOS operating system when creating your custom firmware.

3 CONNECT

Extensive Application

Agriculture: Get real-time information on soil humidity and temperature in farming fields to ensure the proper use of watering systems.

Industry: Survey machines in remote locations! Identify their operational and supply status, and turn their alarms on in case of failure and supply shortage.

Logistics: Control fleet movement, reroute vehicles on the road, and track the location and status of trucks, buses, or delivery vans. Get immediate alerts on problems like sudden breakdown, high traffic, etc.

...and more!

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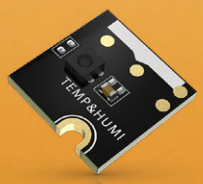
WisBLOCK Sensor



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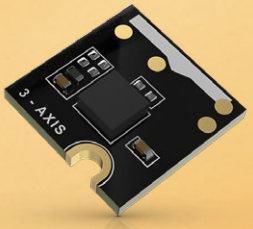

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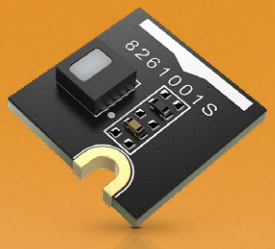

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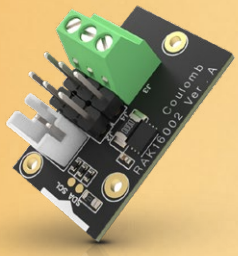

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RAK1910

WisBLOCK Interface

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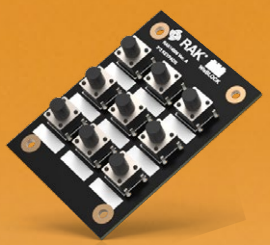

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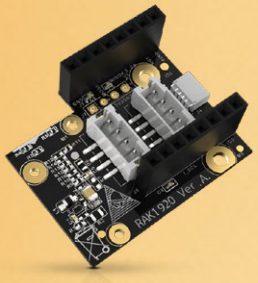

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WisBLOCK Power

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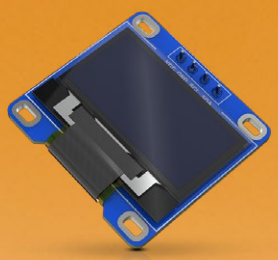

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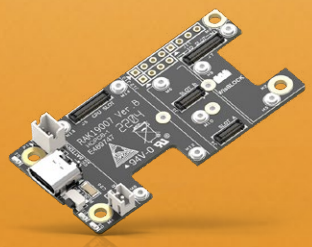

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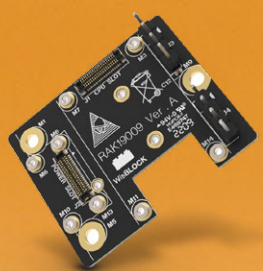

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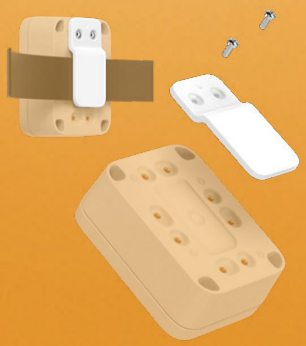

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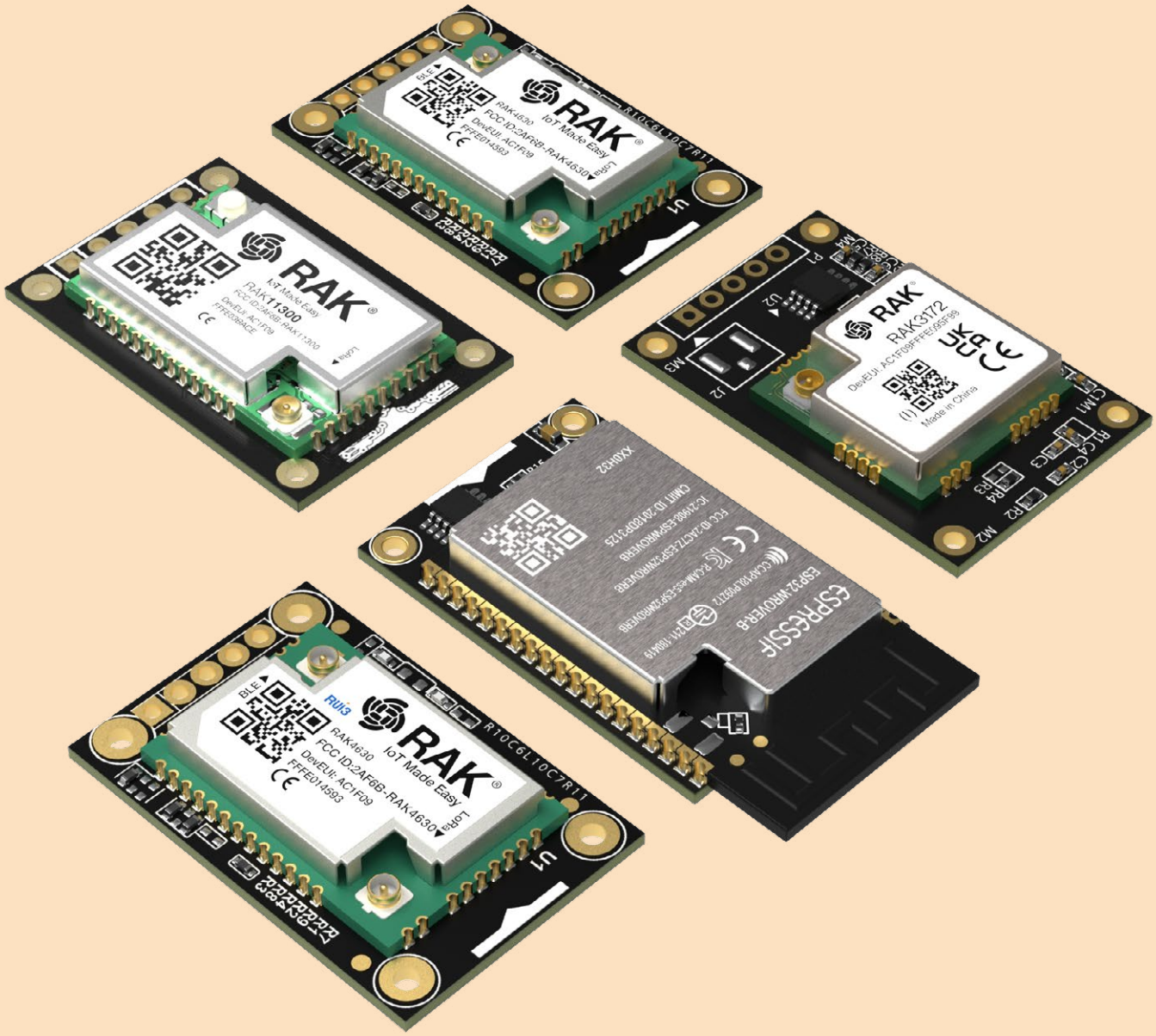


WisBLOCK

Core

WisBlock MCU Module

LoRa®/LoRa® + BLE

WisBlock Core series MCU modules are the processing units of IoT solutions.
Different modules can provide different communication support, such as LoRa®, Wi-Fi, BLE or Bluetooth. WisBlock MCU modules include RAK4631 LPWAN module, RAK4631-R LPWAN module, and RAK11310 LPWAN module. LoRa®'s low power consumption and long-distance communication features make it very suitable for IoT applications, such as home automation, sensor networks, building automation, personal LAN applications.

Low power consumption

The LoRa® module uses a ultra-low power consumption MCU and is equipped with Semtech's latest LoRa® SX1262 chip. It has lower power consumption than the old SX127x series under the same transmission power.

Multi platform development

The module supports programming through multiple platforms such as Arduino ™ IDE, PlatformI/O, and MicroPython, providing users with diverse options for software platforms.

LoRaWAN® and LoRa® P2P communication

Compatible with standard LoRaWAN® 1.0.2/LoRaWAN® 1.0.3 protocol, supporting Class A, B, C and LoRa® Point to Point (P2P) communication.

Model	RAK4631 LPWAN Module	RAK4631-R LPWAN Module	RAK11310 LPWAN Module	RAK3372 LPWAN Module
Module size	30 x 20 mm	30 x 20 mm	30 x 20 mm	30 x 20 mm
MCU	Nordic nRF52840 MCU SX1262 LoRa®chip	Nordic nRF52840 MCU SX1262 LoRa®chip	Raspberry Pi RP2040 ARM MCU	STMicroelectronics STM32WLE5CCU6
Features	• Temperature compensated crystal oscillator • LoRaWAN® 1.0.2 protocol compliant • Low power wireless system with 7.8 KHz to 500 KHz bandwidth • BLE 5.0 • Ultra-low power consumption in sleep mode 2.0 µA • Serial Debugging (SWD) Interface • I/O Port: UART/I²C/GPIO/ USB • External BLE and LoRa® antenna	• Temperature compensated crystal oscillator • LoRaWAN® 1.0.3 protocol compliant • Low power wireless system with 7.8 KHz to 500 KHz bandwidth • BLE 5.0 • Ultra-low power consumption • Serial Debugging (SWD) Interface • RUI3-based firmware, developed through RUI API • Support USB, UART or BLE to send AT commands • I/O Port: UART/I²C/GPIO/ USB • External BLE and LoRa® antenna	• Temperature compensated • LoRaWAN® 1.0.2 protocol compliant • Serial Debugging (SWD) Interface • I/O Ports: UART/I²C/GPIO/ USB • External LoRa® antenna	• LoRaWAN® 1.0.3 protocol compliant • I/O Ports: UART/I²C/GPIO • Low-Power Wireless Systems with 7.8 KHz to 500 kHz Bandwidth • Ultra-Low Power Consumption of less than 2.0 µA in sleep mode • LoRa® PA Boost mode with 22 dBm output power • Serial Wire Debug (SWD) interface

Supported frequency band

Model	RAK4631 LPWAN Module	RAK4631-R LPWAN Module	RAK11310 LPWAN Module	RAK3372 LPWAN Module
India	IN865	IN865	IN865	IN865
Europe	EU868 (high frequency)/ EU433 (low frequency)	EU868 (high frequency)/ EU433 (low frequency)	EU868 (high frequency)/ EU433 (low frequency)	EU868 (high frequency)/ EU433 (low frequency)
North America	US915	US915	US915	US915
Canada	US915	US915	-	US915
Australia	AU915	AU915	AU915	AU915
Korea	KR920	KR920	KR920	KR920
Asia	AS923-1/2/3/4	AS923-1/2/3/4	AS923-1/2/3/4	AS923-1/2/3/4
China	CN470 / CN779	CN470 / CN779	CN470	CN470
Russia	-	-	CN470	RU864

Power consumption

Model	RAK4631 LPWAN Module	RAK4631-R LPWAN Module	RAK11310 LPWAN Module	RAK3372 LPWAN Module
Tx mode LoRa® @20 dBm Condition：LoRa® @ PA_BOOST&BT sleep mode	125 mA	125 mA	Average operating current：24.6 mA	TX Mode(@ 20 dBm 868 Mhz): 87 mA(Min.)
Tx mode LoRa® @17 dBm Condition：LoRa® @ PA_BOOST&BT sleep mode	92 mA	92 mA		
Tx mode BT@4 dBm Condition：BT Tx mode & LoRa® sleep mode	9 mA	9 mA		
Rx mode LoRa® @37.5 Kbps Condition：LoRa® @ Rx mode &BT sleep mode	17 mA	17 mA		
Rx mode BT@2 Mbps Condition：BT Rx mode & LoRa® sleep mode	11.5 mA	11.5 mA		
Sleep mode Condition：LoRa®&BT sleep mod	2.0 μA	2.0 μA	3.8 mA	1.69 μA(EU868/ US915/CN470)

Working voltage

Model	RAK4631 LPWAN Module	RAK4631-R LPWAN Module	RAK11310 LPWAN Module	RAK3372 LPWAN Module
LoRa® Chip Voltage	Rating：-0.5 ~ 3.9 V Recommended working voltage：2.0 ~ 3.7 V	Rating：-0.5 ~ 3.9 V Recommended working voltage：2.0 ~ 3.7 V	Rating：-0.5 ~ 3.9 V Recommended working voltage：2.0 ~ 3.7 V	-
LoRa® Chip I/O pin supply voltage	Rating：-0.5 ~ 3.9 V Recommended working voltage：2.0 ~ 3.7 V	Rating：-0.5 ~ 3.9 V Recommended working voltage：2.0 ~ 3.7 V	Rating：-0.5 ~ 3.9 V Recommended working voltage：2.0 ~ 3.7 V	-
MCU voltage	Rating：-0.5 ~ 3.9 V Recommended working voltage：2.0 ~ 3.6 V	Rating：-0.5 ~ 3.9 V Recommended working voltage：2.0 ~ 3.6V	Rating：-0.5 ~ 3.6 V Recommended working voltage：2.0 ~ 3.6 V	Recommended working voltage：2.0 ~ 3.6 V
USB supply voltage	Rating：-0.3 ~ 5.8 V Recommended working voltage：4.35 ~ 5.5 V	Rating：-0.3 ~ 5.8 V Recommended working voltage：4.35 ~ 5.5 V	-	-
MCU high-voltage power supply	Rating：-0.3 ~ 5.8 V Recommended working voltage：2.5 ~ 5.5 V	Rating：-0.3 ~ 5.8 V Recommended working voltage：2.5 ~ 5.5 V	-	-

Working environment

Model	RAK4631 LPWAN Module	RAK4631-R LPWAN Module	RAK11310 LPWAN Module	RAK3372 LPWAN Module
Working temperature	-40°C ~ 85°C	-40°C ~ 85°C	-20°C ~ 70°C	-40°C ~ 85°C

RAK11200

Wi-Fi + BLE Module

RAK11200 is a WisBlock Core module based on Espressif ESP32-WROVER.
It is a powerful universal Wi-Fi+BLE MCU module, which is suitable for a variety of applications. The current of ESP32-WROVER during low power consumption deep sleep is about 10 μA. This makes RAK11200 an ideal ultra-low power communication solution.

Ultra-low power communication

Use two low-power communication Xtensa® 32-bit LX6 microprocessors, and the current of ESP32-WROVER during deep sleep is about 10 μA. This makes it one of the ideal ultra-low power communication solutions.

High speed CPU processor

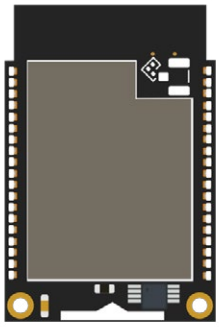
It has two separately controllable CPU cores, and the CPU clock frequency can be adjusted from 80 MHz to 240 MHz.。

Comply with Bluetooth v4.2 BR/ EDR and BLE specifications

The Espressif ESP32-WROVER chip used integrates traditional Bluetooth, low-power communication Bluetooth and Wi Fi functions, and has a wide range of applications.

Support multi platform development

Supports programming through platforms such as Arduino ™ IDE or PlatformI/O.

Model	RAK11200 Wi-Fi Module	
Chip	Espressif ESP32-WROVER	
I/O port	RTC/UART/SPI/I²C/SD card	
Antenna	Built-in PCB antenna	
CPU clock	80 MHz ~ 240 MHz	
Internal storage	4 MB external SPI Flash，520 KB RAM 8 MB SPI Pseudostatic random access memory	
Comply with specifications	Wi-Fi 802.11 b/g/n（802.11n up to 150 Mbps） Bluetooth v4.2 BR/EDR and BLE	

RF characteristics

Bluetooth RF

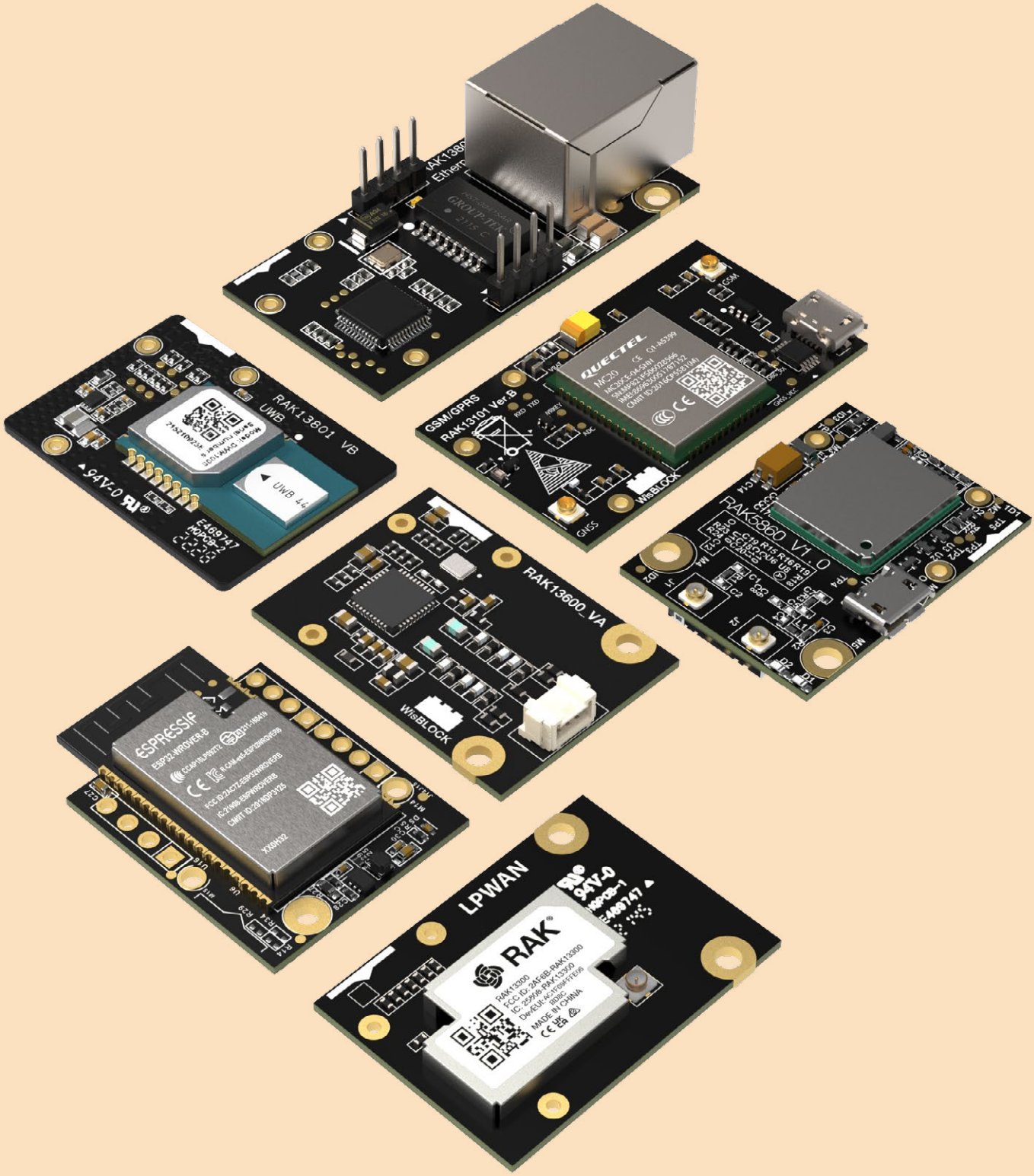
Receive		Transmit	
Sensitivity @30.8% PER	-94 ~ -92 dBm	**RF transmission power**	Typical value 0 dBm
Maximum received signal @30.8% PER	Minimum value 0 dBm	**Gain Control Step Size**	Typical value 30 dBm
Co frequency interference C/I	Typical value 10 dBm	**RF power control range**	-12 ~ 9 dBm
Intermodulation	Minimum value -36 dBm	**Drift velocity**	Typical value 0.7 kHz/50us
		Drift velocity	Typical value 2 kHz

Wi-Fi RF

Parameters	Condition	Value
Operating frequency range	-	2412 ~ 2484 MHz
Transmitting power	11b mode	17.5 ~ 20 dBm
Transmitting power	11n MCS7	12 ~ 14 dBm
Sensitivity	11b, 1 Mbps	Typical value -97 dBm

Electrical characteristics

Parameters	Value
Module power supply	Rating：0.5 ~ 4.2 V　Recommended working voltage：3.10 ~ 4.2 V
ESP32 Module power supply	Rating：2.3 ~ 3.6 V　Recommended working voltage：3.0 ~ 3.6 V
Output current of step-down IC	Maximum rating：700 mA
Operating temperature	Recommended operating temperature：-40°C ~ 85°C



WisBLOCK
Wireless

RAK13300

LoRa® Module

RAK 13300 is a LoRa® wireless module based on the SX1262 LoRa® chip, which provides an easy-to-use, small size, and low power solution for long-distance wireless data applications.

- Low power consumption
- Support LoRa® Point to point communication
- Support integration to different LoRaWAN® server platform

Support integration to different LoRaWAN® server platform

Comply with LoRaWAN® 1.0.2 protocol, and support LoRa ® Point to point communication. You can easily connect to the ThingsNetwork (TTN), Chirpstack, Activity and other server platforms.

Ultra low power consumption

Adopt LoRaWAN ® 1.0.2 Communication protocol, optional solar/lithium battery power supply, power supply is controlled by WisBlock Core through I/O interface.

Support LoRa® P2P communication

Provide Arduino, VSCode platform code, support to send/receive payload via LoRa® P2P.

Easy deployment

A 40 pin WisBlock I/O connector, M1.2 x 3 mm screws and corresponding mounting holes are included for easy connection to the WisBlock base plate.

Specifications			
Protocol	LoRaWAN® 1.0.2	**Supply voltage**	2.0 V ~ 3.6 V
Chip group	SX1262 LoRa®	**Temperature range**	-40°C ~ 85°C
Activation mode	OTAA/ABP	**Module Size**	35 x 25 mm
Battery (optional)	Lithium ion/lithium polymer battery	**Supported frequency band**	IN865, EU868, AU915, US915, KR920, RU864、AS923
	Solar charger		

- Long distance wireless communication
- Supply Chain and Logistics
- Smart city
- Safety and security
- Smart meter
- Building Automation
- Health care

RAK2305

Wi-Fi Module

RAK2305 is a WisBlock Wireless series module that extends the WisBlock system through Wi Fi and Bluetooth connection. Based on the ESP32 WROVER module of Espressif, it can communicate with the WisBlock Core module using the Espressif AT command through the UART interface.

- Base on Espressif ESP32 WROVER
- 2.4 GHz Wi-Fi + BLE module for IoT
- 4 MB SPI flash memory and 8 MB PSRAM
- Support SPI/I²C/UART interface
- Espressif AT command interface
- Optional refresh custom firmware
- Ultra low power consumption
- PCB antenna

Optional Firmware Refresh

- RAK2305-Basic-Wi-Fi-BLE-AT.bin(default version)：Factory mode version with Wi Fi and BLE AT commands.
- RAK2305-Basic-Wi-Fi-HTTP-MQTT-AT. bin：This version supports Wi Fi, MQTT, and HTTP AT commands.

Power consumption control

The power supply can be controlled by WisBlock Core MCU to reduce power consumption.

Support AT command

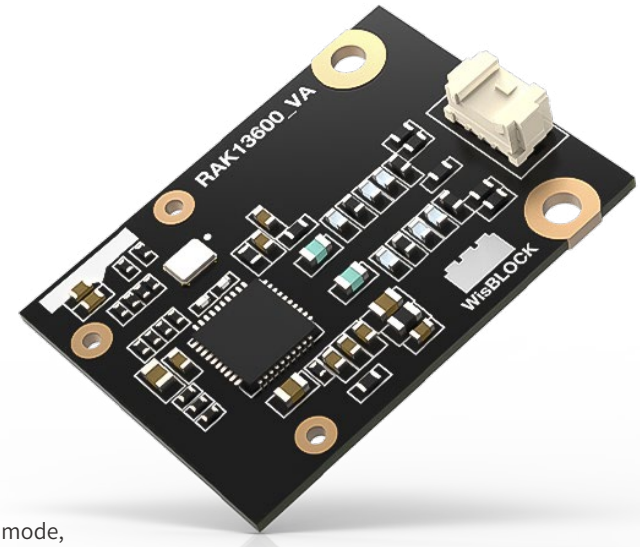
The initiator sends AT commands to the target through UART and receives AT responses. Support the development of custom AT commands based on the ESP-AT project, and implement more functions as required.

Specifications			
Chip group	Espressif ESP32 WROVER	**Output current of step-down IC**	1000 mA
Operating frequency	2.4 GHz	**I/O connector**	LED interface: used to control base plate LED
			UART0 interface: interface for firmware download and log output
			UART1 interface: main serial communication interface
Support protocol	BLE 4.2 802.11 b/g/n	**Interface**	SPI/I²C/UART
Power supply	0.5 ~ 4.2 V	**Module Size**	29.5 x 25 mm

- High integration application
- Network Unicom application
- Wireless transmission distance
- Low power consumption solution
- Short range wireless communication

RAK13600

NFC Module



RAK13600 is an NFC module based on PN532 chip, which provides a convenient, small size, low power consumption NFC application solution.

Six different operation modes are supported: ISO/IEC14443A/MIFARE reader, FeliCa reader, ISO/IEC 14443B reader, ISO/IEC14443A MIFARE card emulation mode, FeliCa card emulation mode, ISO/IEC 18092 ECMA 340 point-to-point.

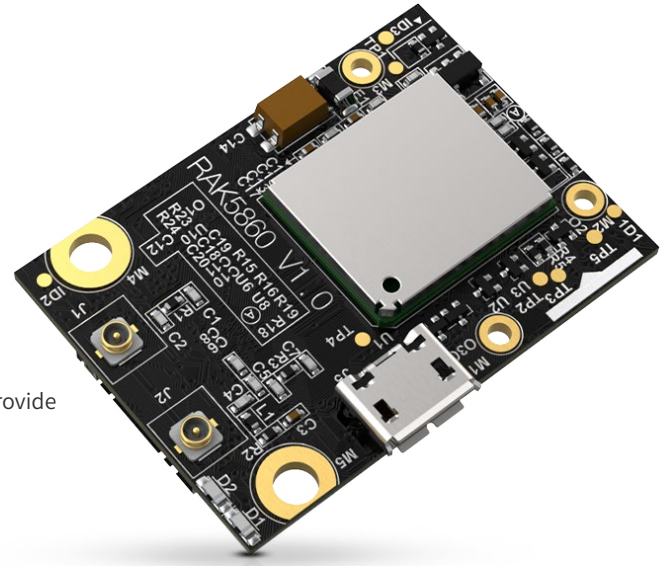
- High speed UART
- Low power consumption mode
- Hard power down mode
- Dedicated host interrupt
- Integrated RF level detector
- Integrated data pattern detector
- Highly integrated transceiver module
- Support scanning NFC/RFID tags and devices
- Support host interface, SPI interface, I^2C interface
- Dedicated I/O ports for external device control
- Power switch for external security supporting chip
- ECMA 373 NFC-WI interface for connecting external safety IC
- Based on 80C51 microcontroller core, for 13.56 MHz non-contact communication
- Support non-contact communication according to FeliCa protocol at speeds of 212 kbit/s and 424 kbit/s
- Typical operating distance in ISO/IEC 14,443A/MIFARE or FeliCa card emulation mode can reach 100 mm
- In reader mode, the typical working distance of communication with ISO/IEC 14443A/MIFARE, ISO/IEC 14443B or FeliCa card can reach 50 mm
- Support MIFARE Classic 1K or MIFARE Classic 4K encryption in reader mode, and higher transmission speed communication of MIFARE, with speeds of 212 kbit/s and 424 kbit/s

Specifications	
Chip group	PN532
Power	2.7 ~ 5.5 V
Digital supply current	25 mA
Analog supply current	6 mA
Transmitter supply current	60 mA
Operating temperature	- 30°C ~ 80°C
Module Size	25 x 35 mm

- PC, mobile terminal
- Portable equipment
- wearable devices
- Public transport terminal
- Identification
- Financial consumption
- Security certification field
- Business Automation

RAK5860

NB-IoT Module



RAK5860 is an NB IoT interface module based on Quectel BG77 module and supporting CAT M1 and CAT NB2 connections. It uses LTE NB IoT (Narrow Band Internet of Things) to connect to the WisBlock system to provide wireless communication support for applications.

- low power consumption
- Nano SIM and ESIM options
- LTE Cat M1
- LTE Cat NB2
- LTE communication
- GNSS positioning

Support GPS/GLONASS/GNSS

Support GPS (Global Positioning System) and GLONASS (Global Satellite Navigation System)
GNSS (Global Navigation Satellite System) positioning option for satellites.

Programmable with Quectel AT command set

The serial connection to the WisBlock Core MCU allows easy programming using the Quectel AT command interface.

low power consumption

The power supply can be controlled by the WisBlock Core MCU to reduce power consumption.

Nano SIM and ESIM options

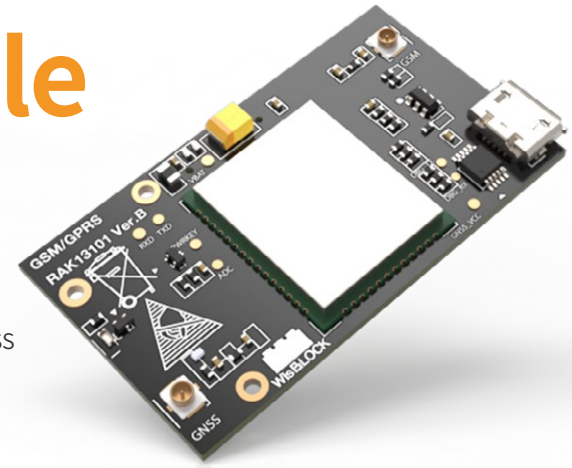
Dual card single standby, support SIM card insertion detection.

Specifications			
Chipset	Quectel MC20CE	**Peak current@ VBAT = 3.8 V**	Idle mode 110 mA
Supply voltage	3.3 V ~ 4.2 V	**GSM dial-up mode**	769 mA
GNSS_VCC	2.8 V ~ 4.2 V	**GPRS data mode**	1170 mA
Power supply	3.3 V	**Average supply current Power-off mode**	20 mA
Power supply peak current	2 A	**Sleep mode**	1.2 mA
Module Size	25 x 45 mm		

Wearable Devices · Pet Tracking · Asset Tracking · Car Recorder

RAK13101

GPRS/GSM Module



WisBlock RAK13101 GSM/GPRS Module provides GSM/GPRS capability on the WisBlock platform by using Quectel MC20CE cellular module.

- Supports GSM/GPRS/GNSS: 850/900/1800/1900 MHz
- Supports BeiDou/GPS/GLONASS/QZSS
- Built-in LNA
- IPEX connectors for the GSM and GNSS antenna
- Micro-USB debug and log output connector
- Nano SIM and ESIM options

Support GPS/GLONASS/GNSS

Support GPS (Global Positioning System) and GLONASS (Global Satellite Navigation System)
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Programmable with Quectel AT command set

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low power consumption

The power supply can be controlled by the WisBlock Core MCU to reduce power consumption.

Nano SIM and ESIM options

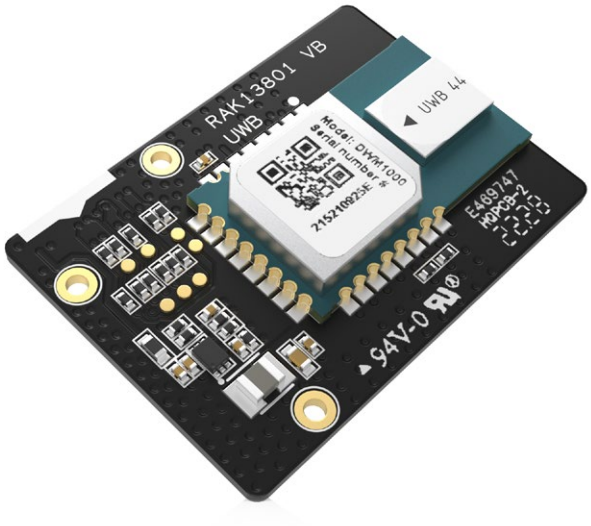
Dual card single standby, support SIM card insertion detection.

Specifications			
Chipset	Quectel MC20CE	**Peak current @ VBAT = 3.8 V**	Idle mode 110 mA
Supply Voltage	3.3 V ~ 4.2 V		GSM dial-up mode 769 mA
GNSS_VCC	2.8 V ~ 4.2 V		GPRS data mode 1,170 mA
Power Supply	3.3 V	**Average supply current**	Power-off mode 20 mA
Power Supply Peak Current	2 A		Sleep mode 1.2 mA
		Module Size	25 x 45 mm

Wearable Devices · Pet Tracking · Asset Tracking · Car Recorder

RAK13801

UWB Module



The RAK13801 is a Decawave DW1000-based UWB (ultra-wideband) wireless communication module that can be used for bi-directional ranging, TDOA positioning systems or asset location with 10cm accuracy.

- Low power consumption
- High accuracy
- High cost effectiveness
- High multipath fading immunity
- Supports very high tag density in RTLS

UWB (Ultra Wideband) Transceiver

Supports UWB (Ultra Wideband) communication, short-range wireless communication similar to Wi-Fi or Bluetooth, using a frequency bandwidth higher than 1 GHz and integrating antenna, RF circuitry, power management and clock circuitry in the module.

Low Power, Low Cost

The integrated UWB single chip has low power consumption, reduces battery replacement and reduces product life cycle cost.

Precise location tagging helps businesses implement solutions in a more cost-effective manner.

Easy Deployment

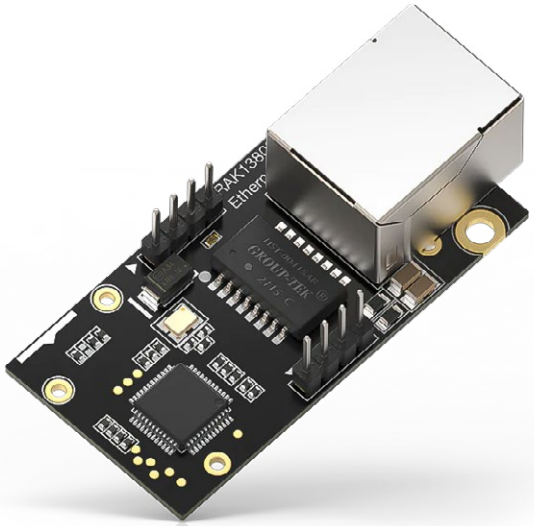
Comes with 40-pin WisI/O connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to WisBlock Base Board.

Specifications			
Chipset	Decawave DW1000	**Interface**	SPI
Positioning accuracy	< 10 cm	**Operating temperature**	-40°C ~ 85°C
Power supply	4.2 V	**Module Size**	35 x 25 mm
Supply current	1.32 mA		

- High-precision real-time positioning systems
- Asset tracking
- Wearable Devices
- Location-aware wireless sensor networks
- Factory/warehouse security and automation

RAK13800

Ethernet Module



RAK13800 is an Ethernet module based on the WIZnet W5100S-L embedded Internet controller chip, a single-chip solution for Internet Protocol (TCP/IP) Internet connectivity.

- Support Hardwired Internet protocols
- Support four independent SOCKETs simultaneously
- Support SOCKET-less command: ARP-Request、PING-Request
- Support Ethernet Power-down mode & Main Clock gating for power save
- Support WOL (Wake on LAN) over UDP
- Supports serial and parallel host interfaces
- Internal 16Kbytes Memory for TX/RX Buffers
- 10BaseT/100BaseTX Ethernet PHY Integrated
- Support Auto-Negotiation

Support for TCP/IP protocols

The hardwired TCP/IP stack supports TCP, UDP, IPv4, ICMP, ARP, IGMP, and PPPoE.

Support SOCKET communication

Users can easily develop Ethernet applications by using simple SOCKET programming. W5100S-L provides four independent SOCKET and 16 KB internal memory that can be used simultaneously for RX/TX data communication buffer.

Easy Deployment

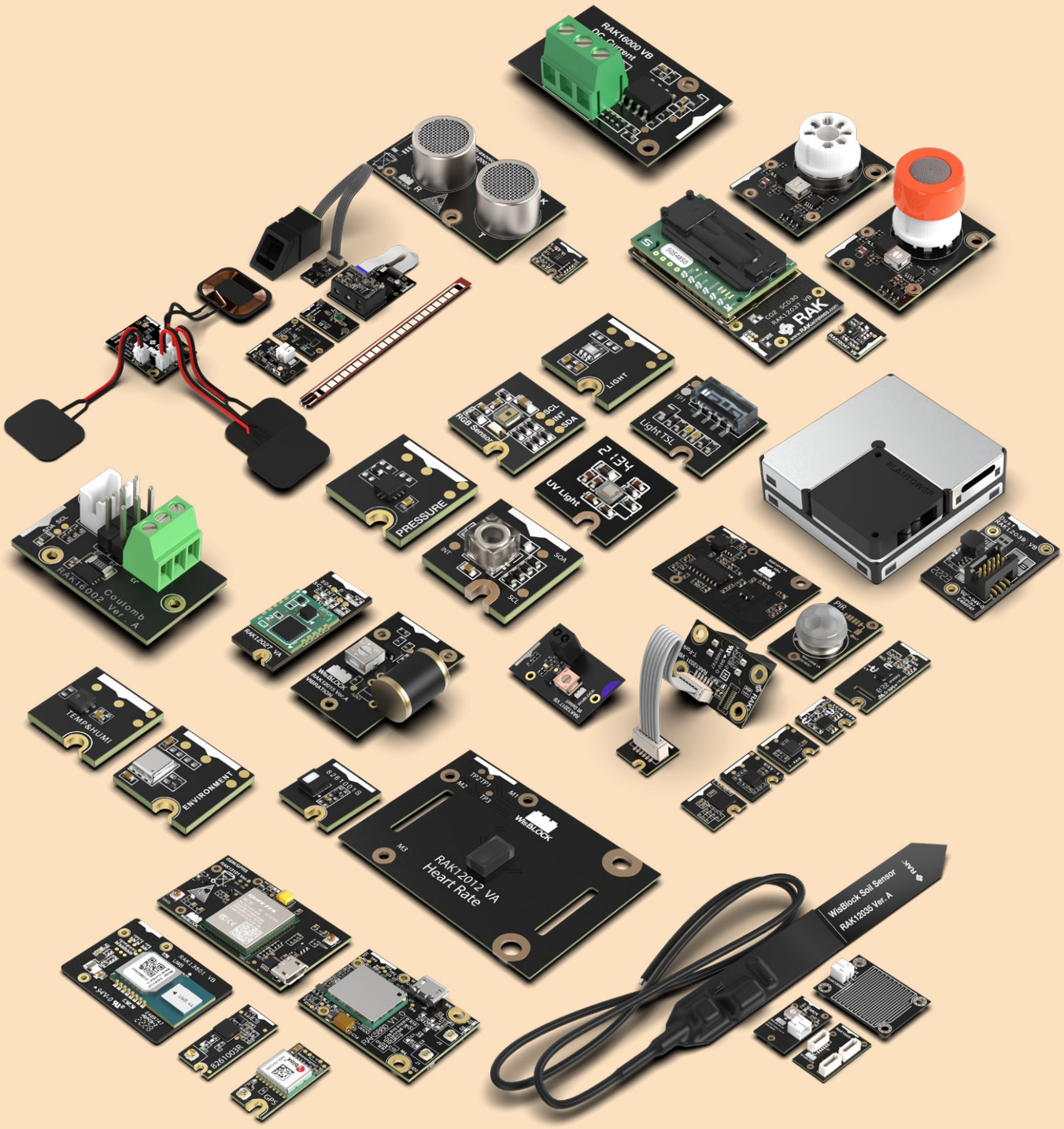
Comes with 40-pin WisI/O connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to WisBlock Base Board.

Specifications	
Chipset	WIZnet W5100S-L
Supply voltage	2.97 V ~ 3.63 V
Supply current	1.32 mA
Input Voltage	4.6 V
Output voltage	3.63 V
Operating Temperature	-40°C ~ 125°C
Module Size	25 x 50 mm

- Industrial Control
- Smart energy
- Security Access Control
- Smart Home
- Gateway Devices
- Transmission / Distribution Equipment

WisBlock Sensor Module

14-52



WisBLOCK

Sensor

RAK1901

Temperature and Humidity Sensor Module

RAK1901 is a temperature and humidity sensor based on Sensirion SHTC3. It can provide temperature and humidity information in the environment and is used to build an environmental temperature and humidity data acquisition system.

- Low power consumption
- High accuracy
- High reliability and long-term stability
- High cost effectiveness
- High signal-to-noise ratio
- Analog and digital signal processing

Low power consumption

Digital temperature and humidity sensor with I²C interface.can operate in low power mode with an average consumption of < 0.5 µA.Suitable for battery-powered mobile or wireless applications.

Easy Deployment

The compact size comes with a 24-pin WisSensor connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock Base Board.

Complete Sensor System

Includes capacitive humidity sensor, band gap temperature sensor, analog and digital signal processing, A/D converter, calibration data memory and digital communication interface supporting I²C fast mode.

Three power modes

Includes sleep mode, normal mode and lower power mode, with only 0.3 µA power consumption in sleep mode.

Parameters	Specifications
Temperature	-40°C ~ 85°C
Humidity	0 ~ 100%
Power supply	1.6 V ~ 3.6 V
Operating Temperature	-40°C ~ 85°C
Sleep Current	0.3 µA
Interface	I²C
Module Size	10 x 10 mm

- Environmental Monitoring
- Air Quality Monitoring
- Mobile Applications
- Wearable Devices
- Home Automation Control

RAK1906

Environmental Sensor

The RAK1906 WisBlock Environmental Sensor Module is a 4-in-1 digital sensor board that comprises gas, humidity, pressure, and temperature sensor, based on the Bosch® BME680 module. The RAK1906 is ideal for applications such as indoor air quality, home automation, and building IoT solutions.

- Current consumption: 0.15 µA to 350 µA
- Temperature range: -40 °C to 85 °C
- Humidity range: 0 to 100%
- Pressure range: 300 hPa to 1100 hPa
- Gas sensor response time < 1 sec
- Sensor outputs can be used with the Bosch BSEC library algorithm to calculate the IAQ (Indoor Air Quality) index

Low Power Consumption

Optional lithium battery power supply, the power supply is controlled by WisBlock Core through the WisBlock sensor interface, low power consumption and low power supply voltage capability can extend the battery life of battery-powered systems.

All-in-One Sensor

Integrates temperature, humidity, pressure and multiple gas detection, works with Bosch BSEC library to calculate the indoor air quality (IAQ) index by measuring the gas variable resistance value.

Super Small Size

The 10 x 10 mm compact design comes with a 24-pin WisSensor connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Three Power Modes

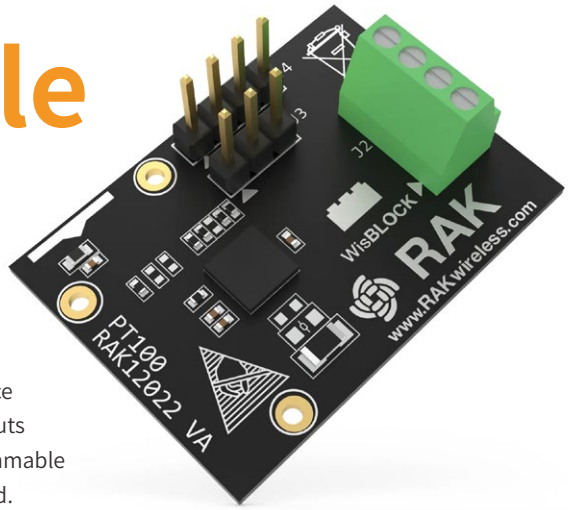
Includes sleep mode, normal mode and force mode, the power consumption in sleep mode is only 0.15 µA.

Specifications	
Measurement parameters	Temperature, humidity, pressure, gas
Measuring range	Temperature: -40°C ~ 85°C
	Humidity: 0 ~ 100%
	Pressure: 300 hPa ~ 1100 hPa
	Air quality index: 0 ~ 500 (obtained by converting resistance values)
Power Supply	1.6 V ~ 3.6 V
Operating temperature	–40°C ~ 85°C
Sleep current	0.15 µA
Interface	I^2C
Module Size	10 x 10 mm

- Environmental Monitoring
- Air Quality Monitoring
- Mobile Applications
- Wearable Devices
- Home Automation Control

RAK12022

PT100 Module



RAK12022 is a PT100 I/O module that uses MAX31865, an easy-to-use resistance-to-digital converter optimized for platinum resistance temperature detectors (RTDs). An external resistor sets the sensitivity for the RTD being used and a precision delta-sigma ADC converts the ratio of the RTD resistance to the reference resistance into digital form. The MAX31865's inputs are protected against overvoltage faults as large as 45 V. Programmable detection of RTD and cable open and short conditions is included.

- Based on MCP2518FD and ATA6563
- Compatible with 2-, 3-, and 4-wire sensor connections
- SPI-compatible interface
- Fully differential VREF inputs
- 15-Bit ADC resolution; nominal temperature resolution 0.03125NC (varies due to RTD nonlinearity)
- Total accuracy over all operating conditions: 0.5 NC (0.05% of full scale) max
- 21 ms (max) conversion time

Compatible Interface

Supports 2-wire, 3-wire, and 4-wire PT100 sensors and has an SPI interface. You can combine a PT100 sensor with this module, or use it as an interface module only.

Wide Applications

Designed for rough environments, the PT100-type temperature sensors are perfect for industrial applications.

Chipset	Maxim Integrated MAX31865
Module Size	35 x 25 mm
Total Accuracy Over All Operating Conditions	0.5 NC (0.05% of Full Scale) max
Power Supply Voltage	3.3 V
Operating Temperature	-40°C ~ 85°C
Conversion Time	21 ms
ADC Resolution	15-Bit
Nominal Temperature Resolution	0.03125 NC (Varies Due to RTD Nonlinearity)

- Industrial Equipment
- Medical Equipment
- Instrumentation

RAK1903

Ambient Light Sensor Module

RAK1903 is a single-chip ambient light sensor based on the OPT3001DNPR for measuring the intensity of light in the visible range.

- Low power consumption
- Precise spectral response
- Infrared suppression function
- Optical filtering matched to the human eye

Optical filtering matched to the human eye

With a high-precision human-eye response that rejects > 99% (typical) of infrared light, it can accurately measure the intensity of light seen by the human eye, regardless of the light source.

Infrared suppression function

When mounting the sensor under dark glass, the powerful infrared suppression helps maintain high accuracy.

Low power consumption

Optionally powered by lithium batteries, the power supply is controlled by WisBlock Core through the WisSensor interface. The low power consumption and low supply voltage capability extends the battery life of the battery-powered system.

Built-in full range setting function

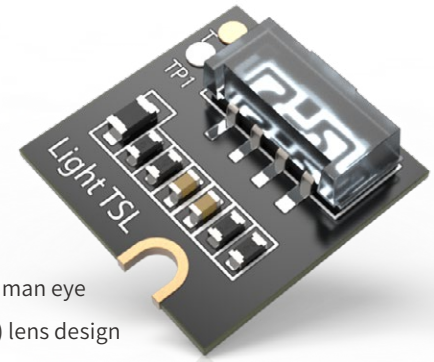
No need to manually select the full scale range, this feature allows optical measurements to be made over a 23-bit effective dynamic range.

Specifications	
Measurement parameters	Visible light intensity
Measurement range	0.01~ 83865 Lux
Resolution	0.01 Lux
Spectral response of peak irradiance	550 nm
Power supply	1.6 V ~ 3.6 V
Operating temperature	–40°C ~ 85°C
Operating current	1.8 µA
Interface	I^2C
Module Size	10 x 10 mm

- Lighting Instruments
- Electronic equipment backlight adjustment
- Induction lighting equipment
- Environmental protection and energy saving applications
- System applications based on optical experience

RAK12010

Ambient Light Sensor (ALS) Module



The RAK12010 is an ambient light sensor based on the VEML7700 chip. used to build an ambient light data acquisition system.

- Temperature compensation
- Software shutdown mode control
- High dynamic detection resolution
- Optical filtering matched to the human eye
- Supports low transmittance (dark) lens design

Temperature compensation

With built-in temperature compensation circuitry, the sensor achieves good temperature compensation in the -25°C ~ 85°C temperature range by suppressing flicker noise at frequencies of 100 Hz and 120 Hz.

Software shutdown mode control

Ultra-low power consumption is achieved through shutdown mode control, with power consumption as low as 2 µA in operating mode and only 0.5 µA in shutdown mode.

Optical filtering matched to the human eye

With high precision human eye response, it can accurately measure the intensity of light seen by the human eye with < 10% output tolerance.

High dynamic detection resolution

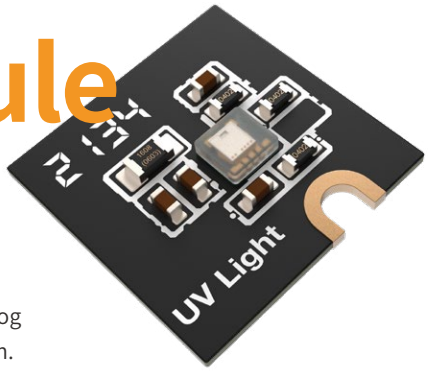
Features 16-bit dynamic range for ambient light detection from 0 lx ~ 120k lx with resolutions down to 0.0036 lx/ct.

Specifications	
Measurement range	0 lx ~ 120k lx
Resolution	0.0036 lx/ct
Supply voltage	3.3 ~ 4.2 V
Operating voltage	2.5 ~ 3.6 V
Standby current	0.5 µA
Operating temperature	–25°C ~ 85°C
Interface	I^2C
Module Size	10 x 10 mm

- Building Ambient Light Data
- collection systems
- Flat-panel TVs and consumer handheld devices
- Electronic device backlighting
- Industrial lighting systems
- Optical switches

RAK12019

UV Sensor Module



The RAK12019 is an Ambient Light Sensor (ALS) or Ultraviolet Light Sensor (UVS). The measured ambient light intensity and ultraviolet index are interfaced via the I²C bus making it immune to electrical noises, unlike its analog output counterpart. This module utilizes the LTR-390UV-01 sensor from Lite-On.

- Close to human eye spectral response
- Built-in temperature compensation circuit
- RoHS and Halogen-free compliant
- Wide dynamic range of 1:18,000,000 with linear response
- Automatic rejection for 50 Hz/60 Hz lighting flicker
- Programmable interrupt function for ALS, UVS with upper and low

Programmable Interrupt Function

Programmable interrupt function for ALS, UVS with upper and lower thresholds without polling sensor readings, thereby increasing system efficiency.

Built-In Temperature Compensation Circuit

Excellent temperature compensation in the temperature range of –40°C to 85°C by suppressing flicker noise at frequencies of 50 Hz and 60 Hz.

Low Power Consumption

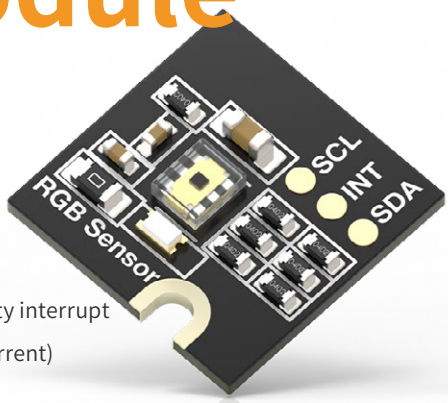
Optional lithium battery power supply controlled by WisBlock Core through the WisSensor interface, low power consumption and low power supply voltage capability can extend the battery life of battery-powered systems.

Specifications	
Measurement parameters	Ambient light intensity, UV index
Resolution	13 ~ 20 bit effective resolution
Supply Voltage	2.5 V ~ 3.6 V
Operating Voltage	1.7 V ~ 3.6 V
Operating Temperature	–40°C ~ 85°C
ALS active mode current	110 µA
UVS active mode current	100 µA
Interface	I²C
Module Size	10 x 10 mm

- Control the brightness and color of terminal display panels for mobile, computing, and consumer devices
- Ultraviolet phototherapy
- Biomedical
- Anti-counterfeit detection
- Photocatalytic air purification

RAK12021

RGB Sensor Module



RAK12021 is a WisBlock RGB Sensor that extends the WisBlock system which is based on TCS37725FN from AMS.
The Red, Green, Blue, and Clear (RGBC) light sensing can be obtained via I^2C interface. An external IR LED is also added for Proximity Detection.

- Color light sensing with IR-Blocking filter
- Proximity detection
- Maskable light and proximity interrupt
- Low power (2.5 µA sleep current)

Programmable Rgb Light Sensing And Proximity Detection

A wide range of applications with high flexibility, providing more options for WisBlock solutions.

Integrated IR Blocking Filter

Accurate color and ambient light sensing in a wide range of lighting conditions.

Specifications	
Chipset	AMS TCS37725FN
Interface	I^2C
Operating Voltage(3V3_S)	Rating: -0.5 ~3.8 V Recommended operating conditions: 2.7 ~ 3.6 V
Output terminal current (except LDR)	Rating: -1 ~ 20 mA
Operating Mode Current (Active - LDR pulse off)	235 µA
Operating mode current (wait state)	65 µA
Operating Mode Current (Sleep state - no I^2C active)	Max: 10 µA Typical: 2.5 µA
ESD Tolerance, Human Body Model	±2000 V
Module Size	10 x 10 mm

- RGB LED backlight control and ambient light color temperature sensing
- Cell phone touch screen disable
- Mechanical switches
- Industrial process control and Medical Diagnostics

Barometric Pressure Sensor Module

RAK1902 barometric pressure sensor and RAK12011 waterproof barometric pressure sensor support 260 hPa ~ 1260 hPa pressure measurement and -40°C ~ 85°C temperature measurement, is an ultra-compact piezoresistive pressure sensor, can be widely used in a variety of scenarios of barometric data acquisition system.

- High accuracy
- Ultra small size
- Robust package design
- Embedded Temperature Compensation
- High overvoltage capacity: 20X full scale

- Environmental Monitoring
- Medical therapy equipment
- Digital Output Barometer
- Agricultural logistics and cold chain transport

Super Small Size

The world's smallest pressure sensor with a chip surface area of only 2 x 2 mm and a thickness of less than 0.8 mm.

2 in 1 Sensor

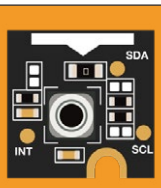
High-precision sensors integrating air pressure and temperature monitoring function.

Robust Package Design

Land Grid Array (LGA) packaging is adopted to improve the measurement performance and the contradiction between operating current and noise.

Temperature Compensation

Maintains stable performance in changing environments, consuming as little as 3 µA.

Model	 RAK1902 Barometric Pressure Sensor Module	 RAK12011 Waterproof Barometric Pressure Sensor Module
Chipset	ST LPS22HB	ST LPS33HW
Package	LPS22HB Adopt full-mold holed LGA package (HLGA)	LPS33HW Ceramic LGA package with metal cover and gel inside the IC protects electronic components from water
Output	24 bit barometric data output, 16 bit temperature data output	
Interface	I^2C	
Power supply	1.7 ~ 3.6V	
Power consumption	3 µA	
Pressure measurement accuracy	±0.1 hPa	
Temperature measurement accuracy	±1.5°C	
Module Size	10 x 10 mm	

Gas Sensor Module

The RAK12004 MQ2 gas/smoke sensor is used to detect LPG (liquefied petroleum gas), butane, propane, methane, alcohol, hydrogen, smoke and other flammable gases.

The RAK12009 MQ3 alcohol gas sensor is used to detect alcohol vapors in the air.

- Alert function
- Wide detection range
- Stable and long life
- Fast response and high sensitivity

Adjustable High Sensitivity

The sensor digital output sensitivity can be adjusted by changing the potentiometer.

Buzzer Alarm Function

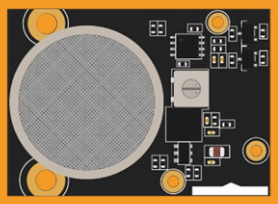
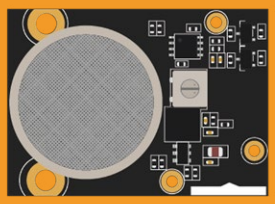
Provides Arduino, VSCode platform code. Supports buzzer alarm function.

Supports OLED Display

Provides Arduino, VSCode platform code. Views detected sensor data through the OLED display.

Easy to Deploy

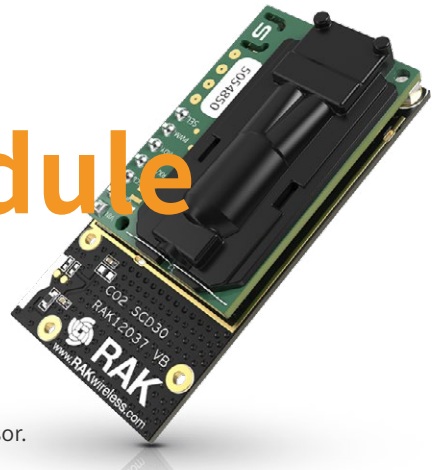
Comes with a 40-pin interface connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Model	 RAK12004 MQ2 Gas/Smoke Sensor Module	 RAK12009 MQ3 Alcohol Gas Sensor Module
Chipset	MQ2	MQ-3B
Measurement parameters	LP (liquefied petroleum gas), butane, propane, methane, alcohol, hydrogen, smoke, and other flammable	gases Alcohol vapor
Measurement range	300 ~ 10,000 ppm	25 ~ 500 ppm
Gas-sensitive material	Tin dioxide (SnO_2)	
Power supply	3.3 V	
Interface	I^2C	
Connection	40-pin I/O connection	
Module Size	25 x 35 mm	

- Gas leak alarms for domestic use
- Combustible Smoke Gas Alarms for Industrial Applications
- Portable Smoke Gas Detector
- Alcohol gas alarm for car
- Alcohol gas alarms for industrial applications

RAK12037

CO_2 Sensor Module



RAK12037 is a WisBlock Sensor that extends the WisBlock system based on the SCD30 module. This module uses NDIR CO_2 sensor technology to sense CO_2 and has an integrated temperature and humidity sensor.

- High accuracy
- Dual-channel detection for superior stability
- 3-in-1 sensor
- Fully calibrated and linearized
- NDIR CO_2 sensor technology

3 in 1 Sensor

Adopts high-precision sensors and integrates temperature, humidity and carbon dioxide monitoring functions.

High Precision

High-quality CO_2 sensor based on non-dispersive infrared (NDIR), capable of detecting 400 to 10,000 ppm with an accuracy of ±(30 ppm + 3%).

Easy Integration

Based on the dual-channel principle of CO_2 concentration measurement, the sensor automatically compensates for long-term drift by design. Its compact size allows easy integration into different applications.

Fully Calibrated and Linearized Output

Auto-calibration function can complete self-calibration by reading continuously for 7 days, with at least 1 hour of "fresh air" per day.

Parameters	Range	Accuracy
CO_2	400 ppm ~ 10,000 ppm	±30 ppm
Temperature	-40°C ~ 70°C	0.4°C
Humidity	0% ~ 100% Relative Humidity	3% RH
Power Supply	3.3 V ~ 5.5 V	
Current consumption	19 mA @ 1 measurement every 2 seconds	
Interface	I^2C	
Module Size	50 x 25 mm	

- Environmental Monitoring
- Air Quality Monitoring
- IoT Devices
- HVAC air conditioning system equipment
- Humidifier, air purifier and other smart home equipment

RAK12047

VOC Sensor Module

The RAK12047 WisBlock VOC Sensor Module is an indoor air quality sensor based on MOx-based Sensirion Gas Sensor SGP40. It can detect a wide range of Volatile Organic Compounds (VOCs) and is ideal for applications such as air quality monitoring, home automation, and building IoT solutions.

- For indoor air quality applications
- Long-term stability and service life
- On-chip humidity compensation
- Metal oxide (MOx) based gas sensor
- Halogen-free, RoHS and REACH compliant

Humidity Compensation

Provides a humidity compensated indoor air quality signal via a digital I^2C interface.

Low Power Consumption

Power consumption has been drastically reduced through sensing materials and micro-hotplate technology, making it suitable for battery-operated applications.

Easy to Deploy

The compact size comes with a 24-pin WisSensor connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Easy to Configure and Manage

Supports Arduino, VSCode platform compilation. Easy management and monitoring of sensor data through WisGateOS.

Specifications	
Measurement parameters	Volatile Organic Compounds (VOC)
Measurement range (TVOC)	0 ~ 1,000 ppm
Output data	0-500 VOC index
Power supply	3.3 V ~ 4.2 V
Supply current	2.6 mA
Current consumption	34 µA ~ 3.0 mA
Interface	I^2C
Module Size	10 x 10 mm

- IoT Devices
- Environmental Monitoring
- Air quality monitoring
- On-demand control of ventilation systems
- HVAC air conditioning system equipment

RAK12039

Particle Matter Sensor Module

RAK12039 is based on PMSA003I digital particle concentration sensor, which obtains the number of suspended particles in the air. It is interfaced via I²C bus and allows you to capture standard PM1.0, PM2.5, and PM10 values, as well as, a number of particles in micrometer on a 0.1 L particle standard volume.

- High precision
- Compact plug-in design
- Plug-and-play I²C interface

I²C

Connected via I²C BUS, the sensor captures standard PM1.0, PM2.5 and PM10 values.

Low Power Consumption

Adopts LoRa® communication protocol. The power supply is controlled by WisBlock Core through the I/O interface.

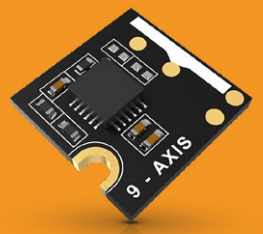
Easy to Install

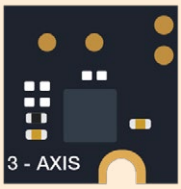
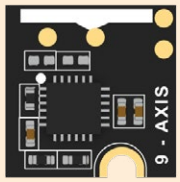
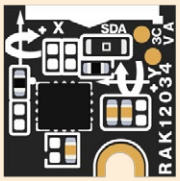
Comes with a 40-pin WisBlock I/O connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Specifications	
Measurement parameters	Airborne suspended Particle matter
Measurement range	0.3 ~ 1.0、1.0 ~ 2.5、2.5 ~ 10 μm
Minimum distinguishable particle size	0.3 μm
Operating temperature range	-10°C ~ 60°C
Storage humidity range	-40°C ~ 80°C
Interface voltage	3.3 V
Power supply voltage	5.0 V (on-board boost converter)
Current consumption	34 μA ~ 3.0 mA
Interface	I²C
Module Size	38 x 35 x 12 mm (PMSA003I)

- Air quality monitoring
- Dust concentration tester
- Health and epidemic prevention
- Environmental protection
- Occupational health and safety testing

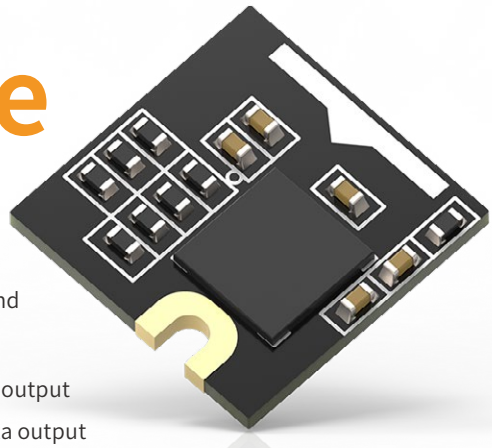
Attitude Displacement Sensor

 RAK1904 **3-axis Acceleration Sensor Module**	**Based on ST LIS3DH 3-axis acceleration sensor, which is a highly integrated low-power 3-axis sensor providing precise acceleration**, angular rate, and geomagnetic measurement in each spatial direction.	• Low power consumption • High resolution • Easy-to-use software library and tutorials
 RAK1905 **9-axis Acceleration Sensor Module**	**RAK1905 is a 3-axis gyroscope, 3-axis accelerometer, and 3-axis magnetometer**. It is based on MPU-9250 from TDK and designed for 9-axis motion tracking. The data can be obtained via I^2C interface.	• Low power consumption • 16-bit ADC • Digital Motion Processor (DMP)
 RAK12033 **6-axis Acceleration Sensor Module**	**Based on IIM-42652 from TDK InvenSense. It is a smart industrial motion tracking device that supports an extended operating temperature range**. The module is combined with a 3-axis gyroscope and a 3-axis accelerometer. RAK12033 can measure the angular rate and report data through a standard I^2C digital interface that speeds up to 1 MHz.	• Low power consumption • Supports a wider range of operating temperatures • 20,000 g shock tolerant
 RAK12034 **9-axis Acceleration Sensor Module**	**Based on BMX160 Bosch Sensor, which is a highly integrated low-power 9-axis sensor providing precise acceleration**, angular rate, and geomagnetic measurement in each spatial direction.	• Low power consumption • Low noise • High integration

Specifications	 RAK1904 3-axis Acceleration Sensor Module		 RAK1905 9-axis Acceleration Sensor Module		 RAK12033 6-axis Acceleration Sensor Module		 RAK12034 9-axis Acceleration Sensor Module	
Chipset	ST LIS3DH	3-axis Acceler-ometer	TDK MPU-9250	3-axis Acceler-ometer	TDK I IM-42652	3-axis Acceler-ometer	Bosch BMX160	3-axis Acceler-ometer
		/		3-axis Gyroscope		-axis Gyroscope		-axis Gyroscope
		/		3-axis Magnet-ometer		/		3-axis Magnet-ometer
Acceleration range	±2G/±4G/±8G/±16G							
Gyroscope range	/		±250、±500、±1000、±2000° /s		±15.625、±31.25、±62.5、±125、±250、±500、±1,000、±2,000° /s		125° /s ~ 2000° /s	
Magnetic field range	/		±4800 µT		/		x/y ±1300 µT，z ±2500 µT	
Power supply	3.3 V							
Current consumption	0.5 µA ~ 11 µA		8 µA ~ 2.7 mA		46.7 µA ~ 959 µA		High performance mode is1585 µA	
Interface	I^2C							

RAK12025

Gyroscope Sensor Module



RAK12025 is a gyroscope module based on I3G4250D from STMicroelectronics. The I3G4250D is a low-power 3-axis angular rate sensor able to provide unprecedented stability at a zero-rate level and sensitivity over temperature and time.

- Low power consumption
- High stability
- Selectable full scale (245/500/2000 dps)
- I^2C/SPI digital output interface
- 16-bit rate value data output
- 8-bit temperature data output
- Two digital output lines (interrupt and data ready)

Optional Range

Users can choose the range according to their needs. This module provides 3 options of ±245/ 500/ 2000 dps.

High Sensitivity

The optional range corresponds to different sensitivity accuracy, and has high temperature sensitivity, which changes with temperature. The accuracy can reach 2%.

Digital Output Interface

Includes a sensing component and a digital interface capable of measuring angular velocity, which can measure rotational speed and report data through a standard I^2C digital interface.

Specifications		
Chipset	ST 13G4250D	
Supply voltage	2.4 ~ 3.6 V	
Power supply current	6.1 mA	
Sleep mode Power supply current	1.5 mA	
Sensitivity	FS bit = 245 dps	7.4 ~ 10.1 mdps/digit
	FS bit = 500 dps	14.8 ~ 19.8 mdps/digit
	FS bit = 2,000 dps	59.2 ~ 79.3 mdps/digit
Operating temperature	-40°C ~ 85°C	
Interface	I^2C/SPI	
Module Size	10 x 10 mm	

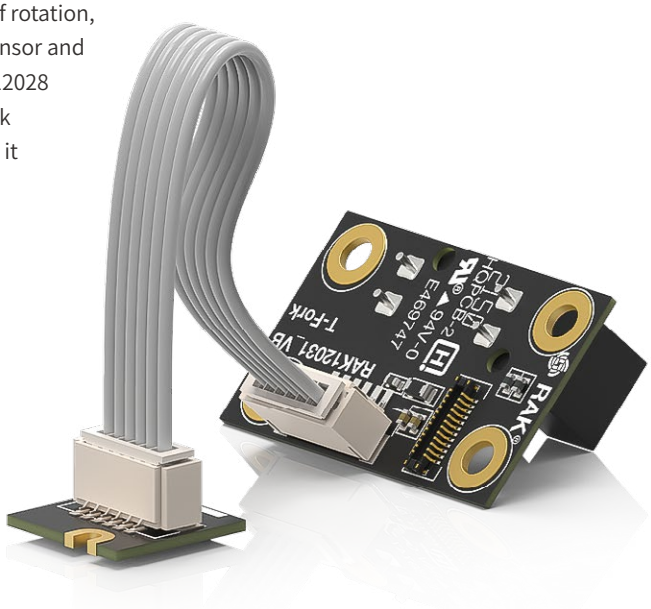
- Car navigation
- Moving object position control
- Attitude control
- UAV flight control systems
- Camera and Smartphone

RAK12031/RAK12028

TBF (Through-Beam-Fork) Sensor/Connector Module

RAK12031 is a WisBlock Through-Beam-Fork (TBF) sensor module that is based on EE-SX1041 from Omron. It can detect the presence of small moving objects, measure the speed of rotation, linear motion, and more. RAK12031 is a separate TBF sensor and have 2 connectors, which can be connected to the RAK12028 TBF Connector module or by using a RAK19005 WisBlock Sensor Extension Cable (opens new window)to connect it to the WisBlock Base

- I/O interface
- T-Fork module
- Detect presence of small moving objects
- Method for measurement velocity with grating
- Slot width: 5 mm
- Slot depth: 8.2 mm
- I^2C Interface (RAK12028)
- Standard 24-pin connector (RAK12028)



Durable

Using light for contact-free switching, avoiding contact points deterioration (worn-out or corroded), suitable for applications which require frequent switching with high-reliability.

High Detection Accuracy

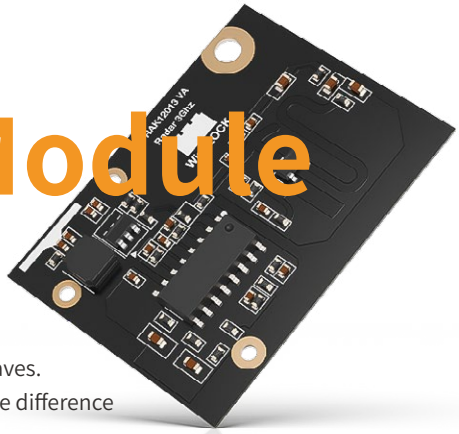
Using the grating speed measurement method to detect small objects, featuring high response speed, and detection position accuracy.

Specifications	
Chipset	Omron EE-SX1041
Interface	I/O
Operating voltage	3.3 V
Module Size	15 x 25 mm

- Photocopiers
- Paper and banknote pass-through detection for ATMs
- Gear rotation detection for cameras and robots

RAK12013

Radar Sensor Module



RAK12013 is a 3.2 GHz microwave radar module based on RCWL-9196.
It uses the Doppler radar effect to detect moving objects/motion using microwaves. The RCWL-9196 will transmit and receive a 3.2 GHz radar signal and compare the difference between the two signals to determine whether the object is moving or not.

- Low power consumption
- Detection Area: 360 degrees angle with no blind spot
- Trigger Way: repeat trigger
- Strong anti-interference capability

Anti-interference

Radar signals are not affected by environmental factors, such as temperature and dust. Do not interfere with other signals (such as LoRa®, Wi-Fi, Bluetooth, etc.).

Supports Retriggering

A capacitor is added to the sensor to provide a longer retriggering time. Supports retriggering, and can adjust the retriggering time.

Adjustable Detection Distance

Supports the adjustment of the detection distance from 5 to 7 meters. When connected with a resistor, the detection distance will be shortened.

Easy to Install

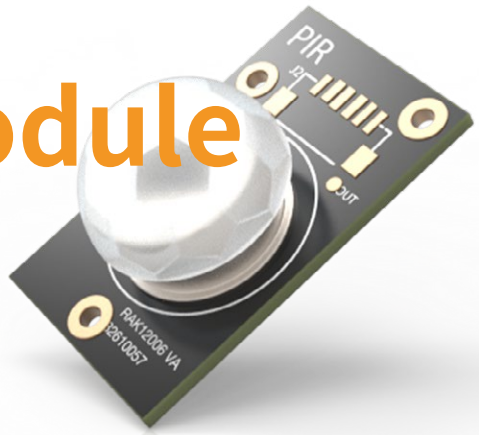
Comes with a 40-pin WisBlock I/O connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Specifications	
Chipset	RCWL-9196
Detection range	5 ~ 7 m 360° all-round detection
Frequency	3.2 GHz
Supply voltage	2.2 ~ 4.7 V
Power supply current	2.8 mA
Power	20 ~ 30 mW
Interface	I/O Interface
Module Size	25 x 35 mm

- Guardianship for the elderly
- Automatic body sensing devices
- Static speed measurement
- Healthcare
- Intelligent Security

RAK12006

PIR Sensor Module



The RAK12006 is a Pyroelectric Infrared Radial (PIR) module. It is designed to detect occupancy and motion from the infrared radiated objects. The sensor uses AM312 from Senba Sensing Technology Co., Ltd.

- Low power consumption
- High sensitivity
- High reliability
- Digital Signal Processing
- Built-in filter, screen the interference by other frequency
- Schmitt Trigger Output REL

Support Retriggering

A delay for a period of time after the sensor outputs a high level voltage. If there is human activity within its sensing range, the output voltage will remain high until the person leaves after the delay and becomes a low level.

Anti-interference

The second-order Butterworth band-pass filter with built-in infrared sensor shields the input interference of other frequencies.

Digital Signal Processing

Includes a sensing component and a digital interface capable of measuring IR radiation objects, whose occupancy and movement can be detached. A standard digital interface is used to transmit data.

Easy to Configure and Manage

Supports Arduino, VSCode platform compilation, easy management and monitoring of sensor data through WisGateOS.

Specifications		
Chipset	AM312	
Detection range	3 m, ⩽ 100° cone angle	
Supply voltage	3.3 V	
Battery (optional)	Li-ion/Li-polymer battery	Solar charger
Interface	I/O	
Module Size	15 x 25 mm	

- Digital Photo Frame
- Smart Home
- USB Alarm
- PIR motion detection
- Intrusion detection, occupancy detection
- IoT sensors
- LAN monitor
- Smart Security

RAK12017

IR Detection Sensor Module

The RAK12017 is an IR detection module. This module uses ITR20001 optical switch from Everlight to detect whether the IR Signal reflects.
Sample applications of this module are: to identify if an object is approaching and check changes between black and white lines.

- High sensitivity
- High reliability
- Fast response time
- Detect whether IR Signal is reflected back

Adjustable Detection Range

Supports adjusting the detection range by turning the knob on the sensor.

Easy to Configure and Manage

Provides Arduino and VSCode platform codes to support detection of IR signal interruption, color change of black and white lines, and passage of close-range obstacles.

Easy to Install

Supplied with 40-pin WisBlock I/O connector, M1.2 x 3 mm screws and corresponding mounting holes for easy attachment to the WisBlock baseplate.

Specifications		
Chipset	EVERLIGHT ITR20001	
Power supply	3.3 V	
Infrared tracking range	1 ~ 5 cm	
Wavelength peak	940 nm	
Battery (optional)	Li-ion/Li-polymer battery	Solar charger
Interface	I/O Interface	
Module Size	15 x 25 mm	

- Motion Detection
- Tape detection
- Contactless switch
- Position counting
- Anti-theft alarm

RAK12052

Thermal IR Array Module

RAK12052 is a 32 x 24 thermal IR array module based on MLX90640 from Melexis.
MLX90640 is a fully-calibrated 32 x 24 pixels thermal IR array in an industry-standard 4-lead TO39 package with a digital interface, and it contains 768 FIR pixels. An ambient sensor is integrated to measure the ambient temperature of the chip and a supply sensor to measure the VDD. The outputs of all sensors IR, Ta, and VDD are stored in internal RAM and accessible through I^2C. It is comparable in having a thermal camera (or Predator's vision) but in compact but usable low resolution.

- 32 x 24 resolution
- Noise equivalent temperature difference (NETD) 0.1 K RMS @1 Hz refresh rate
- I^2C compatible digital interface
- FOV options: 55° x 35°
- Easy to integrate
- Factory calibrated

Easy to Integrate

It works like those fancy thermal cameras, but is compact and simple enough for easy integration, just in low resolution.

Factory Calibrated

The MLX90640 is a fully calibrated 32 x 24 pixels thermal IR array in an industry-standard 4-lead TO39 package with a digital interface.

Chipset	Melexis MLX90640
Resolution	32 x 24 pixels
Power Supply Voltage	3.3 V
Module Size	15 x 25 mm
Operating Temperature	-40°C ~ 80°C
Current Consumption	< 23 mA
FOV Options	55° x 35°
Noise Equivalent Temperature Difference (NETD)	0.1 K RMS @ 1 Hz refresh rate

- High precision non-contact temperature measurements
- Intrusion or Movement Detection
- Presence Detection or Person Localization
- Temperature sensing element for intelligent building air conditioning
- Thermal Comfort Sensor in automotive air conditioning control system
- Microwave oven
- Industrial temperature control of moving parts
- Visual IR thermometers

RAK12015

Vibration Detection Sensor

The RAK12015, a part of WisBlock Sensor, is a Vibration Detection Module that uses a high-precision sensor, the ANT-801S. This sensor is capable of detecting micro shocks or vibration without direction limits.

- High precision sensor
- No directional restrictions
- Ultra low power consumption
- Adjustable sensitivity
- 60,000,000 vibrations guaranteed
- LoRaWAN®wireless transmission

Low Power Consumption

Using the LoRa® communication protocol, optional solar/lithium battery power supply, which is controlled by WisBlock Core through the I/O interface.

Adjustable Sensitive Accuracy

The sensitivity adjustment button can be rotated, with analog and TTL level signal output. The indicator light is off when the effective output signal is high level.

Easy to Deploy

The compact size comes with a 40-pin I/O connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Easy to Configure and Manage

Supports Arduino, VSCode platform compilation, easy management and monitoring of sensor data through WisGateOS.

Specifications		
Chipset	ANT-801S	
Power supply	3.3 V	
Battery (optional)	Li-ion/Li-polymer battery	Solar charger
Connection	40-pin I/O connection	
Module Size	15 x 25 mm	

- Electronic locks
- Anti-theft devices
- Alarm systems
- Mechanical equipment vibration detection
- Range bullseye count detection and other vibration testing

RAK12027

Earthquake Sensor Module

The RAK12027 is an Earthquake Sensor Module. It carries D7S, the world's smallest high-precision seismic sensor from Omron. When an earthquake occurs with a seismic intensity equivalent to five (5) upper or higher on the JMA (Japan Meteorological Agency) Seismic Intensity Scale, the D7S will activate the shut-off output to notify the user that an earthquake has occurred.

- Low power consumption
- Collapse alarm integrated
- Highly accurate intensity level determination
- RoHS compliant

Collapse Alert

Structural collapse alarm is issued when the horizontal position of the equipment changes by more than 20 degrees.

High Precision

A Spectral Intensity (SI) high accuracy seismic indicator. Highly correlated to structural damage.

Easy to Deploy

The compact size comes with a 24-pin WisSensor connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Easy to Configure and Manage

Supports Arduino, VSCode platform compilation, easy management and monitoring of sensor data through WisGateOS.

Specifications	
Chipset	Omron D7S
Detection parameters	Seismic intensity level 5 or higher output
Supply voltage	3.3 V
Operating temperature	-30°C ~ 70°C
Storage temperature	-40°C ~ 80°C
Interface	I^2C
Module Size	10 x 23 mm

- Prevention of post-earthquake fires and other secondary disasters
- Power Distribution Panels
- Electricity/Gas Meters
- Bridges / Tunnels
- Railroads

RAK12007

Ultrasonic Sensor Module

RAK12007 is an ultrasonic sensor module based on the CS100, an industrial-grade ultrasonic distance measurement chip. This chip integrates an ultrasonic transmitter, ultrasonic receiver, and digital processing circuits. The distance measurement result output is in the form of the pulse width.

Supports OLED Display

Provides Arduino, VSCode platform code. Supports viewing the detected sensor data through an OLED display.

High Performance

When CS100 is used with a 40 KHz open-type ultrasonic probe, it only needs a 22 MR pull-down resistor and an 8 M crystal oscillator to achieve high-performance distance measurement.

Low Cost

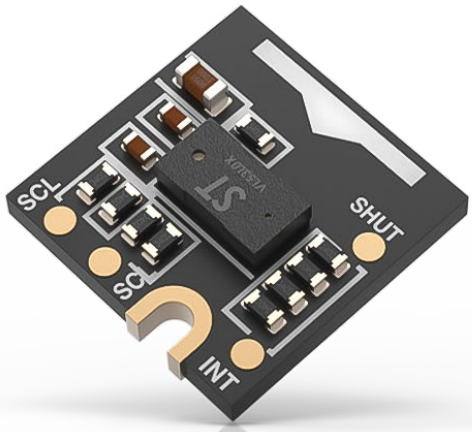
Fewer peripheral devices makes the wiring easier. In cost-sensitive application scenarios, the ultrasonic distance measurement function can be realized by using a single-sided PCB, which greatly reduces the cost.

Specifications	
Chipset	CS100
Detection range	2 cm ~ 4 m
Supply voltage	3.3 V
Operating current	5.3 mA
Power-off current	0.3 mA
Operating temperature	-40°C ~ 85°C
Interface	I/O
Module size	25 x 48 mm

- Remote control
- Burglar alarm
- Automatic door
- Proximity switch
- Ranging, liquid level; Or material level

RAK12014

ToF Sensor Module



The RAK12014, a part of the RAKwireless WisBlock Sensor Series, is a Time-of-Flight (ToF) module designed based on VL53L0X from STMicroelectronics. The VL53L0X is a ToF laser-ranging module, providing accurate distance measurement up to 2 m.

- Low power consumption
- High accuracy
- Measures absolute range up to 2 meters
- Xshutdown (reset) and interrupt GPIO
- I^2C interface for device control and data transfer

High Ambient Light Immunity

Using ST's ToF technology, regardless of the target color and reflectivity, distance measurement can be well performed, with stronger anti-interference ability.

Eye Safety

lass 1 laser device in accordance with the latest standard IEC 60825-1:2014 (3rd edition).

Easy to Deploy

The compact size comes with a 24-pin WisSensor connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Easy to Configure and Manage

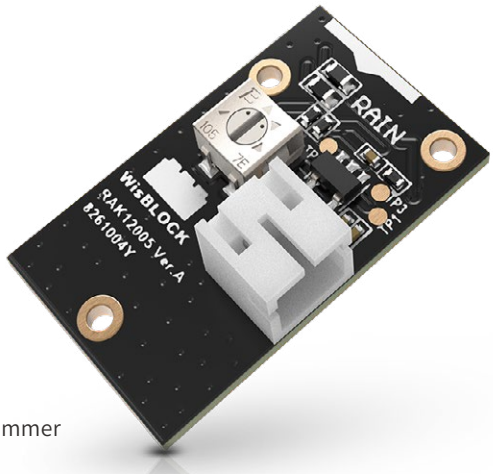
Supports Arduino, VSCode platform compilation, easy management and monitoring of sensor data through WisGateOS.

Specifications	
Chipset	ST VL53L0X
Measuring absolute distance	2 m
Supply voltage	3.6 V
Power consumption	20 mW
Interface	I^2C
Module size	10 x 10 mm

- Service robots and vacuum cleaners
- Sanitary Products
- Smart Buildings and Smart Lighting
- IoT user and target detection
- Laser-assisted autofocus
- Video focus tracking assistance

RAK12005/RAK12030

Rain Sensor Module



The RAK12005 is an electroconductive-liquid detect module used for detecting water and other electroconductive liquids. If the detection area is wet, the output of Microchip's MCP606 CMOS op-amp will go positive, signaling the presence of liquid.RAK12005 WisBlock Rain Sensor Module also has a separate sensor PCB, the RAK12030. This sensor PCB is connected to the RAK12005 with a cable so that you can place the sensor under the open sky and keep your WisBlock solution in a dry place or inside a waterproof enclosure.

- Digital output
- Adjustable sensitivity
- Configurable detection threshold via trimmer
- Independent sensor PCB RAK12030

Advanced CMOS Technology

Provides low bias current, high-speed operation, high open-loop gain, and rail-to-rail output swing through advanced CMOS technology. When water or other conductive liquid is detected, the output of the MCP606 CMOS operational amplifier will become positive, indicating the presence of liquid.

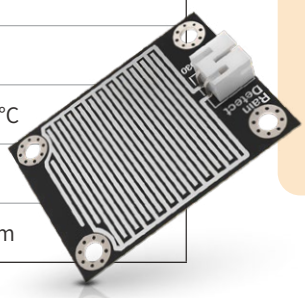
Easy to Deploy

The compact size comes with a 40-pin WisBlock I/O connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Easy to Configure and Manage

Supports Arduino, VSCode platform compilation, easy management and monitoring of sensor data through WisGateOS.

RAK12005 Specifications	
Chipset	Microchip MCP606
Detection parameters	Water and other conductive liquids
Sensor PCB	RAK12030 (below)
Supply voltage	3.3 V
Static current	25 µA
Operating Temperature	-40°C ~ 85°C
Interface	I/O
Module size	15 x 25 mm



- Battery Powered Instruments
- High impedance applications
- Strain gauges
- Medical Instruments
- Test Equipment

RAK12035/RAK12023

Soil Moisture Sensor Module

RAK12023 is a soil moisture connector module. It has one (1) standard WisBlock IO connector, which you can connect with the WisBlock Base. It also has three (3) connectors dedicated to the RAK12035. RAK12035 is a separate soil moisture sensor probe that can be connected to the RAK12023 module. RAK12023 is capable of a connection of up to three RAK12035 soil moisture sensor probes simultaneously.

- Separate connector PCB RAK12023
- Supports calibration via software
- ADC gain

All-in-One Sensor

Integrated with temperature, humidity and capacitance detection, the voltage is measured by the ADC in the microcontroller, the NTC component is used to measure the soil temperature, and the capacitance sensing is used to measure the moisture.

Moisture Protection

The electronics on the PCB, along with the cables, are covered with shrink tubing for extra protection from moisture.

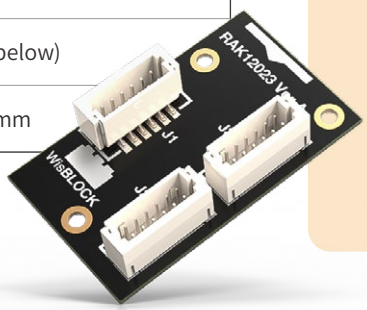
Calibration via Software

Calibrating by uploading the example code. The calibration value will be saved in the RAK12035 module itself to be read from the sensor later.

Easy to Configure and Manage

Supports Arduino, VSCode platform compilation, easy management and monitoring of sensor data through WisGateOS.

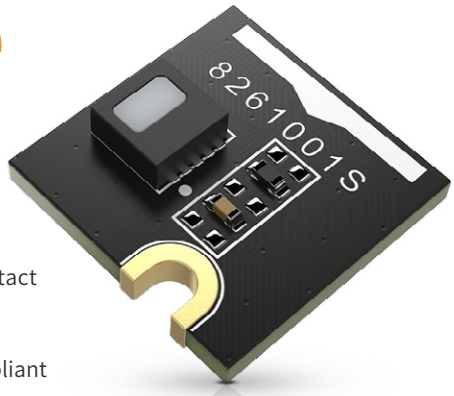
Specifications	
Chipset	Atmel ATTINY441-SSU
Detection parameters	Temperature, humidity, conductivity
Connector PCB	RAK12023 (below)
Module size	18 x 149 mm



- Agricultural irrigation
- Greenhouse
- Flower and vegetable
- Grassland and pasture
- Rapid soil survey
- Plant Culture
- Scientific Experiment

RAK12003

Infrared Temperature Sensor Module



The RAK12003 WisBlock Infrared Temperature Sensor Module can be used for an accurate contactless thermal measurement for applications such as General purpose industry, temperature control of moving and hard to reach parts, body temperature measurement, non-contact thermometer for mobile and IoT application.

- High accuracy
- Factory calibrated
- 50 ° field of view
- Configurable refresh rate
- RoHS 3 compliant

High Precision

Accuracy is ±0.2° over a narrow target temperature range of 35°C to 42°C , suitable for medical applications.

Configurable Refresh Rate

The refresh rate (how fast the MLX90632 RAM updates results) is configurable from 0.5 Hz to 64 Hz.

Ultra-Small Size, Easy Installation

The 10 x 10 mm compact design comes with a 24-pin WisSensor connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Low Power Consumption

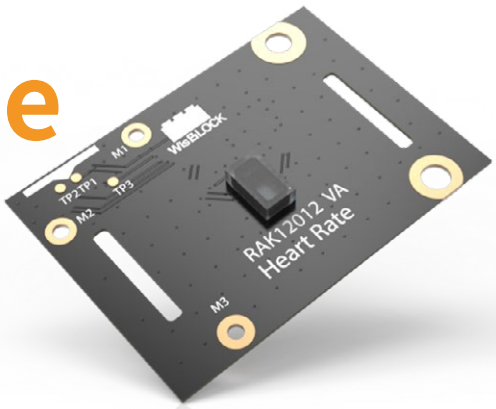
Supports low-power sleep mode, in which the current consumption is less than 2.5 µA.

Specifications	
Chipset	MLX90632SLD-DCB-000-RE
Measurement range	-20°C ~ 100°C
Supply voltage	±0.2°C
Supply voltage	3.3 V
Sleep current	< 2.5 µA
Operating temperature	-20°C ~ 80°C
Interface	I^2C
Module size	10 x 10 mm

- General Industrial
- Medical applications
- Temperature control of moving parts
- Body temperature measurement
- Non-contact thermometers for cell phone and IoT applications

RAK12012

Heart Rate Sensor Module



The RAK12012 is an integrated pulse oximetry and heart-rate monitor module used for measuring person's heart rate and oxygen saturation. The sensor attached to this module is MAX30102 from Maxim Integrated.

- Heart-Rate Monitor and Pulse Oximeter sensor in LED Reflective Solution
- Ultra-Low Power Operation
- Robust Motion Artifact Resilience
- Fast Data Output Capability

Low Power Consumption

Low power consumption at ultra-low power operation is achieved based on programmable sampling rate, LED current, and ultra-low shutdown current.

Fast Data Output

Fast data output function based on high sampling rate.

Easy to Install

Comes with a 40-pin WisBlock I/O connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Powerful Motion Artifact Suppression

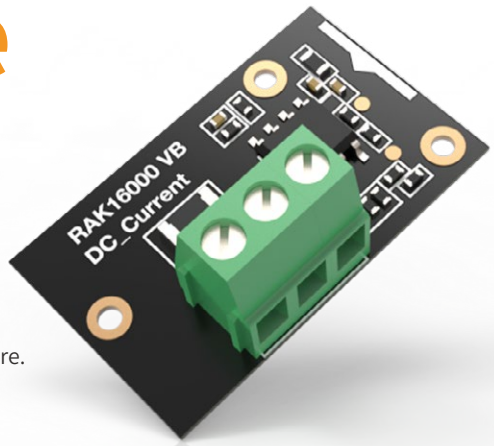
High SNR integrated glass cover for optimal, reliable performance.

Specifications	
Chipset	MAX30102
Detection parameters	Heart rate, blood oxygen saturation
Supply voltage	3.3 V
Continuous power consumption	440 mW
Operating temperature	-40°C ~ 80°C
Interface	I^2C
Module size	25 x 35 mm

- Wearable Health Monitoring Devices
- Biometric
- Assistive Fitness Devices
- Smart Phones
- Tablets
- Heart Rate Detectors
- Pulse Oximeter

RAK16000

DC Current Sensor Module



RAK16000 is capable of measuring DC current in the range of 0 to 3 A in a voltage range of 0 to 26 V. With the two measured DC values, you get the power consumption by multiplying the current and voltage. Additionally, this module uses the INA219BID from Texas Instruments that offers high accuracy maximum rate of 0.5% over temperature.

- High accuracy
- High resolution
- Support measurement range adjustment

High Precision

The INA219BID has a maximum accuracy of 0.5% over temperature. A parallel resistor of 100 mΩ provides resolution up to 0.1 mA.

Adjustable Range

With a 100 mΩ shunt resistor, the minimum current that can be measured is 100 µA, and the LSB (least significant bit) is 100 µA. With a 1 Ω shunt resistor, a current of 10 µA can be measured with a range of 320 µA.

Capturing Power Loss

The power loss can be obtained by multiplying the measured current and voltage values.

Easy to Install

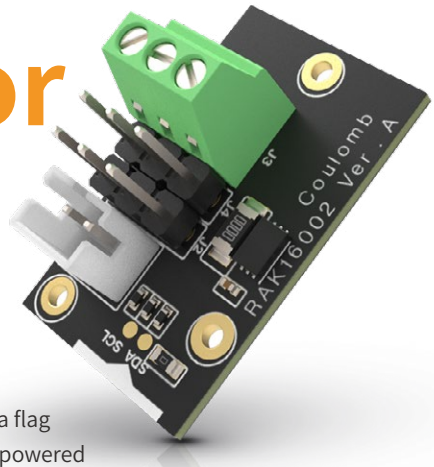
Comes with a 40-pin WisBlock I/O connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Specifications	
Chipset	INA219BID
Measurement parameters	DC current: 0 ~ 3 A DC voltage: 0 ~ 26 V
Supply voltage	3.3 V
Storage temperature	-40°C ~ 125°C
Interface	I^2C
Module size	15 x 25 mm

- Servers
- Telecom Equipment
- Power Management
- Welding Equipment
- Power Management

RAK16002

Coulomb Sensor Module



RAK16002 is a Coulomb sensor module based on LTC2941IDCB that features programmable high and low thresholds for the accumulated charge. If a threshold is exceeded, the device communicates an alert by setting a flag in the internal status register. It can measure the battery charge state in battery-powered IoT devices. Its operating range is perfectly suited for single-cell Li-Ion batteries.

- Low power consumption
- Indicates Accumulated Battery Charge and Discharge
- High Accuracy Analog Integration
- 1% Charge Accuracy
- Configurable Alert Output/Charge Complete Input

Alarm Output Configuration

Supports programmable high and low thresholds of accumulated charge, once exceeded, the module then communicates the alert via a flag set in the internal status register.

High Accuracy Analog Integration

±1 A sensing current range, 1% charging accuracy.

Low Power Consumption

Supports solar/lithium battery power supply, which is controlled by WisBlock Core through the I/O interface. The quiescent current is less than 100 μA in low power mode.

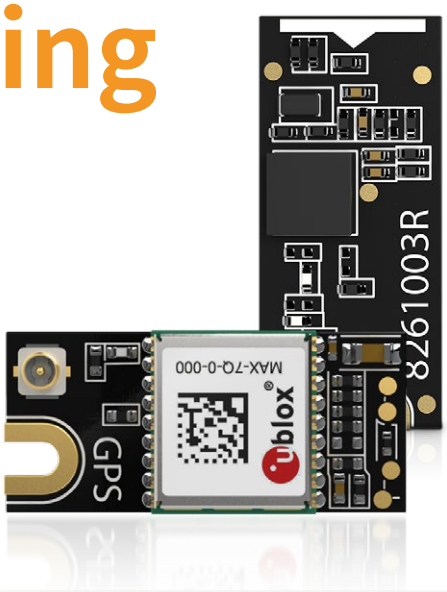
Easy to Configure and Manage

Supports Arduino, VSCode platform compilation. Supports easy management and monitoring of battery charging status through WisGateOS.

Specifications	
Chipset	LTC2941IDCB
Sensing current range	±1 A
Accuracy	1%
Supply voltage	2.7 ~ 5.5 V
Supply current	120 mA
Operating temperature	-40°C ~ 85°C
Storage temperature	-65°C ~ 150°C
Interface	I^2C
Module size	15 x 25 mm

- Low Power IoT Products
- Indoor Environment Sensors
- Air Quality Sensors
- Soil moisture sensors
- GNSS position trackers

GNSS Positioning Module



The GNSS positioning module supports multiple satellite data protocols and retrieves precise position information, including two versions of RAK1910 GNSS positioning module and RAK12500 GNSS positioning module, which can be used to retrieve data information such as latitude, longitude, altitude, ground speed and satellite navigation.

- High accuracy
- High sensitivity
- Quick positioning repair
- Cold start support

Quick Start

It takes only 29 seconds from cold boot to initial fix position, and 1 second from warm boot.

High Precision

The speed accuracy of RAK1910 and RAK12500 can reach ± 0.1 m/s and ± 0.05 m/s respectively, and the positioning accuracy can reach ± 2.5 m.

Easy to Configure

Supports Arduino, VSCode platform compilation. Supports easy management and monitoring of location information through WisGateOS.

Easy Installation

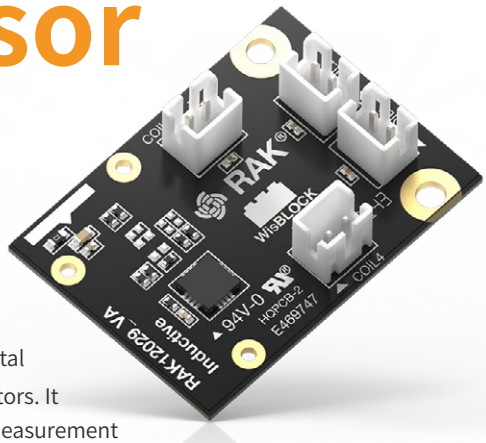
Comes with a 24-pin WisSensor connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Specifications		
Model	RAK1910	RAK12500
Chipset	u-blox MAX-7Q	u-blox ZOE-M8Q
Measuring parameters	longitude, latitude, altitude, speed, direction, Date/time	longitude, latitude, altitude, speed,Direction (heading), SIV (satellite navigation)
Satellite data protocol	GPS/GLONASS	GPS/GLONASS/QZSS/Beidou
Positioning accuracy	±2.5 m	
Speed accuracy	± 0.1 m/s	± 0.05 m/s
Interface	UART	I^2C/UART
Power supply	2.7 ~ 3.6 V	
Backup battery current	15 µA	
Update rate	10 Hz	
Module size	10 x 23 mm	

- High precision mapping
- GPS retrieval, car navigation
- Mobile target monitoring, tracker
- Wearable devices

RAK12029

Inductive Sensor Module



RAK12029 is a metal detection sensor module based on the LDC1614 from Texas Instruments. The LDC1614 is an inductance-to-digital converter (LDC) that measures the oscillation frequency of four LC resonators. It outputs a digital value, that is, proportional to frequency, with 28 bits of measurement resolution. With this digital value, you can detect the presence of metallic objects.

- 28-bit LDC
- High Resolution
- our channels Sensing coils
- Supports internal or external reference clocks
- Resistant to DC magnetic fields and magnet interference

28-bit Measurement Resolution

After the sensor measures the oscillation frequency of the LC resonator, it outputs a value proportional to the frequency with a measurement resolution of 28 bits, which can be used by the user to detect the presence of metal objects.

4 Channels Induction Coils

Supports up to 4 independent channels of induction coil. Users can select the number of connected coils.

Optional Clock Oscillator

Optional clock oscillator for external 40 MHz clock source for RAK12029, which uses a built-in crystal oscillator by default.

Easy to Use

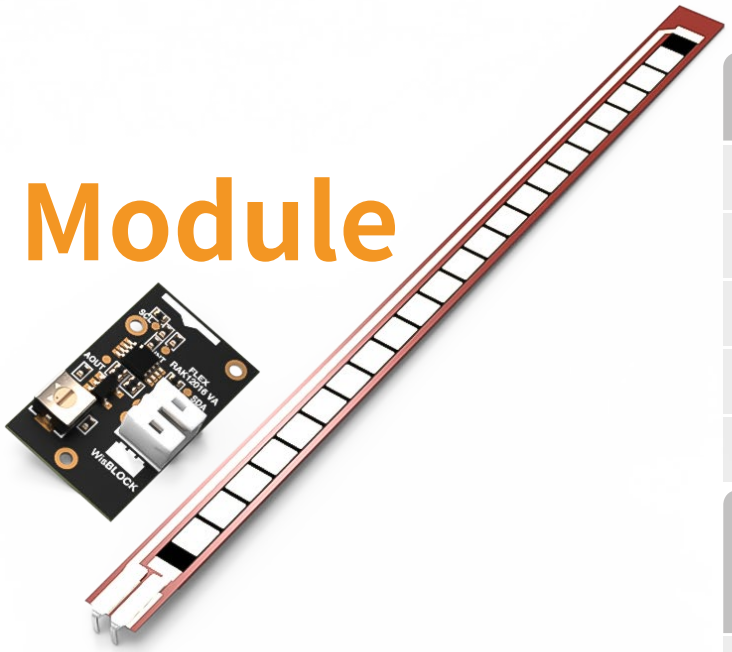
Low configuration requirements. Easy to use. It can start working when the sensor frequency is within the range of 1 KHz to 10 MHz.

Specifications	
Chipset	LDC1614
Detection parameters	Metal module
Supply voltage	3.3 V
Power supply current	Operating mode: 2.1 mA
	Sleep mode: 35 µA
	Shutdown mode: 0.2 µA
Interface	I^2C
Module size	25 x 35 mm

- Food processing
- Chemical industry
- Packaging
- Textile
- Pharmaceuticals

RAK12016

Flex Sensor Module



RAK12016 is a flex sensor module. It uses an FS-L-0095-103-ST from Spectrasymbol, which can measure the amount of deflection or bending.

- High accuracy
- ADC gain
- Support self-calibration function

Self-Calibration

Allows users to calibrate the device by changing parameters in the program according to the actual resistance value of the sensor, after using FS-L-0095-103-ST for the first time or after long-term use.

Easy to Configure and Manage

Supports Arduino, VSCode platform compilation, easy management and monitoring of sensor data through WisGateOS.

Easy to Install

Comes with a 40-pin WisBlock I/O connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Watchdog

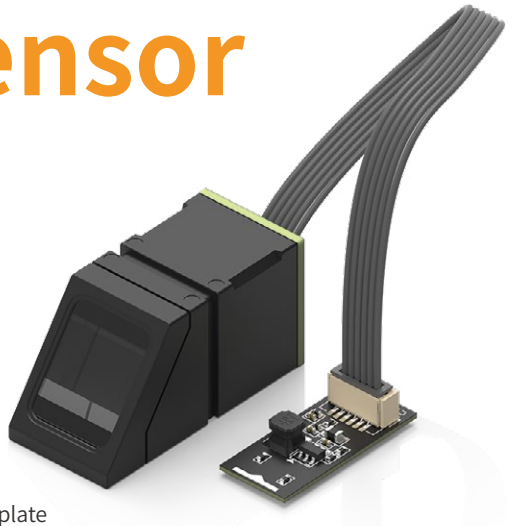
ADC with an I²C interface that provides a watchdog function to ensure that the input voltage remains within the limits set in the registers.

Specifications	
Chipset	FS-L-0095-103-ST
Measuring range	1° ~ 180°
Accuracy	1°
Power supply	3.3 V
Storage temperature	-35°C ~ 80°C
Interface	I²C
Module size	15 x 25 mm

- Robotics
- Virtual Motion
- Music Devices
- Energy Glove Application

RAK12001

Fingerprint Sensor Module



The RAK12001 is a fingerprint sensor module based on GROW R307. This module supports both fingerprint enrollment and fingerprint matching. When enrolling, it is required to place the finger two times in the sensor. The system will process the fingerprint images collected and generate a template, then store the fingerprint template in its memory. When matching, the sensor will determine if the finger placed in its optical sensor has a match on its memory.

- Window dimension: 19 mm x 21 mm
- Character file size: 256 bytes
- Scanning speed: < 0.3 second
- Verification speed: < 0.2 second
- built-in 5 V boost converter

Easy to Install

Simply connect the GROW R307 optical sensor to the RAK12001 module through a cable, and then integrate it into a solution easily through the RAK12001 WisBlock connector.

High Precision and Image Processing Performance

Professional optical technology, precise module manufacturing process. Good image processing ability, which can capture images with resolution up to 500 dpi.

Specifications	
Chipset	GROW R307
Interface	UART
Operating voltage	3.3 V
Operating current	50 mA
Module size	10 x 23 mm

- Access Control
- Attendance
- Safe deposit box
- Car door lock

RAK12018

Code Scanner Module

RAK12018 WisBlock Code Scanner Module is a WisBlock Interface module capable of scanning 1D or 2D codes. It uses the LV3296 scanner module from RAKINDA that works on bar codes, QR, and other standard 1D/2D codes.

- Uses RAKINDA LV3296 scanner module
- Read 1D and 2D Barcodes

Versatile for Various Applications

It can read all kinds of mainstream barcodes and QR codes, suitable for various code-scanning applications.

Flexible installation, suitable for different enclosures

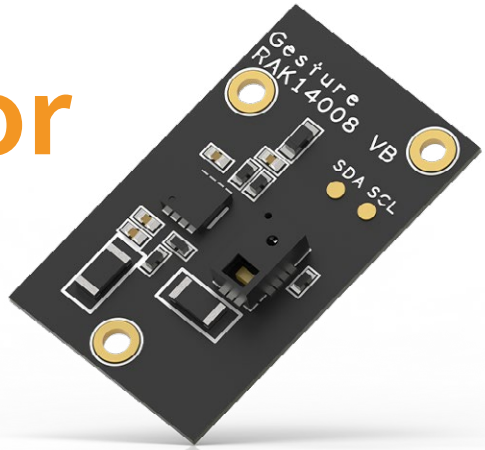
LV3296 can be connected to the RAK12018 main circuit board through flexible cables to cater for different cabinet configurations. It can also be installed directly on the RAK12018 circuit board, making it small and compact for installation.

Specifications	
Chipset	RAKINDA LV3296
Interface	UART
Operating voltage	3.3 V
Operating current	Max. value: 168 mA Typical value: 100 mA
Standby current	8.1 mA
Sleep current	100 µA
Module size	25 X 36.4 mm

- Flat Panel Devices
- Medical diagnostic and analytical equipment
- Paper screen code POS data collectors
- Handheld/portable and fixed barcode capture

RAK14008

Gesture Sensor Module



RAK14008 is a gesture sensor module based on PAJ7620U2. It is designed for gesture recognition applications with an I²C digital interface. It can recognize nine (9) human hand gesticulations such as moving up, down, left, right, forward, backward, circle-clockwise, circle-counter clockwise, and waving. It also offers built-in proximity detection in sensing approaching or departing objects from the sensor.

- Built-in proximity detection
- Gesture speed:60-600 ° /s in Normal Mode 60-1200 ° /s in Gaming Mode
- Flexible power-saving scheme
- Ambient light immunity
- Ambient light noise cancellation
- I²C interface up to 400 kbit/s

Adaptable

Embedded infrared LEDs and optical lenses enable it to work in low light and even in a dark environment with high usability.

Integrated MP20051 Voltage Regulator

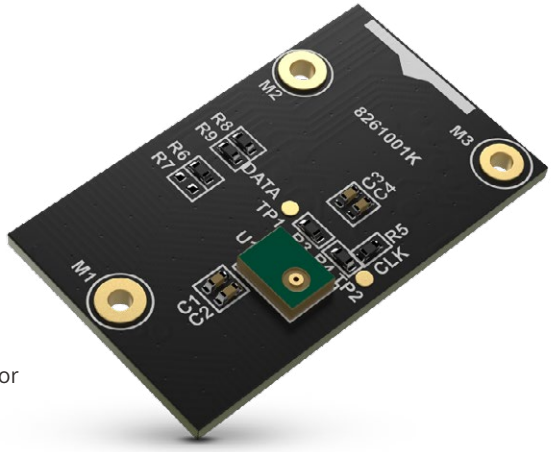
An externally adjustable output voltage from 2.5 V to 5.5 V is available. It is equipped with low-power shutdown protection, short-circuit protection, thermal protection, and features low acoustic noise.

Specifications	
Chipset	PAJ7620U2
Interface	I²C
MP20051 Power Supply (VBAT)	2.5 ~ 5.5 V
PAJ7620U2 power supply (3V3_S)	2.8 ~ 3.3 V
Current consumption in power-off mode	5 µA
Acoustic overload point	122.5 dBSPL
Signal-to-noise ratio	64 DB
Input clock frequency	1.2 ~ 3.25 MHz
Operating temperature	-40°C ~ 85° C
Storage temperature	-40°C ~ 125° C
Module size	25 x 15 mm

- Smart Home
- Office and Teaching
- Human-computer interaction, gesture toys and home sensory play devices

RAK18000

PDM Stereo Microphone Module



The RAK18000 is a digital microphone module based on two MP34DT06J microphone modules. It is designed to detect sounds and to support left and right channels. It is also capable of changing microphone orientation on the left or right channel through the switch resistor.

- 64 dB signal-to-noise ratio
- –26 dBFS ± 1 dB sensitivity
- Stereo microphone 2 x MP34DT06J
- Low power consumption
- Standard 40-pin connector

Small in Size

Ultra-compact, low-power consumption for small scale IoT solutions.

Low Distortion, High Sensitivity

Low-distortion digital microphone with a signal-to-noise ratio of 64 dB, and a sensitivity of –26 dBFS±1 dB.

Specifications	
Chipset	ST MP34DT06J
Interface	I^2C
Operating voltage	3.3 V
Current consumption in normal mode	650 µA
Current consumption in power-off mode	5 µA
Acoustic overload point	122.5 dBSPL
Signal-to-noise ratio	64 dB
Input clock frequency	1.2 ~ 3.25 MHz
Operating temperature	-40°C ~ 85°C
Module size	25 x 15 mm

- Mobile terminals, laptops, portable media players
- VoIP and voice recognition, A/V e-learning devices
- Gaming and virtual reality input devices
- Digital cameras and camcorders
- Anti-theft systems

RAK13011

Magnetic Switch Sensor Module

RAK13011 is a Magnetic Switch Sensor module, part of the WisBlock Sensor Series. This sensor is essentially a reed switch assembly consisting of a magnet and a reed switch whose contacts are normally open. The contacts close when the magnet is less than 13 mm away. Its switch is not affected by nearby (5 cm distance) located electrical motors. The reed switch and magnet are housed in durable ABS plastic and can easily mount to most surfaces with screws. They can also be mounted by using double-sided foam tape.

- Standard screw fastening reed sensor with cable termination
- Single GPIO interface
- 3.3 V power supply
- Operating temperature: -40°C ~ 85°C

Wide Applications

Ideal for applications related to the opening and closing status of windows and doors, or even for the passage of objects in a production line.

Easy Wire Removal

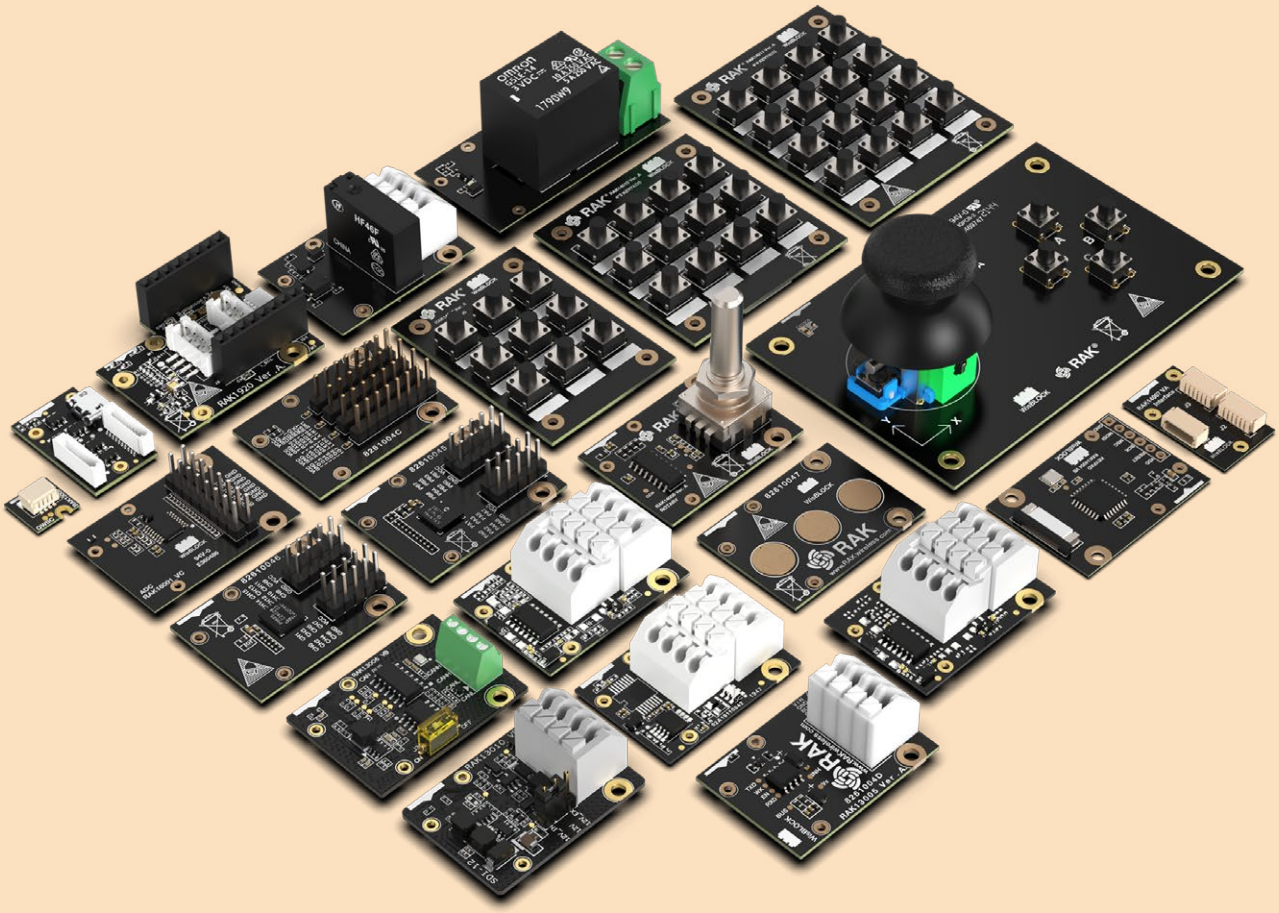
Push-in termination of solid wires on the module, easy wire removal via the operating tool

Specifications	
Power Supply Voltage	3.3 V
Operating temperature	-40°C ~ 85°C
Module size	10 x 23 mm

- Door & Window Contacts
- Pneumatic or Hydraulic Actuator Position Indication & Others

WisBlock Interface Module

53-70



WisBLOCK

Interface

RAK13001

Relay I/O Module

RAK13001 is a WisBlock Interface module which extends the WisBlock system to be used on isolated digital input and output applications. There is one digital output that is isolated by an electromechanical relay and one digital input isolated by an opto-couple. The isolated input can be configurated as wet contact (default mode) or dry contact. RAK13001 digital output is used to programmatically switch on/off devices operating at high voltage or current applications.

- One relay isolated output
- One opto-couple isolated input
- The input supports wet contact(default mode) or dry contact
- The isolation between internal and external is up to 2500 VDC
- The output of relay supports 30 VDC/2 A rating
- The input of opto-couple supports 12-24 V

Controllable Switch

With programmable functions, based on the set program. When certain conditions are met, the circuit can be freely controlled to meet the application requirements.

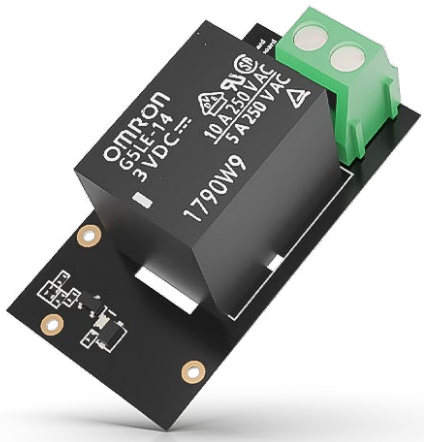
Application Diversification

An automatic switching component with isolation function, used in remote control, communication, automatic control, mechatronics and power electronic equipment.

Specifications	
Model	RAK13001 Relay I/O Module
Chipset	HONGF HF46F
Operating voltage	3.3 V
Closing current	1 μA
Supply current at relay closed	70 mA
Max AC switching voltage(Relay Output)	130 V
Max DC switching voltage(Relay Output)	30 V
Max switching current(Relay Output)	2 A
Contact resistance(Relay Output)	100 mohm
Isolation voltage(Relay Output)	4000 VDC
DC Input Voltage(Optocoupler input)	12 ~ 24 VDC
Input Current(Optocoupler input)	Max.: 50 mA
Isolation Voltage(Optocoupler input)	2500 Vrms
Module size	25 x 35 mm

RAK13007

Relay Module



RAK13007 is a WisBlock Interface module that extends the WisBlock system to be used on isolated digital output applications.
There is one digital output that is isolated by an electromechanical relay. The RAK13007 digital output is used to programmatically switch on/off devices operating at high voltage or high current applications.

- One relay isolated output
- The isolation between internal and external signal is up to 2,500 VDC, 50/60 Hz for 1 min
- Inductive Load: 250 VAC / 5 A and 30 VDC / 4 A
- Resistive Load: 150 VAC / 105 A and 30 VDC / 8 A

Specifications			
Model	AK13007 Relay module	**Insulation Distance**	Creepage (Typ): 3.3 mm Clearance (Typ): 2.7 mm
Contact Resistance	100 mΩ	**Shock Resistance**	Max. 50 mA
Operate Time	Max. 10 ms	**Isolation voltage (Optocoupler input)**	Destruction: 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude) Malfunction: 10 to 55 to 10 Hz, 0.75 mm single amplitude (1.5 mm double amplitude)
Release Time	5 ms max.	**Shock Resistance**	Destruction: 1,000 m/s^2 Malfunction: 100 m/s^2
Bounce Time	Operate: Approx. 0.6 ms Release: Approx. 7.2 ms	**Endurance**	10,000,000 operations min. (at 18,000 operations/hr) Electrical: 100,000 operations min. (at 1,800 operations/hr) for standard type 36,000 operations min. (10 A at 250 VAC) 100,000 operations min. (at 1,800 operations/hr), 12 A at 250 VAC - applicable for G5LE-1-E, NO contact only
Max. Switching Frequency	Mechanical: 18,0000 operations/hr Electrical: 1,8000 operations/hr at rated load		
Insulation Resistance	100 MΩ min. at 500 VDC		
Dielectric Strength	2,000 VAC, 50/60 Hz for 1 min between coil and contacts 750 VAC, 50/60 Hz for 1 min between contacts of the same polarity 1,500 VAC (for suffix -G) 1 min between contacts of the same polarity	**Ambient Temperature**	Operating: -40°C to 85°C (with no icing)
Impulse Withstand Voltage	4,500 V (1.2 x 50 us) between coil and contacts	**Module size**	25 x 48 mm

RAK14013

Joystick Module

The RAK14013 is a joystick module with embedded MCU based on ATTINY441-SSU from Atmel. It has four common tactile push buttons and a rotary 2-axis analog joystick. The status of the buttons and voltage readings of an analog joystick is monitored by the MCU and converted to digital data via I^2C interface.

- With tactile button
- 2 axis analog joystick
- Requires combination with RAK14007 interface module

Wide Applications

Equipped with tactile buttons and 2-axis analog joystick to meet users' diverse solutions.

High Degree of Freedom

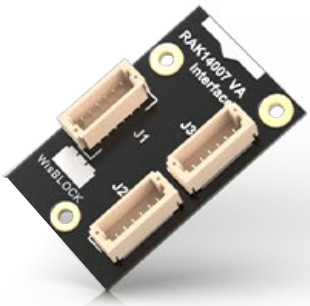
No standard WisBlock connector to be fixed on the baseboard. Connected via cable and can be operated freely in various scenarios.

Specifications	
Model	RAK14013 Joystick Module
Embedded MCU	Atmel ATTINY441-SSU
Interface	I^2C
Operating voltage	3.3 V
Module size	54 x 85 mm

- Mobile devices
- Industrial Controls
- Robotics
- Manipulators
- Movable devices

RAK14007

Interface Module



RAK14007 is an Interface module for connecting other WisBlock modules(like RAK14013) to the WisBlock system. It has one standard WisBlock IO connector and one connector(FWF10002-6P) for other WisBlock modules.

- separate joystick PCB module RAK14013 is required
- With standard 40-pin connector

Specifications	
Model	RAK14007 Interface Module
Module size	25 x 15 mm

Easy to Install

Connected through the cable to the baseboard, making its solution more flexible.

RAK14002

Touch Sensor Module

The RAK14002 Touch Sensor module is a 3-channel Capacitive Touch Sensor. This module is based on the Microchip CAP1293 Capacitive Touch Sensor, and it has a ready to use SW library and tutorial makes it easy to build a touchpad, swipe detector.

- Three (3) Capacitive Touch Sensor Inputs
- Low Power Operation standby mode
- Programmable sensitivity
- Multiple Button Pattern Detection
- Automatic recalibration

Automatic Recalibration

Each sensor input is calibrated to compensate for system parasitic capacitance and is automatically recalibrated to compensate for environmental changes.

Low Power Consumption

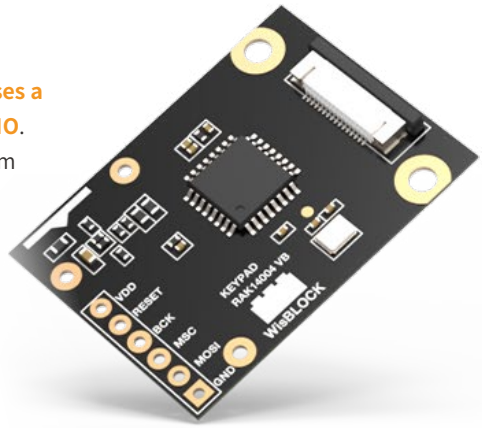
Supports low power consumption mode. The quiescent current is 50 µA in standby mode.

Specifications			
Model	RAK14002 Touch Sensor Module	**Capacitive Sensing Active**	Max. 750 µA Nom. : 500 µA
Chipset Microchip	Microchip CAP1293	**Deep Sleep State current**	5 µA
Interface	I^2C	**Standby state active 70 ms cycle time**	Max. 170 µA Nom. : 120 µA
Operating Voltage	3.3 V	**Standby state active 140 ms cycle time**	50 µA
Power-On reset voltage	Max. : 1.3 V Nom. : 1 V	**Operating temperature**	–40°C ~ 125°C
		Module size	25 x 35 mm

Mobile devices Industrial controls Robots, manipulators and movable devices

RAK14004

Keypad Module



The RAK14004 module is designed as an IO extension module that uses a matrix scanning technique to support more buttons with limited GPIO. The scan and keys control is performed by an ATMEGA328PB-AU MCU from Microchip. This module can be used in conjunction with RAK14009, RAK14010, or RAK14011 keypad modules. The maximum number of buttons supported is 8 x 8 = 64 buttons.

- Up to 8 x 8 buttons using scan matrix arrangement
- Keystroke recognition and message upload
- Standard 40-pin connector

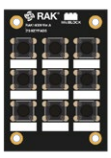
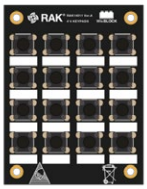
Specifications	
Model	RAK14004 Keyboard Module
Chipset Microchip	Microchip ATMEGA328PB-AU
Interface	I^2C
Operating voltage	3.3 V
Module size	25 x 35 mm

- Games
- Office
- Computer

RAK14009/RAK14010/RAK14011

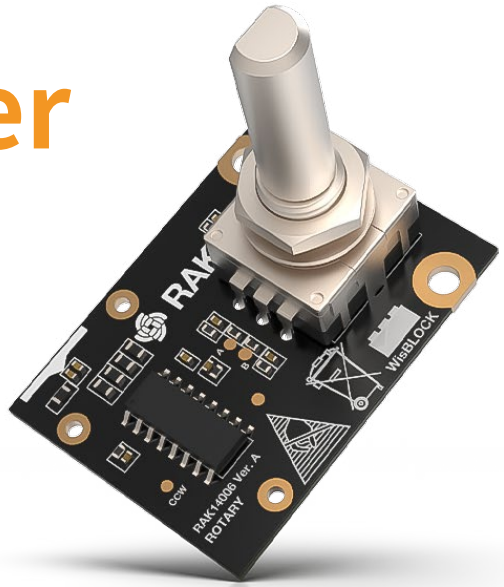
Matrix Button Module

The matrix button module is a set of 3 x 3, 3 x 4 and 4 x 4 button matrices that can be used with the RAK14004 keypad module to build solutions with different application specifications. We offer three button matrix products for users, including RAK14009, RAK14010 and RAK14011.

Model	RAK14009 3 x 3 Matrix Button Module	RAK14010 3 x 4 Matrix Button Module	RAK14011 4 x 4 Matrix Button Module
Module			
Module size	33 x 45 mm	43 x 44.99 mm	43 x 55 mm
Matrix Specifications	3 x 3 Matrix Buttons	3 x 4 Matrix Buttons	4 x 4 Matrix Buttons

RAK14006

Rotary Encoder Module



The RAK14006 is a rotary encoder module with PEC11L-4125F-S0020 from BOURNS. RAK14006 can detect user inputs such as rotation direction and rotation number of steps. Also, an independent push switch is provided for the user.

- Rotary Encoder with an independent push switch
- Standard 40-pin connector

Independent Switch

Built-in independent switch to control the activation of the module, which is more operable.

Rotation Signal Detection

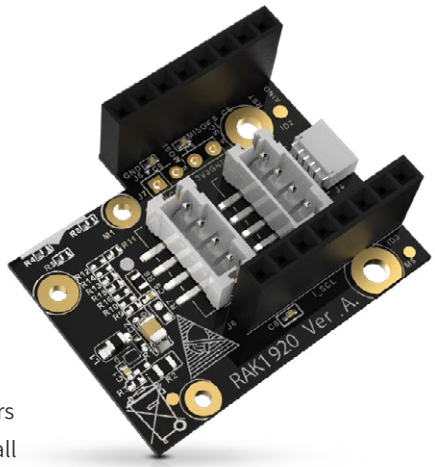
Accurate detection of rotation direction and rotation complement to ensure data reliability.

Specifications	
Model	RAK14006 Rotary Encoder Module
Chipset	BOURNS PEC11L-4125F-S0020
Power Supply	3.3 V
Revolutions Per Minute(RPM)	60 RPM(Max.)
Detent Numbers	20 detents
Rotational Life	100,000 cycles
Modue Size	25 x 35 mm

- Liquid Level Control
- Tuning and Timer Settings
- Audiovisual Equipment
- Household Appliances
- Environmental Control

RAK1920

Sensor Adapter Module



The RAK1920 module, a part of the WisBlock Interface series, is a sensor extension module, which extends the WisBlock system with an adapter board to connect Click Boards (MikroElektronika), QWICC (Sparkfun) based and Grove (Seeed) based sensors to WisBlock. It supports several defacto-standard interfaces in the IoT market and allows you to integrate sensors manufactured by Mikroe, SparkFun, SeeedStudio, and others. Also, it supports all kinds of I²C module digital I/O, UART, and ADC sensors with a Grove ™ interface.

- Interface to all Click Boards of Mikroe
- Interface to all Qwiic sensors of SparkFun
- Interface to all I²C and Digital I/O sensors of Grove
- Interface to UART and ADC sensors options of Grove
- Reserved I²C interface
- 3.3 V and 5 V sensors options

Multiple Interfaces

Supports several standard interfaces in the IoT market and allows you to integrate sensors manufactured by Mikroe, SparkFun, SeeedStudio, and others.

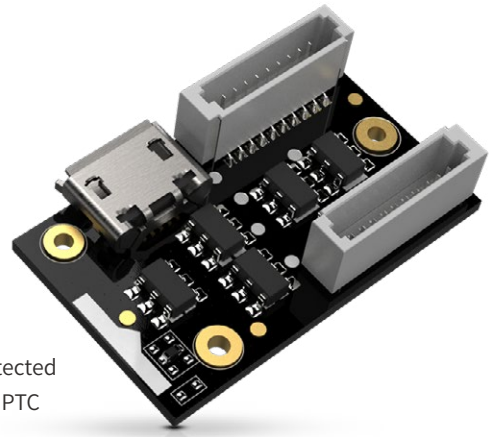
Reserved I²C Interface

Supports all kinds of I²C module digital I/O, UART, and ADC sensors with a Grove ™ interface.

Specifications		
Model	RAK1920 WisBlock Sensor Adapter Module	
Interface	Mikroe Click Boards Interfaces Grove Sensor Interfaces Qwiic Sensor Interface Reserved I²C Interfaces	
Absolute Maximum Ratings	**Power Supply for the Module**	-0.5 ~ 4.2 V
	Boost converter output current	50 mA
Recommended Operating Conditions	**Power Supply for the Module**	2.6 ~ 4.2 V
	3.3V Power Supply	3.3 V
	5.5 V Power Supply	5.0 V
Module Size	30 x 36 mm	

RAK5804

Interface Extension Module



RAK5804 is designed as an IO extension module that allows you to connect your digital or analog devices or sensors to create a customized IoT solution. These sensors are connected through two expansion connectors: J2 and J3. In order to provide power to peripheral devices, 3.3 V can be obtained from these expansion connectors. Internal protections allow to shut down the power supply when a short circuit is detected in the peripheral devices. Overcurrent cases are protected through internal PTC thermistors in the power supply circuit.

- Supports two (2) pieces of 10-pin IO extension connectors
- Supports one (1) USB connector to access WisBlock Core Module
- IO Connector
- TVS protected circuits
- PTC thermistor to prevent output power overload

Compatible with Various Interfaces

Variety of interfaces, such as USB/ I^2C/serial port/digital & analog I/O, etc., providing more possibilities for integrating WisBlock IoT solutions. It also supports connecting with WisBlock Base (with power socket) to access its MCU.

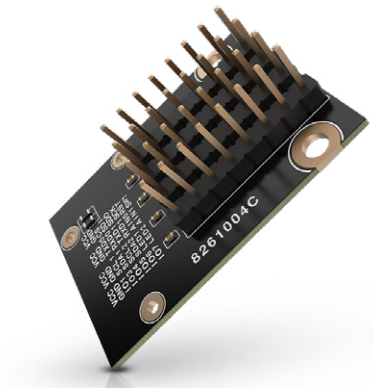
High Security

Internal protection shuts down the power supply when a short circuit is detected in the peripheral devices. Overcurrent cases are protected through internal PTC thermistors in the power supply circuit.
All external expansion interfaces of the RAK5804 module are equipped with TVS protection circuit to avoid damaging the mainboard and WisBlock Core circuit with ESD when users plug in or unplug to the expansion interfaces.

Specifications		
Model	RAK5804 WisBlock Interface Extension Module	
Interface	1 USB port, 2 I^2C port, 1 Serial port, 4 Digital IO, 1 Analog input port, 2 LED outputs, 1 Button input	
Absolute Maximum Ratings	**Power Supply for the Module**	-0.5 ~ 4.2 V
	3.3 V Power Supply	-0.5 ~ 3.6 V
	PTC Protection Current	500 mA
	Working Temperature	-30°C ~ 65°C
	Storage Temperature	-40°C ~ 85°C
Recommended Operating Conditions	**Power Supply for the Module**	2.6 ~ 4.2 V
	3.3V Power Supply	3.0 ~ 3.6 V
Module Size	25 x 15 mm	

RAK13002

I/O Module



The RAK13002 is a WisBlock Core adaptor module that can be mounted to the IO slot of the WisBlock Base board. This module exposed all WisBlock Core signals such as I²C, SPI, UART, GPIO, and ADC to standard 2.54 mm pitch pin header for easy integration of external components and devices.

- Supports two I²C interfaces
- Supports two UART interfaces
- Supports one SPI interface
- Supports up to six (6) GPIOs
- Supports two (2) ADC interfaces
- Backup battery (super cap) can keep the RTC running for up to 7 days (tested in lab)

Multiple interfaces

Supports multiple interface types, such as I²C/ UART/SPI/GPIO/ADC, etc.

Long Battery Life

Built-in backup battery (super cap) can keep the RTC running for up to 7 days (tested in lab)

Specifications			
Model	RAK13002 WisBlock IO Module		
Interface	Two I²C interfaces Six GPIOs	Two UART interfaces Two ADC interface	One SPI interface One 3.3 V power supply interfcae
Power supply	3.3 V		
Module Size	25 x 35 mm		

RAK13003

I/O Expansion Module

The RAK13003 is an IO expansion module that can be mounted to IO slot of WisBlock Base board. It offers 16 bidirectional I/O ports by using MCP23017 IC from Microchip. The configuration of the module is via I²C interface and it supports both standard and fast I²C modes.

- 16-Bit Remote Bidirectional I/O Port
- High-Speed I²C Interface
- Configurable Interrupt Output Pins
- INTA and INTB can be configured to operate independently or together
- External Reset Input
- Low Standby Current: 1 µA (max.)

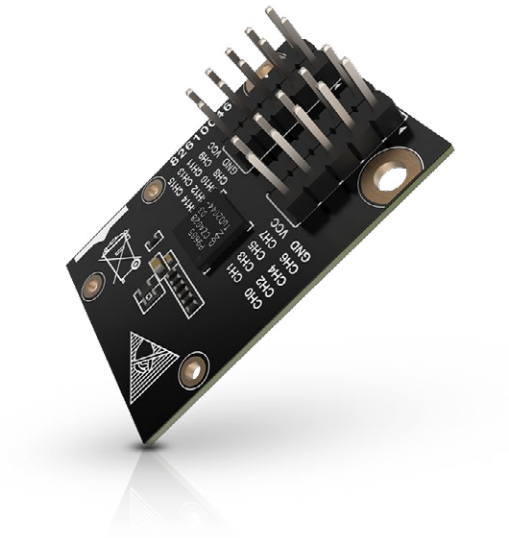
Specifications			
Model	RAK13003 WisBlock IO Expansion Module	**Standby current**	1 µA
Chipset	Microchip MCP23017	**Supply current**	1 mA
Power supply for the module	2.7 V ~ 5.5 V	**Operating Temperature**	-40°C ~ 85°C
Interface	I²C interface	**Module Size**	25 x 35 mm

16-bit Bidirectional I/O Port

Multiple bidirectional I/O ports providing more options for WisBlock solutions.

RAK13004

PWM Expander Module



The RAK13004 is a PWM expander module that can be mounted to the IO slot of WisBlock Base board. It can be controlled 16-channel LED, and the module uses PCA9685 from NXP, I²C interface.

- 16 LED drivers connector
- 1 MHz Fast-mode Plus compatible I²C-bus interface
- 4096-step (12-bit) linear programable brightness per LED
- LED output frequency typically varies from 24 Hz to 1526 Hz
- Supports hot insertion
- Low Standby Current
- 5.5 V tolerant inputs

Wide Applications

16 LED driver connectors, programmable to configure LED display, custom solutions.

Stable

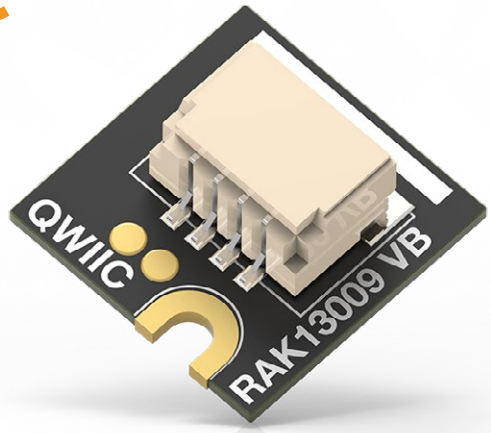
Hot insertion capable and 5.5 V tolerant inputs

Specifications	
Model	RAK13004 WisBlock PWM Expander Module
Chipset	NXP Semiconductors PCA9685
Interface	I²C
Power Supply	3.3 V
Supply Current	6 mA(Nom.), 10 mA(Max.)
Standby Current	2.2 µA(Nom.), 15.5 µA(Max.)
Power-on Reset Voltage	1.7 V
Operating Temperature	-40°C ~ 85°C
Module Size	25 x 35 mm

- RGB or RGBA LED drivers
- LED status information
- LED displays

RAK13009

QWIIC Module



The RAK13009 is a QWIIC module, which is a part of the RAKWireless WisBlock Interface series. This module has two connectors: one for the WisBlock sensor and then for the standard QWIIC interface. By using this module, you can plug any QWIIC interface module into the WisBlock sensor and use it just like any other WisBlock sensor.

- Standard QWIIC interface
- Small and Compact

Standard QWIIC Interface

Meets the needs of integrating sensors with QWIIC interface into WisBlock solutions to offer users with customized solutions.

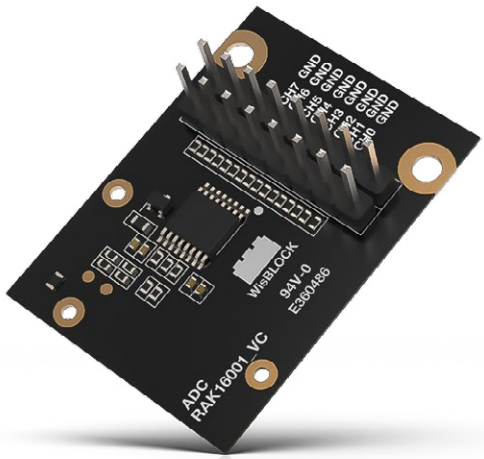
Small and Compact

Supports standard WisBlock Sensor connectors and can be installed in the WisSensor slot in WisBlock baseboard, which is easy and convenient to operate. Small size design is suitable for solutions with limited deployment space.

Specifications	
Model	RAK13009 WisBlock QWIIC
Interface	QWIIC interface, 24-pin WisSensor Connector, I^2C
Max Current on a QWIIC Cable	226 mA
Module Size	10 x 10 mm

RAK16001

ADC Module



The RAK16001 is an Analog-to-Digital (ADC) module, which uses an ADS7830 from Texas Instruments that can measure 8-independent voltages or 4-independent differential voltages. The ADS7830 is an 8-bit ADC module that features a serial I^2C interface and an 8-channel multiplexer with one sample-and-hold amplifier circuit.

- ADC Module: 8 Single-ended inputs or 4 Differential inputs
- 70 kHz sampling rate
- ±O.5 LSB INL/DNL
- 8 Bits no missing codes

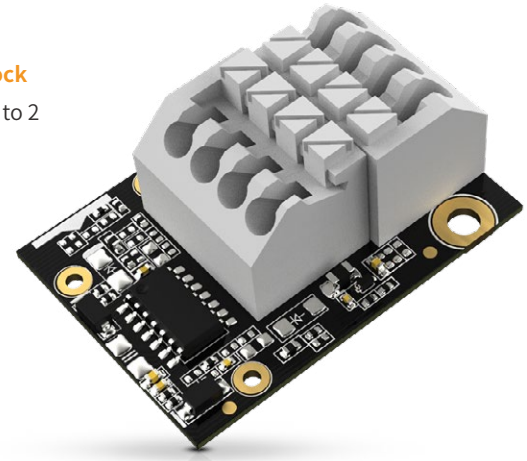
Specifications	
Model	RAK16001 WisBlock ADC Module
Chipset	Texas Instruments ADS7830
Interface	I^2C
Operating Voltage(VDD)	3.3 V
ADC Voltage Reference(VREF)	2.5 V
Full-Scale Input Scan (Positive Input – Negative Input)	0 ~ VREF V
Absolute Input Range(U2) (Positive Input)	-0.2 ~ VDD + 0.2 V
Absolute Input Range(U3) (Negative Input)	-0.2 ~ 0.2 V
Module Size	25 x 45 mm

RAK5801

4 ~ 20 mA Interface Module

RAK5801 is a WisBlock Interface module that extends the WisBlock system with 4-20 mA current to voltage converter. It supports up to 2 4-20 mA interfaces and voltage supply for connected sensors.

- 4 to 20 mA current to voltage converter.
- Two 4-20 mA analog inputs
- 0.1 mA conversion accuracy
- 12 V output to power external sensors
- Fast crimping terminals
- Reserved I^2C expansion interface
- Designed with a 2 kV ESD protection level



Easy to Install

The use of crimp terminal connectors is easy to operate and can simplify the field deployment operation

Low Power Consumption

Supports low power consumption mode. The module can be powered by the WisBlock Core module to save energy during idle periods.

Specifications			
Model	RAK5801 WisBlock 4-20mA Interface Module	**Operational Amplifier Gain**	3.0
Analog Sampling Resolution	0.005 mA	**Input Voltage**	3.0 ~ 3.6 V
Analog Sampling Accuracy	1%	**Output Voltage**	12 V
Analog Maximum Input Current	25 mA (There is a risk to burn the circuit surpassing this limit.)	**Output Current**	Maximum 30 mA
		Operating Temperature	-30°C ~ 65°C
Analog Port ESD Protection Level	2 kV HBM	**Storage Temperature**	-40°C ~ 85°C
Current Sampling Resistor	49.9 Ω	**Module Size**	35 x 25 mm

RAK5802

RS485 Interface Module

RAK5802 is a WisBlock Interface module, which extends the WisBlock system with an industry standard RS485 to serial converter. It supports one RS485 port and voltage supply for connected sensors.

- RS485 interface and Modbus protocol
- Compatible with multiple WisBlock Core modules, such as RAK4631
- Reserved I^2C expansion interface
- In the field fast crimping terminals
- Designed with 18 kV ESD protection level
- Supports TX/RX signals automatic detection, no need to have DE signal for the RS485 chip.
- Supports up to 16 RS485 nodes

Easy to Install

Easy-to-handle crimp terminal connectors simplify field deployment.

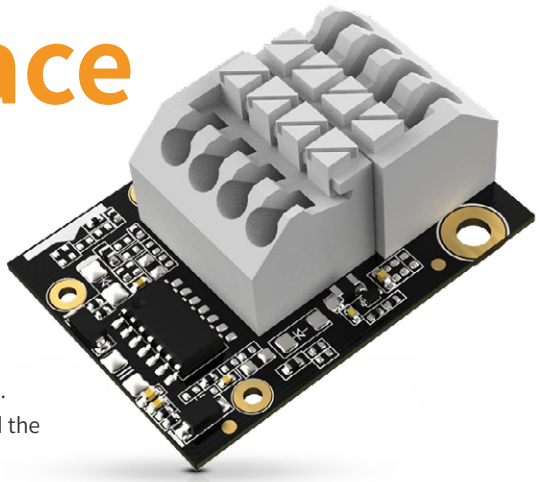
Low Power Consumption

Power supply can be controlled by the WisBlock Core MCU to reduce power consumption.

Specifications	
Model	RAK5802 WisBlock RS485 Interface Module
Chipset	3PEAK TP8485E
Absolute Maximum Ratings	Power supply for the module -0.5 ~ 4.2 V
Step down IC output current	1000 mA
Working temperature	-30°C ~ 65°C
Storage Temperature	-40°C ~ 85°C
3.3 V power supply	3.0 ~ 3.6 V
Module Size	35 x 25 mm

RAK5811

0 ~ 5 V Interface Module



The RAK5811 is a 0-5 V analog input interface module. The signal is routed through the IO bus to the WisBlock Core module. Inside of the WisBlock Core module, the MCU digitizes the signal and the sampled data is transmitted, for example, via a LoRa® transceiver.

- Two 0-5 V analog input channels
- 10 mV conversion accuracy
- Reserved I^2C expansion interface
- 12 V output to power external sensors
- Fast crimping terminal to easily connect external components on the field
- Designed with a 2 kV ESD protection level

Easy to Install

Easy-to-handle crimp terminal connectors simplify field deployment

Low Power Consumption

Supports low power consumption mode. Powered by WisBlock Core module for saving energy during idle periods.

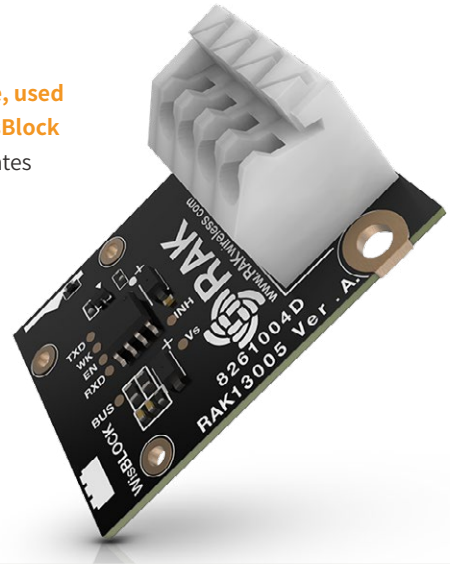
High Conversion Accuracy

Inside, a high-precision operational amplifier, which supports a wide range of operating temperatures, is used for signal amplification and conversion.

Specifications			
Model	RAK5811 WisBlock 0-5V Interface Module	**Input Voltage**	3.0 V ~ 3.6 V
Analog Input Interface	2 channels of 0-5 V	**Input Current**	Maximum 100 mA
Analog Sampling Resolution	5 mV	**Output Voltage**	12 V
Analog Sampling Accuracy	1%	**Output Current**	Maximum 30 mA
Analog maximum input voltage	5.3 V (There is a risk to burn the circuit surpassing this limit.)	**Operating Temperature**	-30°C ~ 65°C
Analog Port ESD Protection Level	2 kV HBM	**Storage Temperature**	-40°C ~ 85°C
Operational Amplifier Gain	3.0	**Module Size**	35 x 25 mm

RAK13005

LIN Module



The RAK13005 is a Local Interconnect Network (LIN) transceiver module, used in automatic technologies that can be mounted on the IO slot of the WisBlock Base board. It is designed for in-vehicle networks using data transmission rates from 2.4 kBaud to 20 kBaud, and it uses the TLE7259-3 chip from Infineon.

- Based on Infineon TLE7259-3
- Single-wire LIN transceiver for transmission rates up to 20 kBaud
- Compliant to ISO 17987-4 and LIN Specification 2.2A
- Supports both Controller(Master) and Peripheral(Slave) modes
- Very low current consumption in sleep mode with wake-up functions
- Support 12 V and 24 V LIN bus power supply
- Digital I/O levels compatible with 3.3 V and 5 V microcontrollers

Easy to Install

The use of crimp terminal connectors is easy to operate and can simplify the field deployment operation.

Low Power Consumption

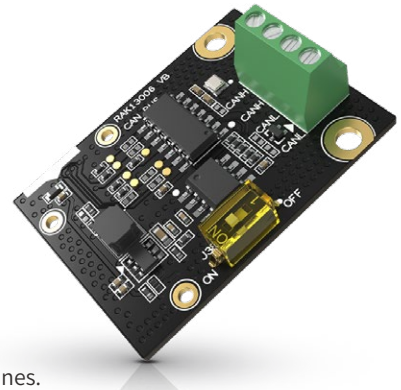
Very low current consumption in sleep mode with wake-up functions.

Specifications	
Model	RAK13005 WisBlock LIN Module
Chipset	Infineon TLE7259-3
Supply Voltage Range for Normal Operation	5.5 ~ 27 V
Junction Temperature	-40°C ~ 85°C
Current Consumption at VS in Sleep Mode	5 µA(Nom.), 12 µA(Max.)
Module Size	35 x 25 mm

Automobile Household Appliances Industrial Automation

RAK13006

CAN Module



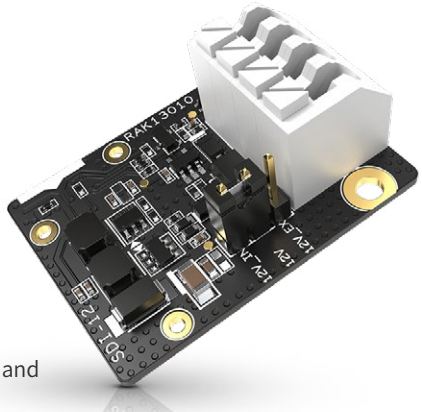
RAK13006 is a CAN Bus communication module based on the MCP2518FD CAN controller and ATA6563 CAN transceiver both from Microchip. The MCP2518FD is the CAN chip that communicates to WisBlock Core MCU via SPI up to 17 MHz SPI Clock Speed, and ATA6563 is the low-level physical layer chip that provides a physical connection with the CAN bus communication lines. It supports both CAN 2.0B and CAN FD with an arbitration bit rate up to 1 Mbps. This WisBlock Interface module is ideal for industrial and automotive applications.

- It supports both CAN 2.0B and CAN FD with an arbitration bit rate up to 1 Mbps.
- Configurable terminal resistance on CANH and CANL lines via slide switch
- ISO11898-2:2016 and SAEJ2962-2 Compliant
- Fast crimping terminal to easily connect external components on the field

Industrial and Automotive Applications

RAK13010

SDI-12 Module



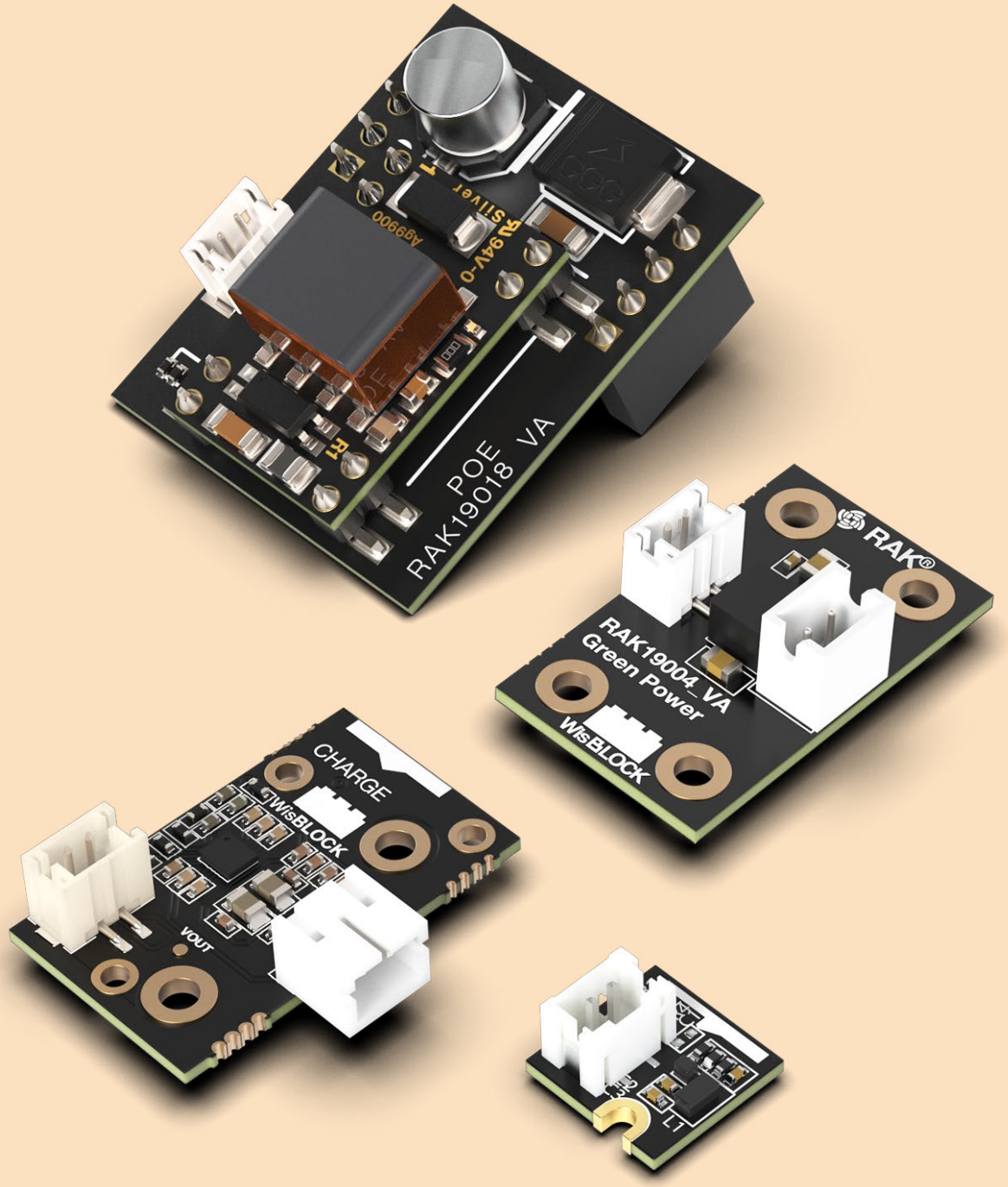
RAK13010 is a WisBlock Interface module that extends the WisBlock system. The SDI-12 (Serial Digital Interface at 1200 baud rate) module is an asynchronous serial communications protocol for intelligent sensors that monitor environment data. It consists of 3 wires: SDI-12_12V, SDI-12_DATA, and GND. The SDI-12 bus is a bidirectional interface for the conversion of commands and data into UART to SDI-12 and vice versa using a 3.3 V microcontroller.

- SDI-12 communications protocol
- Supports the 3-wire SDI-12 communication cable
- Provides the 12 V supply for the SDI-12 sensors and has an option to use an external 12 V supply if required.
- Fast crimping terminal to easily connect external components on the field

Environmental Monitoring

Specifications			
Model	RAK13010 WisBlock SDI-12 Module	**External 12 V**	12 V
3V3_S	3.3 V	**Internal 12 V**	12 V
SN74LVC1G125DBVR supply voltage	5 V	**Ambient Operating Temperature**	-40°C ~ 85°C
Battery voltage	4.2 V	**Module Size**	35 x 25 mm

WisBlock Power Module

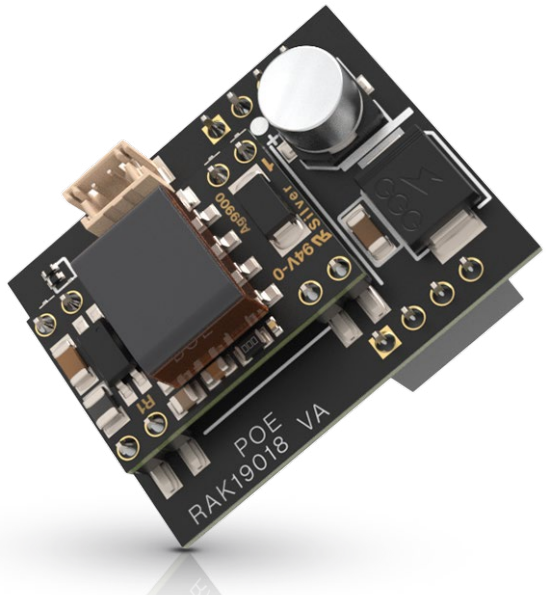


WisBLOCK

Power

RAK19018

PoE Module for RAK13800



The RAK19018 is a Power-over-Ethernet module used together with the RAKa13800 Ethernet Interface module to draw power from CAT5/CAT6 cables. This PoE module is based on the Silvertel Ag9905MT converter board and compatible with the IEEE 802.3af PoE standard.

- Power-over-Ethernet module
- Draw power from CAT5/CAT6 cables
- IEEE802.3af compliant
- Short-circuit protection and Over temperature protection
- Requires RAK13800 Ethernet Module to work

Short-circuit Protection

The DC/DC converter operates over a wide input voltage range and provides a regulated output. It also has built-in short-circuit output protection.

Easy to Install

The connection can be completed by crimping the pin header female connector of the RAK13800 with the pin header connector of the RAK13800.

Built-In Signature Recognition According To Ieee Standards

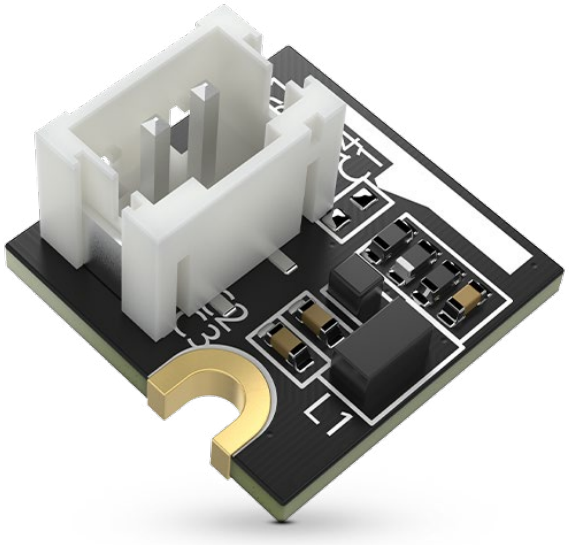
The Ag9905MT's signature and control circuit provide the PoE compatibility requirement by the Power Sourcing Equipment (PSE) before applying up to 9 Watts of power to the port. This provides a Class 0 signature.

Specifications	
Model	RAK19018 WisBlock PoE Module for RAK13800
Chipset	Silvertel Ag9905MT
Input Supply Voltage	36 V ~ 57 V
Under Voltage Lockout	30~36 V
Nominal Output Voltage	5 V
Output Power	9 W
Minimum Load	200 mA
Output Current (VIN = 48V)	1.8 A
Ambient Operating Temperature	-40°C ~ 85°C
Module Size	32 x 25 mm

- Industrial Control
- Smart Energy
- Security Access Control
- Smart Home
- Gateway Devices
- Transmission / Distribution Equipment

RAK19002

Boost Module



The RAK19002 is a step-up boost regulator module, part of the RAKwireless WisBlock Series. The module can supply 12 V/50 mA and could be mounted on WisSensor slot of RAK5005-O. The output voltage of the module is controlled by WisBlock Core IO pin.

- Up to 85% efficiency at 3.6 V input and 12 V output
- ±2 % output voltage accuracy
- Output Over-Voltage Protection
- Output Short Circuit Protection
- TPS61046 step-up boost converter
- Power Save Operation Mode at Light Load

Super Small Size

The 10 x 10 mm compact design comes with a 24-pin WisSensor connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

Easy to Configure and Manage

Supports Arduino, VSCode platform compilation. Used to power external sensors, modules or devices.

TPS61046 Step-up Boost Converter

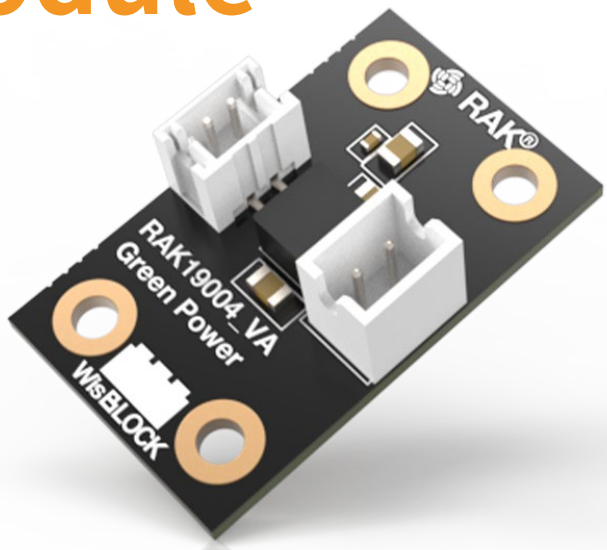
The TPS61046 is a highly integrated boost converter designed for applications requiring high voltage and tiny solution size. It integrates a 30 V power switch, input/output isolation switch, and power diode. It also implements cut output, output voltage protection and thermal shutdown.

Specifications	
Model	RAK19002 WisBlock Boost Module
Chipset	Texas Instruments TPS61046
Input voltage	3.3 V
Output voltage	12 V
Output voltage accuracy	±2%
Output current	50 mA
Shutdown current (IC disable)	0.8 mA
Interface	24-pin I/O connector
odule Size	10 x 10 mm

- Voice over Internet Protocol (VoIP telephony)
- Webcam
- Wireless access point
- Security camera
- Access control system

RAK19004

Green Power Module



RAK19004 is a WisBlock Power module that can harness and convert green power such as wind power, hydroelectric power, or solar power into fixed 5 V output. The module uses a TPS55165-Q1 from Texas Instruments, which is a DC-DC buck-boost converter. Upon startup, the module can have a stable 5 V output from a varying input voltage of 2 V-36 V, and its output current can also be as high as 1 A.

- Low Power Consumption
- Automatic Transition Between Step-Down and Step-Up Mode
- Overtemperature Protection and Output Overvoltage Protection
- TPS55165-Q1 DC-DC buck-boost converter

High Power Conversion Efficiency

The buck-boost converter is based on a fixed-frequency, pulse-width-modulation (PWM) control circuit using synchronous rectification to obtain maximum efficiency.

Easy to Install

With 4 mounting holes, it can be installed in any desired position.

Buck/Boost Overlap Control

The buck-boost overlap control ensures automatic transition between step-down and step-up mode with optimal efficiency.

Specifications	
Model	RAK19004 WisBlock Green Power Module
Chipset	Texas Instruments TPS55165-Q1
Supply voltage at VINP and VINL pins (after wake-up)	2 V ~ 36 V
Output voltage	5 V
Power conversion efficiency	85%
Output Current	1 A
Ambient Operating Temperature	-40°C ~ 125°C
Module Size	15 x 25 mm

- Infotainment and Cluster
- Solar-to-Battery Charging
- Li-Ion Battery Packs
- Body Electronics and Gateway Modules
- Industrial Applications With Fluctuating Input Voltage

RAK19006

Wireless Charge Module

The RAK19006 WisBlock Wireless Charge Module is designed to be a part of the battery charger. It is highly efficient, Qi-complia and has a single-chip wireless power receiver and charger. It integrat receiver and linear charger and supports up to 5 W applications.

- Wireless and wired charge
- JEITA compatible charge
- OVP, OCP, and OTP protection
- Ultra-low leakage current without transmitter
- WPC 1.2.4 compliant wireless power receiver

Wired/Wireless Charging

The power supply voltage is controlled by WisBlock Core through the WisBlock I/O interface, which supports wireless charging and battery direct charging.

Easy to Deploy

The compact size comes with a 40-pin WisBlock I/O connector, M1.2 x 3 mm screws and corresponding mounting holes for easy connection to the WisBlock baseboard.

OLED Display

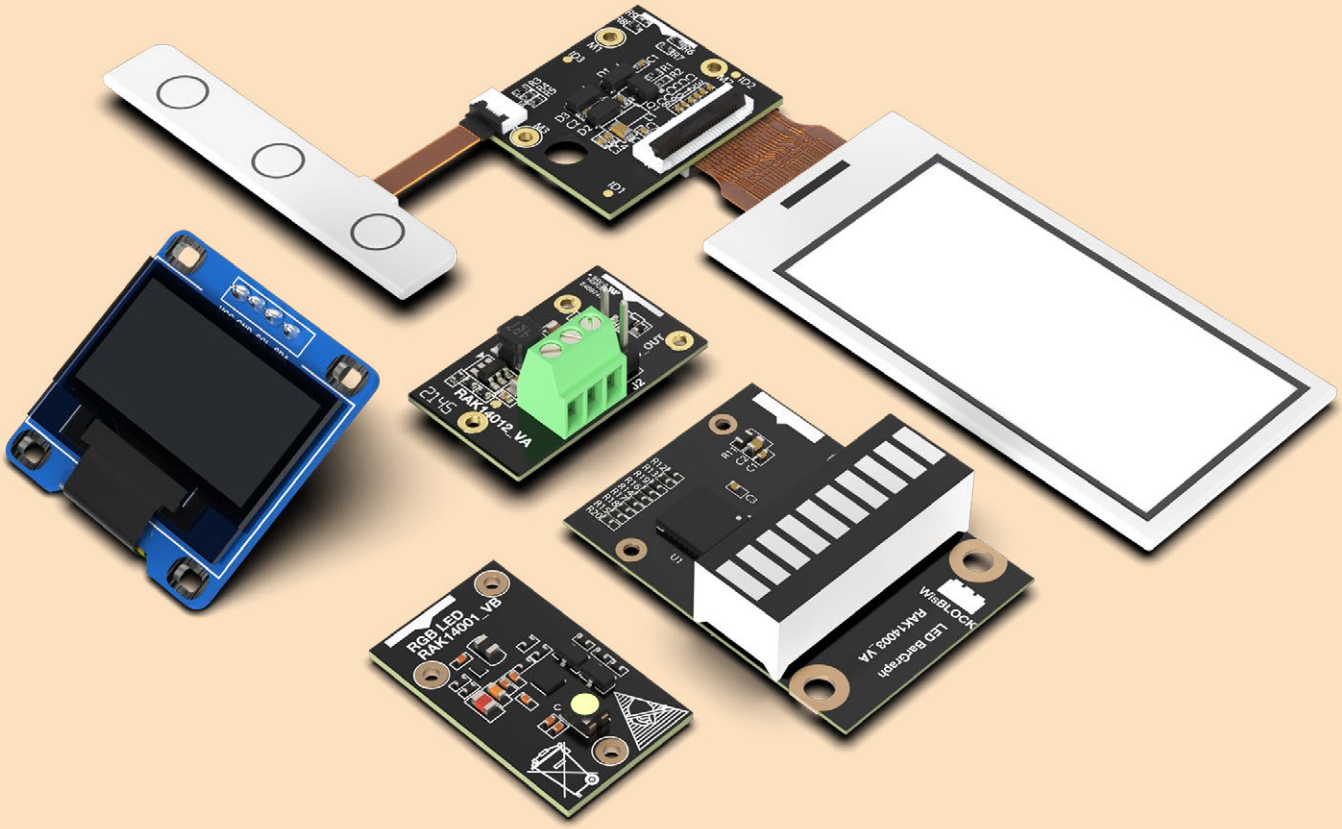
Provides Arduino, VSCode platform code. Support checking the power supply voltage through an OLED display.

Specifications	
Model	RAK19006 WisBlock Wireless Charge Module
Chipset	ConvenientPower CPS3008
Power voltage range	3.4 V ~ 16V
Output voltage range	5 V
Ambient operation temperature	–40°C ~ 85°C
Continuous output current	0.6 ~ 1.1 A
Interface	40-pin I/O connector
Module size	15 mm x 25 mm

- Mobile accessories
- Wireless charging application for wearable devicesSmart home
- Mobile accessories

WisBlock Display & LED Module

76-82

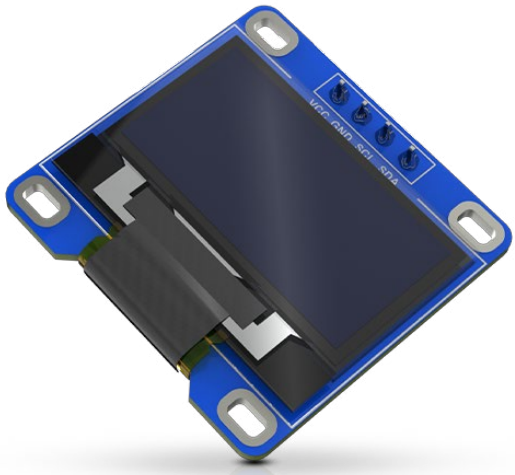


WisBLOCK

Display

RAK1921

OLED Display Module



RAK1921 is a WisBlock OLED display based I²C SSD1306. A ready-to-use SW library and tutorial makes it easy to visualize data of your WisBlock solution. RAK1921 is ideal for battery-powered applications because of its low power consumption. In addition, the WisBlock system allows to power down the module completely to reduce the power consumption of the system even more.

- Wide Viewing Angle
- Wide Temperature Range
- Low Power Consumption
- Slim/thin Outline
- Bright white color on black background

Wide Viewing Angle

0.96 inch OLED display. 128 x 64 pixel resolution. View angle of 160° .

Wide Temperature Range

Temperature range of -30° to 70°C
Works at -30° with good performance.

Thin with High Shock Resistance

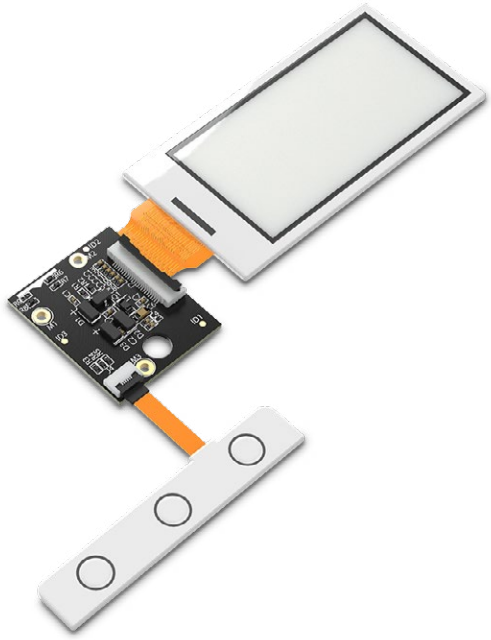
Small thickness, light weight, solid-state OLED, shock-resistant and shatter-resistant.

Specifications	
Model	RAK1921 WisBlock OLED Display
OLED Display Size	0.96 inches
Display Resolution	128 x 64
View Angle	160°
Display Color	Bright white color on black background
Interface	I²C
Driver IC	SSD1306
Power Supply	2.4 V ~ 3.5 V
Normal Mode Brightness	80 cd/m²(Min.), 100 cd/m²(Max.)
Operation Temperature	-30° ~ 70°C
Module Size	27.8 x 27.3 mm

- Retail
- Calculator
- Electronic product
- Wearable device

RAK14000

E-Ink Display Module



The RAK14000 module provides an interface to connect an E-Ink Display, which is known to be an extremely power-efficient display. The E-Ink Display is an Active Matrix Electrophoretic Display (AM EPD) module with 2.13 inches active area (212 × 104 pixels for White Black Version and 250 x 122 pixels for the White-Black-Red Version). It also allows you to connect a Three-Button Module, which can be used on a different application. All of this can be controlled through a WisBlock Core.

- Ultra-wide viewing angle
- Extremely Low Power Consumption! Perfect for power-conscious applications.
- Uses FPC (Flexible PCB) for its Display and Button modules
- On-chip display RAM and oscillator
- Comes with a 3-Button Module. Application can be customized.
- Pure Reflective Mode. Very viewable displays!
- On-chip display RAM and oscillator

Ultra-Wide Viewing Angle

Wide viewing angles. Display resolution: 212 × 104 pixels for White-Black version and 250 x 122 pixels for the White-Black-Red version.

Ultra-Low Power Consumption

E-Ink displays, aka electronic paper, feature very low power. It remains visible for days even without any power.

Pure Reflective Mode

The screen displays patterns by reflecting ambient light. Still clearly visible even in sunlight.

Specifications	
Model	RAK14000 WisBlock E-Ink Display Module
Chipset	RAK14000 WisBlock E-Ink Display Module
Display Size	2.13 inches
Display Resolution White-Black	212 x 104 pixels
Display Resolution White-Black-Red	250 x 122 pixels
Input Voltage	3.3 V
Part Inclusion	E-Ink Display, 3-Button Module, FPC (Flexible PCB)
Sleep mode current	20 µA
Deep sleep mode current	1 µA(Nom.), 5 µA(Max.)
Typical operating current	4.3 mA(Nom.), 4.5 mA(Max.)
Module Size	25 x 21 mm

- Retail
- Education
- Medical
- Warehousing
- Office

RAK14014

TFT LCD Display Module

The RAK14014 is a 240 x 320 pixel full-color TFT display with a touch screen and backlighting. Use it easily with its single-chip TFT-LCD controller FT6336 from Focal Tech which Arduino libraries support. Plus, the TFT display is mounted to a protective glass for our Unify Enclosure.

- 240 x 320 pixels touch screen display
- IPS TFT-LCD
- Full view direction
- The backlight type is 4 x LED (white)
- Single-chip TFT-LCD controller/driver with on-chip frame memory (FM)
- SPI interface
- Display size 2.4 inch

Wide Supply Voltage Range

I/O Voltage (VDDI to DGND): 1.65 V ~ 3.3 V (VDDI ≦ VDD)
Analog Voltage (VDD to AGND): 2.4 V ~ 3.3 V

Touchscreen LCD

Equipped with a 240x320 pixel full-color TFT touch screen and backlighting. The backlight type is 4 x LED (white).

I/O Voltage (VDDI to DGND)	1.65 V ~ 3.3 V (VDDI ≦ VDD)		
Analog Voltage (VDD to AGND)	2.4 V ~ 3.3 V		
Operating Current	80 mA		
Module Size	35 x 25 mm		
LCD Size	2.4 inch		
Display	240 x 320 pixel		
Display Colors (Color Mode)	Full Color: 262 K, RGB=(666) max., Idle Mode Off		
	Color Reduce: 8-color, RGB=(111), Idle Mode On		
Operating Temperature	-30°C ~ 85°C		
	Min.	Typ.	Max.
I/O Voltage	1.65 V	-	3.3 V
Analog Voltage	2.4 V	-	3.3 V

The specifications applied for: VSS=0 V, VCI=3.3 V, TOPR =25° C.

RAK14001

RGB LED Module

The RAK14001 is an RGB LED module that can be mounted to the IO slot of the WisBlock Base board. It is capable of driving RGB LEDs with up to 20 mA per segment via the I²C interface.
The main component of this module is the NCP5623B from On Semiconductors. This IC has a built — in DC/DC converter that works as a high-efficiency charge pump providing the required DC voltage for all three LED segments. There is also an IREF pin that provides the reference current based on the internal band — gap voltage reference to control the output current flowing in the LED.

- RGB Function Fully Supported
- Programmable Integrated Gradual Dimming
- Support I²C Protocol
- Support enable power supply
- Built-in Short Circuit Protection
- Provides Three Independent LED Drives

Customized Dimming

RGB functions are fully supported. RGB LED display mode can be customized based on requirements.

Ultra-Low Power Consumption

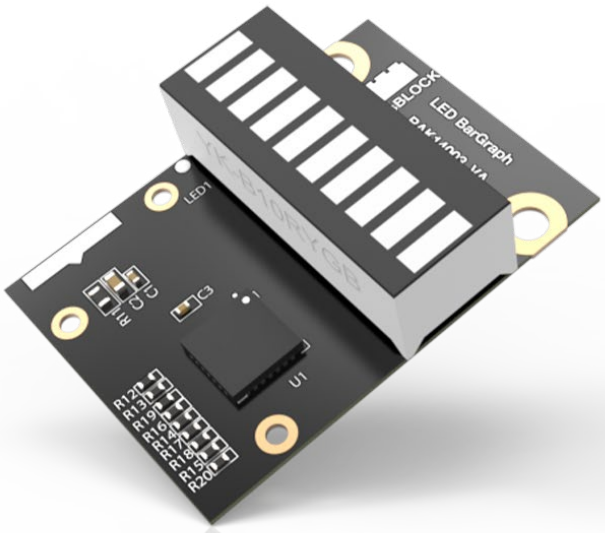
Battery powered. Working current 350 µA, standby current less than 1.0 µA.

Specifications	
Model	RAK14001 WisBlock RGB LED Module
Chipset	On Semiconductors NCP5623B
Interface	I²C
Input Voltage Range	2.7 V ~ 4.2 V
Operating Current@Iout = 0mA	350 µA
Stand by Current	0.8 µA
Module Size	25 x 35 mm

- Multicolor Illuminations
- Portable Back Light
- Cell Phone / Digital Camera Flashlight
- LCD and Keyboard Simultaneous Drive

RAK14003

Bar Graph Module



RAK14003 is an LED Bar Graph that is part of WisBlock Display modules. It consists of 10 configurable LEDs (5 green color LEDs, 3 yellow color LEDs, and 2 red color LEDs). RAK14003 uses the MCP23017 from Microchip as an I/O Expander and KEM-102510A-RYG from Hongke Lighting as the LED bar. Each LED in the module can be controlled separately so the module can build a multipurpose graphic feedback display.

- LED Bar Graph module
- 5 green color LEDs, 3 yellow color LEDs，and 2 red color LEDs
- Each LED can be controlled separately

Customized Diversified Display

LED lights are controlled independently. Programmable through software to customize personalized display.

Small Size

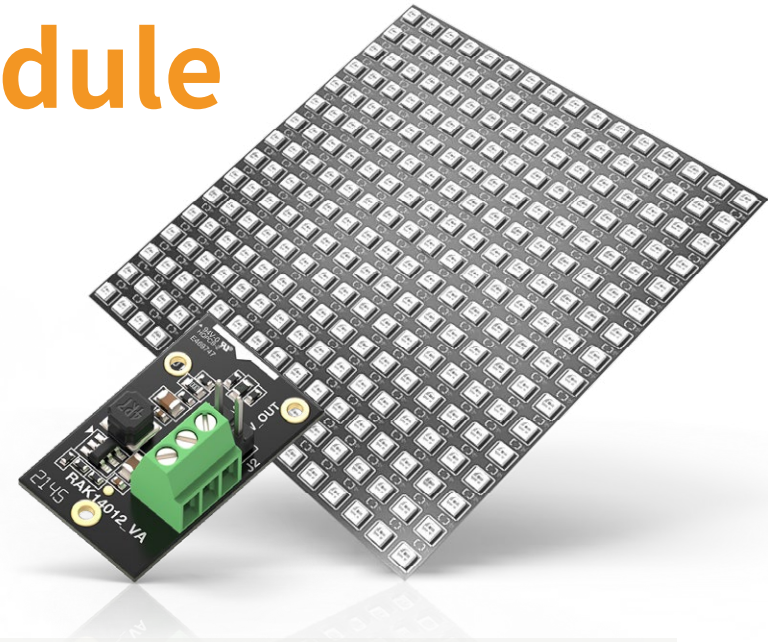
Ideal for graphics display applications where deployment space is limited.

Specifications	
Model	RAK14003 WisBlock LED Bar Graph Module
Chipset	Microchip MCP23017, Hongke Lighting KEM-102510A-RYG
Interface	40-pin connector
Power Supply Voltage	3.3 V
Max Current	170 mA
Module Size	25 x 45 mm

- Multicolor Illuminations
- Portable Back Light
- Digital Cellular Phone Camera Photo Flash
- LCD and Key Board Simultaneous Drive

RAK14012

LED Matrix Module



RAK14012 is an LED matrix driver module for WS2812B LEDs, which has a control circuit and RGB chip. To drive the WS2812B, the RAK14012 has a built-in boost circuit to generate 5 V voltage output. But it is recommended to use an external power supply to power the LED Matrix.

- LED matrix driver
- 3.3 V Power supply
- Built-in boost circuit

Easy to Connect

Uses 3-pin screw terminal connection. Convenient to connect the LED matrix with the module.

Embedded Boost Circuit

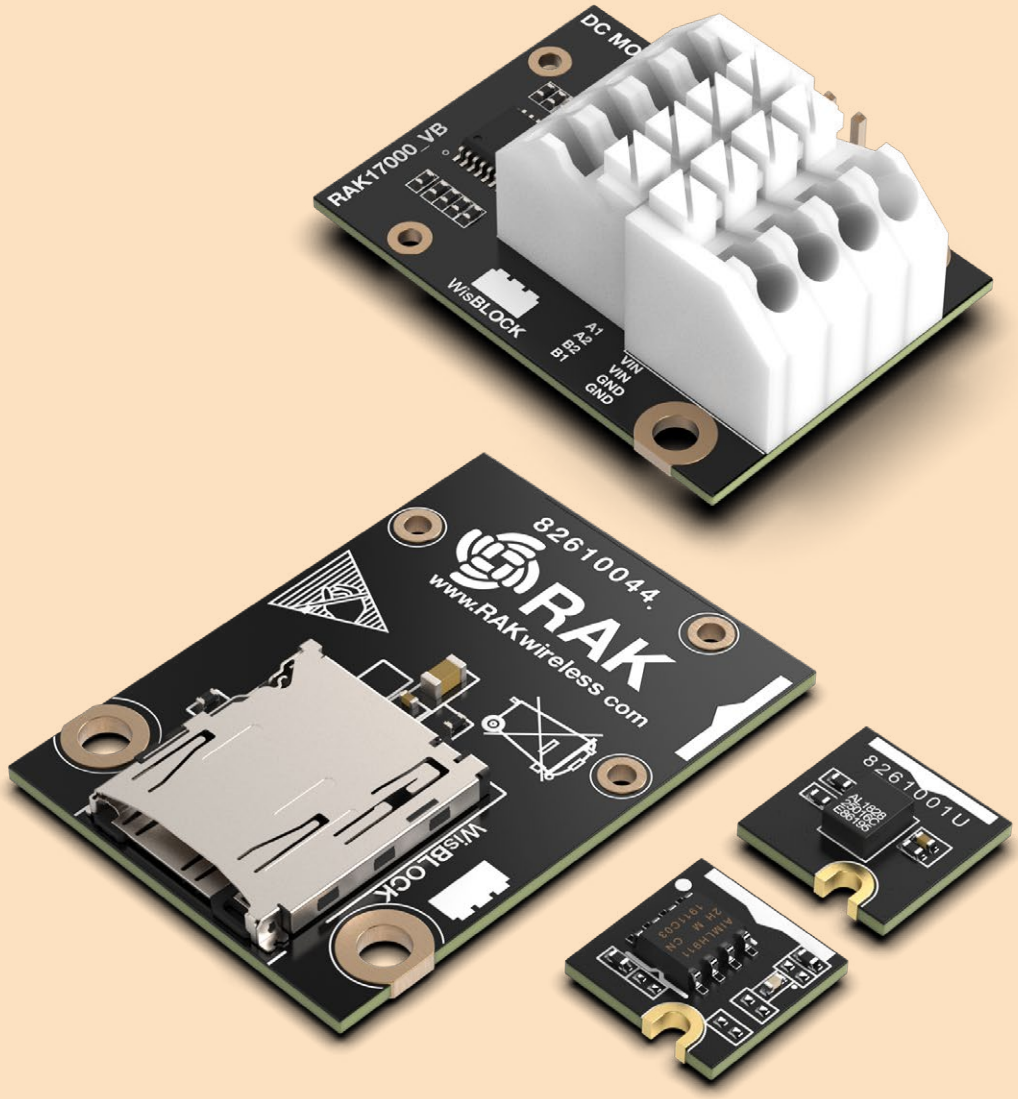
5 V voltage is required to drive the LED matrix module. A built-in boost circuit can directly supply power to the LED matrix. It also supports the use of an external 5 V power supply for power supply.

Specifications	
Model	RAK14012 WisBlock LED Matrix
LED Matrix	WS2812B
Interface	40-pin connector
Power supply for the module	3.3 V
Output from boost	5 V
Module Size	25 x 15 mm

- Full color soft light strip
- LED decorative lighting
- Indoor/outdoor LED irregular screens

WisBlock Storage and Motor Module

83-88

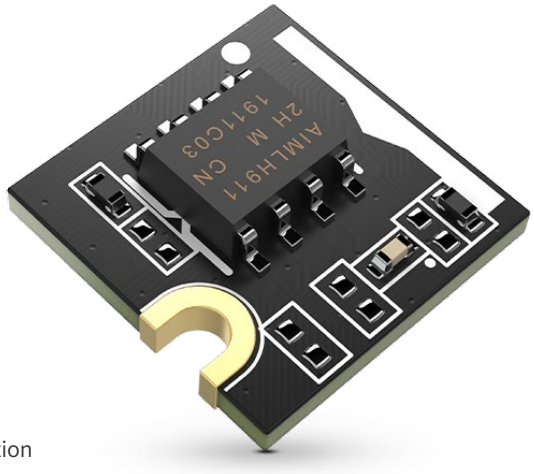


WisBLOCK Storage

WisBLOCK Motor

RAK15000

EEPROM Module



The RAK15000 WisBlock EEPROM module, part of the RAKwireless Wisblock series, is a serial EEPROM module with an I²C interface. Designed to work at low-power mode, the standby average consumption is lower than 3 µA (VCC = 5.5 V). The RAK15000 uses Microchip AT24CM02, which provides 2,097,152 bits of Serial Electrically Erasable and Programmable Read-Only Memory (EEPROM), organized as 262,144 words of 8 bits each.

- 3.3 V input voltage, on/off control by the WisBlock Core module
- I²C-Compatible (2-wire) Serial Interface
  100 kHz Standard mode
  400 kHz Fast Mode
- Random and Sequential Read Modes
- High Reliability
  Endurance: 1,000,000 write cycles
  Data retention: 100 years
- Built in error detection and correction
- 256-byte Page Write Mode

High Data Retention Reliability

Data will not be lost even after power failure. Data retention for up to 100 years.

Erasable Reprogramming

The existing data can be erased and reprogrammed when it is charged. No need to take it out of the computer or device for programming.

Easy to Deploy, Plug and Play

Small size. Standard WisBlock 24-pin connector. Plug and Play.

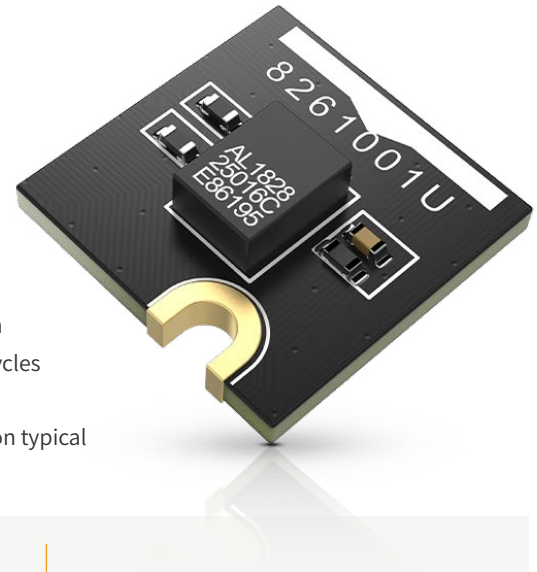
Specifications	
Model	RAK15000 WisBlock EEPROM Module
Chipset	Microchip AT24CM02
Interface	2-Wire, I²C
Capacity	2 Mbit
Memory Organization	256 k x 8
Write Cycles	1,000,000
Data Retention	100 years
Power supply for the module	1.7V ~ 5.5V
Supply current read	1mA(Max.)
Supply current write	3 mA(Max.)
Standby current	3µA(Max.)
Temperature range	-40 ~ 85°C
Module Size	10 x 10 mm

- Computer and peripherals
- Smart meters, smart homes, wearable
- Automotive electronics
- Smartphone camera

RAK15001

Flash Module

The RAK15001 is a NOR flash module with a 16 MBit (2 MByte) nonvolatile memory. It uses GD25Q16CNIG (16 Mbit) from GigaDevice with standard SPI interface. In this large memory, you can save big data that your applications need to access frequently, like conversion tables, lookup tables or images, and even sound files. Compared to the EEPROM module, the RAK15001 Flash Memory module has fewer write/erase cycles, so it is not ideal as storage for constantly changing data like for sensor readings.



- 16 Mbit (2 MByte) capacity
  - 2048K-Byte
  - 256 Bytes per programmable page
- SPI interface: SCLK, CS#, SI, SO, WP#, HOLD#
- Software/Hardware write protection
- Minimum 100,000 Program/Erase Cycles
- Standby current less than 5 µA
- Data Retention 20-year data retention typical

Easy to Deploy, Plug and Play

Small size. Standard WisBlock 24-pin connector. Plug and Play.

High Transmission Efficiency

Executable programs can be executed on-chip.

High Reliability

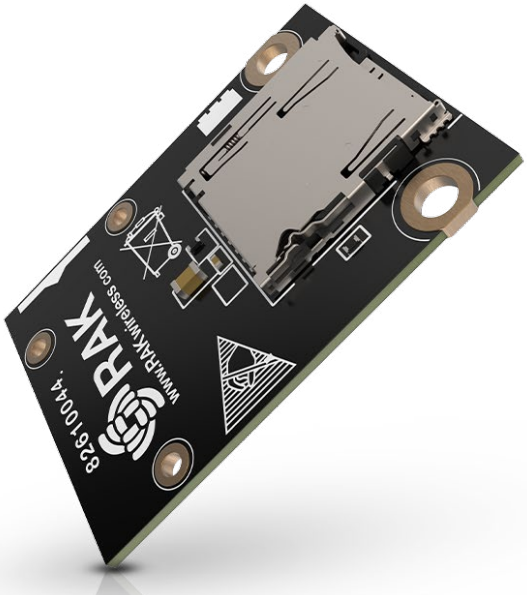
Typically maintain data integrity for 20 years or more.

Specifications	
Model	RAK15001 WisBlock Flash Module
Chipset	GD25Q16CNIG
Interface	SPI interface: SCLK, CS#, SI, SO, WP#, HOLD#
Capacity	16 Mbit
Program/Erase Cycles	At least 100,000
Data Retention	20 years
Full voltage range	2.7 ~ 3.6 V
Operating Current	20 mA(Max.)
Standby current	5 µA(Max.)
Temperature range	-40°C to + 85°C
Module Size	10 x 10 mm

- Automotive electronics
- IoT
- Industrial
- TWS earphone
- Wearable electronics

RAK15002

Micro SD Card Module



The RAK15002 is a Micro SD card module that can be mounted to the IO slot of the WisBlock Base board. This module uses a 4-line SPI interface to access the SD card and supports the card insert detection feature.

- Micro SD card socket
- 4-lines SPI interface
- SD card insert detected

High Flexibility

Choose memory cards of different capacities, based on different applications, to realize customized memory.

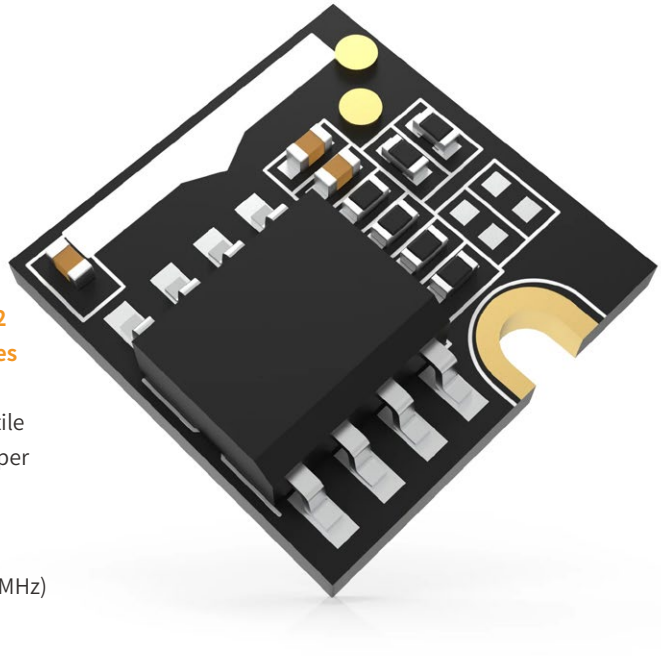
Plug and Play

Standard 40-pin I/O connector for easy connection to the WisBlock baseboard. The plug-and-play SD card slot is easy to operate.

Specifications	
Model	RAK15002 WisBlock Micro SD Card Module
Interface	4-lines SPI interface
Card Type	Micro SD card
Power Supply	3.3 V
Module Size	25 x 35 mm

RAK15004

FRAM Module



RAK15004 is a WisBlock FRAM Storage Module based on MB85RC512T 512 k bit (64 k byte x 8) from FUJITSU. The FRAM technology offers advantages over Flash, EEPROM, and SD card modules with its low power, lifetime, and a superior number of write cycles. It is a very high endurance nonvolatile memory storage chip that provides a write/read count of 10,000,000,000,000 per byte. It can be interfaced via I2C and support high-speed mode at 3.4 MHz.

- I^2C compatible digital interface
- Operating power supply current 0.71 mA (Typ @3.4 MHz) 1.2 mA (Max @3.4 MHz)
- Standby current 15 µA (Typ)
- 64 k byte/ 512 k bit storage capacity

High Reliability

Read/write endurance: 10^{13} times/byte
Data retention: 10 years (+85°C) & 95 years (+55°C)

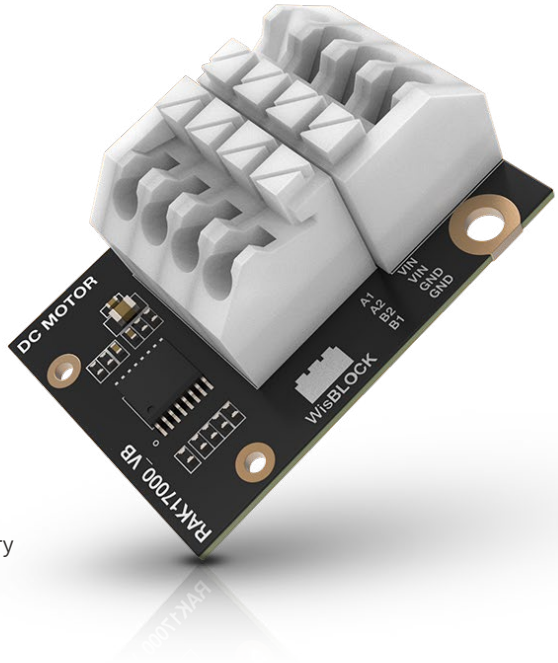
I^2C Digital Interface

Supports high speed mode at 3.4 MHz

Chipset	Fujitsu MB85RC512T
Module Size	10 x 10 mm
Storage Capacity	64 k byte/ 512 k bit
Operating Temperature	-40°C ~ 85°C
Power Supply Voltage	3.3 V
Operating Current	15 µA ~ 0.71 mA

RAK17000

Motor Control Module



The RAK17000 is a DC motor driver module. It can be mounted to the IO Slot of the WisBlock Base of your choice. It can drive one stepper motor or two DC motors. The RAK17000 module uses the DRV8833 motor driver IC from Texas Instruments.

- Dual H-Bridge Current Control Driver One Stepper Motor
- PWM Winding Current control and limited
- Motor power supply can be from an external source or from the WisBlock Base battery
- Selection of power source can be done via 2.54 mm 2-pin jumper
- Wide power supply voltage range: 2.7 to 10.8 V

Easy to Deploy

Compact size, complete with 40-pin I/O connector, M1.2 x 3 mm screws and corresponding mounting holes. Easily connects to WisBlock baseboard.

Safe and Stable

Equipped with motor undervoltage, overcurrent and overheating protection mechanisms. Adjust the state of the motor driver based on the protection mechanism to ensure the safety and stability of the motor driver during use.

Diversification of Power Supply

Supports battery and external power supply to drive motor, selectable via 2.54 mm pitch jumper.

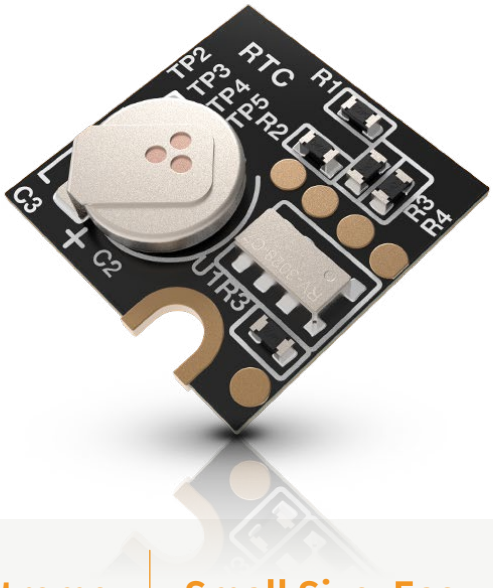
Specifications	
Model	RAK17000 WisBlock Motor Control Module
Chipset	DRV8833
VM sleep mode supply current	1.6 µA
Output current per bridge	0.85 A
Interface	Fast-crimping terminal connector
Device power supply (Motor and Driver IC)	2.7V ~ 10.8V
Digital input pin voltage range	-0.3 ~ 5.75 V
Operation Temperature Range	-40°C ~ 85°C
Module Size	25 x 35 mm

- Battery-Powered Mechanical Devices
- POS Printers
- Office Automation Machines
- Video Security Cameras
- Gaming Machines/Robotics/ Battery-Powered Toys


RAK19008-VA

RAK12002

Real-Time Clock Module



The RAK12002 is a Real-Time Clock module, part of the RAKwireless WisBlock Series, designed to provide real-time clock capabilities to your WisBlock projects. The RTC chip is based on the RV-3028-C7 from Micro Crystal and uses the I^2C interface.

- Built-in 32.768 kHz crystal oscillator
- Automatic leap-year correction
- Counters for seconds, minutes, hours, date, month, year, and day of the week
- Programmable Clock output
- Small size
- Super capacitor backup power supply

Ultra-Low Power Consumption, High Precision

Ultra-low current consumption of 45 nA@3.3 V. High precision up to ± 1 ppm, ± 0.09 s/day. The RTC maintains accurate time inside even when the working power is lost or the program is interrupted.

Stable in Extreme Conditions

All-ceramic package. Wide operating temperature range. Can withstand extreme environmental conditions.

Small Size, Easy to Install

Compatible for any WisSensor interface. Easily connected with the baseboard by clicking modules together.

Specifications	
Model	RAK12002 Real-Time Clock module
Chipset	Micro Crystal RV-3028-C7
Interface	I^2C
Factory calibrated time accuracy	±1 ppm@25°C
Extreme low current consumption	40 nA
Power Supply Voltage	3.3 V
Backup Supply Voltage	3.3 V
存储温度	-55°C ~ 85°C
Operating temperature range	-40°C ~ 85°C
Module size	10 x 10 mm

- IoT
- Wearables
- Medical
- Automotive

RAK18001

Buzzer Module

The RAK18001 is a WisBlock Extra module that uses a MLT-5020 as its built-in buzzer. It produces an audible high-pitched sound which can be used in various alarm and notifier applications. The sound and loudness can be controlled through PWM (Pulse-Width Modulation) signal from a WisBlock Core. The output sounds and pitch level can be customized to the point that it is even possible to play a small melody!

- 3.3V Input Voltage, On/Off Control by the WisBlock Core
- 75dB Sound Output at 10cm distance. Very Audible!
- PWM Controlled: Loudness and Pitch Level can be customized using your code
- Uses MLT-5020 Buzzer. Small and Compact, but Loud!

High Volume

75 dB sound output at a distance of 10 cm, clear and recognizable.

Customizable Sound

Customizes tone and loudness with PWM modulation.

Compact Design

Module size: 10 x 10 mm. Built-in buzzer size: 5 x 5 x 2 mm.

Specifications	
Model	RAK18001 WisBlock Buzzer Module
Chipset	MLT-5020
Resonant Frequency	4,000 Hz
Sound Output at 10cm distance	75dB
Standby current	5 µA
Operating Voltage	2.0 V ~ 5.0 V
Storage temperature	-40°C ~ 85°C
Operational temperatur	-30°C ~ 70°C
Module size	10 x 10 mm

- Computer
- Alarm
- Electronic toy
- Agriculture
- Automotive electronics

Extension Cable

WisBlock Extension Cable used to position WisBlock Sensor or WisBlock I/O modules apart from the WisBlock Base Board. This helps to eliminate the influence of other WisBlock modules from sensors that measure environmental data. The advantage of using WisBlock extension cable is to enable the design of a new enclosure that exposes WisBlock Sensor or I/O slot directly to the environment without problems.

- 120 mm length FPC (Flat Printed Circuit) board
- All signals of the 40-pin IO Slot connector are available (RAK19008)
- All signals of the 24-pin Slot A to D connectors are available (RAK19005)
- Easy click and use application

Reduces Performance Impact

For heat-sensitive sensors, using extension cables can effectively reduce the impact of WisBlock Base heat dissipation on them.

High Flexibility

The use of extension cables can meet the use scenarios with complex environments, and can also meet the needs of users for customized shells.

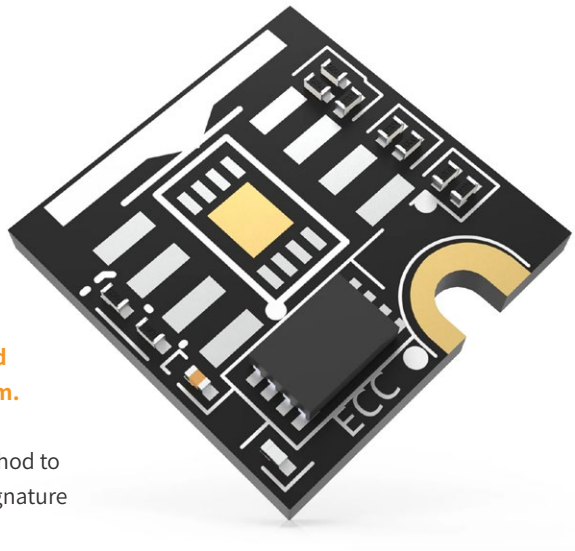
Standard WisBlock Interface

Compatible for any WisSensor interface. Easily connected with the baseboard by clicking modules together.

Specifications		
Model	RAK19005 WisBlock Sensor Extension Cable	RAK19008 WisBlock I/O Extension Cable
Length	120 mm	
Connector Type	24-pin WisConnector	40-pin WisConnector
Connector Compatibility	Compatible with many WisBlock modules with 24-pin Sensor WisConnector	Compatible with WisBlock Base Board with 40-pin IO WisConnector
Transmission Signal Compatibility	All signals of the 24-pin Slot A to D connectors are available (RAK19005) All signals of the 40-pin IO Slot connector are available (RAK19008)	

RAK5814

Crypto Module



Using the Microchip ATECC608A, this module is the perfect companion if you need to secure your data before sending it over LoRa®, Wi-Fi, or BLE by decrypting them.

It integrates ECDH (Elliptic Curve Diffie Hellman) security protocol, an ultra-secure method to provide the agreement for encryption/decryption, and ECDSA (Elliptic Curve Digital Signature Algorithm) sign-verify authentication.

- Cryptographic coprocessor with secure hardware-based key storage
- NIST standard P256 elliptic curve support
- SHA-256 & HMAC hash, including off-chip context, save/restore
- AES-128: encrypt/decrypt, galois field multiply for GCM
- Turnkey PRF/HKDF calculation for TLS 1.2 & 1.3
- Internal high-quality FIPS 800–90 A/B/C random number generator (RNG)

Protected Storage

Up to 16 keys, certificates, or data. Ephemeral key generation and key agreement in SRAM — small message encryption with keys entirely protected. Encryption/Authentication for messages to prevent onboard attacks.

ECDH Security Protocol

FIPS SP800–56A elliptic curve diffie-hellman.

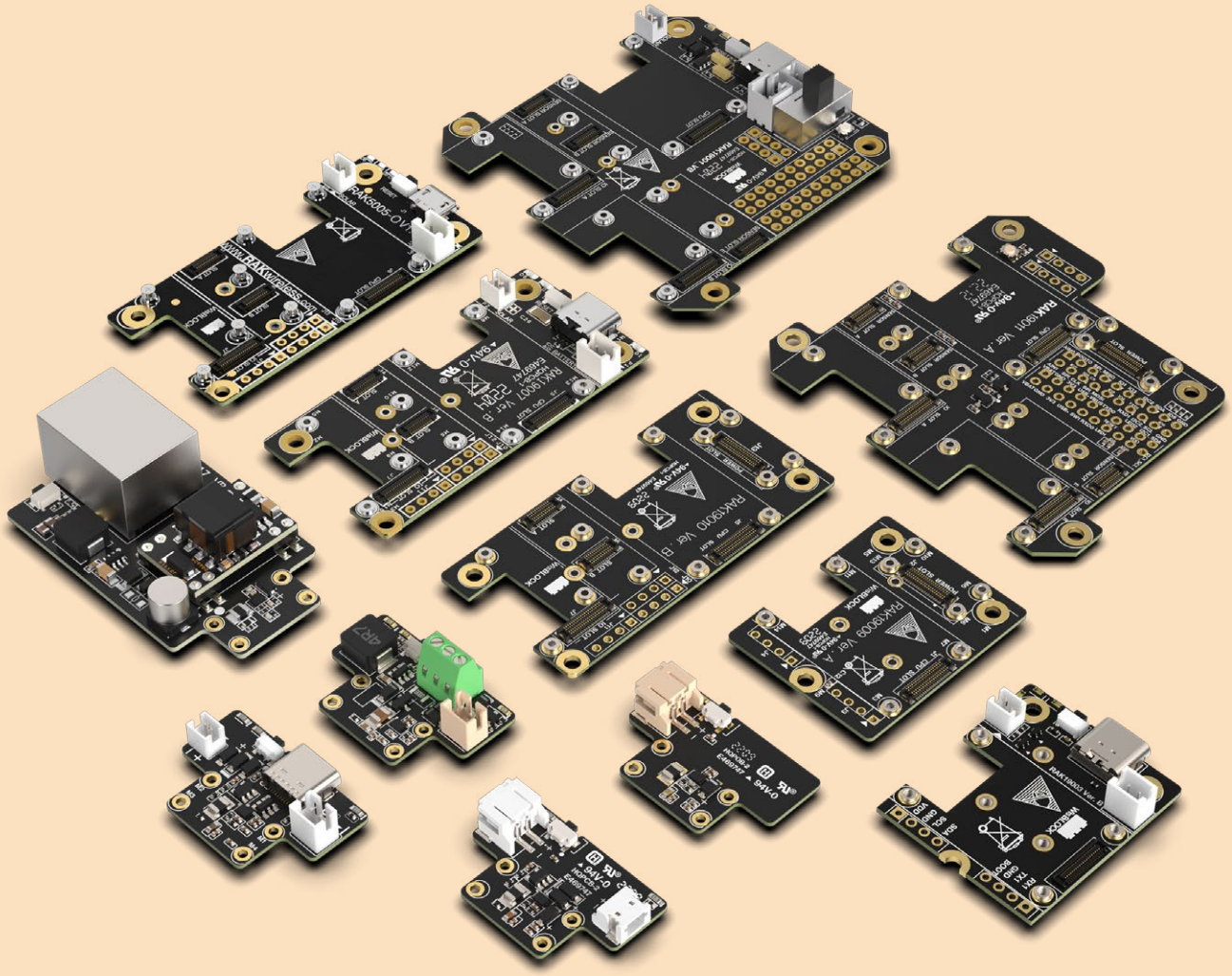
ECDSA Sign-verify Authentication

Full ECDSA code signature validation, optional stored digest/signature — optional communication key disablement before secure boot.

Microchip	ATECC608A		
Module Size	10 x 10 mm		
	Min.	Nom.	Max.
Power Supply Voltage	-	3.3 V	-
Sleep Current	-	-	150 nA
Active Power Supply Current	2 mA	-	14 mA
I^2C Speed	-	-	100 kHz

WisBlock Base Board

94-101



WisBLOCK

Base

Standard Interface Base Board

WisBlock is build up on a WisBlock Base board, a platform carrier that allows easy plug-in of one WisBlock Core processing board and multiple WisBlock modules. WisBlock Base board connects all WisBlock modules together and provides the power supply for attached WisBlock modules. For convenience, there is a Type-C USB connector that is connected directly to WisBlock Core MCU’ s USB port (if supported) or to a USB-UART converter depending on the WisBlock Core. It can be used for uploading firmware or serial communication. The Type-C USB connector is also used as a battery charging port.

Type-C USB port for programming and debugging

There is a Type-C USB connector for debugging, it is connected directly to MCU's USB port (if supported). The internal MCU can be accessed by connecting to a computer's USB port directly. This Type-C USB connector is also used as a battery charging port.

High-speed board-to-board connectors

For each module, a method is designed to connect and fasten the module easily. These connectors are high-speed board-to-board connectors, they provide signal integrity for each data bus. A set of screws are used for attaching the module under the environment with vibrations.

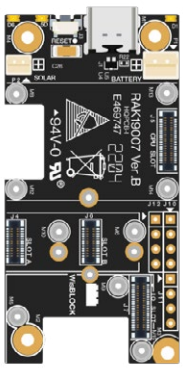
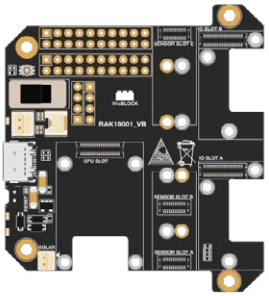
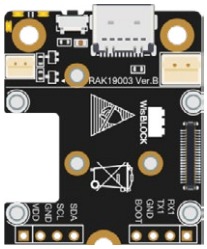
Flexible and Compatible

The modular design makes it easier to implement your IoT solution by simple clicking blocks together. It supports different types of MCUs and sensor modules.

Multiple Industrial-Level Design

The standard interface WisBlock Base of different sizes meets the industrial level design and can meet the solutions of different deployment spaces.

Module Overview

Model	RAK19007 WisBlock Base Board 2nd Gen	RAK19001 WisBlock Dual IO Base Board	RAK19003 WisBlock Mini Base Board
Board Overview			
Size	60 x 30 mm	60 x 67 mm	30 x 35 mm

Environmental Characteristics

Model	RAK19007 WisBlock Base Board 2nd Gen	RAK19001 WisBlock Dual IO Base Board	RAK19003 WisBlock Mini Base Board
Operational temperature range	–35°C ~ 75°C		
Extended Temperature Range	–40°C ~ 80°C		
Storage Temperature Range	–40°C ~ 80°C		

Interface Specifications

Model	RAK19007 WisBlock Base Board 2nd Gen	RAK19001 WisBlock Dual IO Base Board	RAK19003 WisBlock Mini Base Board
Interface Type	Type-C USB	Type-C USB	Type-C USB
CPU Slot	1	1	1
WisBlock Sensor Slot(24-pin)	4	6	2
WisBlock I/O Slot (40-pin)	1	2	-
WisBlock Power Slot(40-pin)	1	1	
IO Extension Header (4-pin 2.54 mm)	3	2	2
IO Extension Header (40-pin 2.54 mm)	-	1	-
Rechargeable Battery Connector(2-pin)	1	1	1
Non-rechargeable Battery Connector (2-pin)	-	1	-
Solar Panel Connecto	1	1	1
LED	3	3	3
Reset Button	1	1	1
User-defined Button	-	1	-
Battery Selector	-	1	-

Electrical Characteristics

Model	RAK19007 WisBlock Base Board 2nd Gen	RAK19001 WisBlock Dual IO Base Board	RAK19003 WisBlock Mini Base Board
Power Supply on the USB port (VBUS)	–0.3 ~ 5.5 V		
Rechargeable Battery Voltage (VBAT)	–0.3 ~ 4.3 V		
Non-rechargeable Battery Voltage	-	–0.3 ~ 5.5 V	-
Solar Panel Voltage (CONN_S)	–0.3 ~ 5.5 V		
IOs of WisConnector	–0.3 ~ VDD + 0.3 V		
ESD	2,000		
Leakage Current (without any module)	2 µA		
Idle Current(with MCU and sensor, in sleep mode)	10 µA		
Working Current(with LoRa® module, transmitting)	130 µA		
Maximum Output Current	-	-	750 mA
Battery Supply Voltage	3.3 ~ 4.3 V		
Charging Voltage	4.5 ~ 5.5 V		
Charging Current	350 mA	At least 500 mA	350 mA
Rechargeable Battery Specification	Standard Voltage: 3.7 V; Charging Voltage: 4.2 V; Capacity: As required; Discharge current: At least 500 mA		
Non-rechargeable Battery Specification	-	3.3 ~ 5.5 V	-

Base Board with Power Slot

WisBlock is build up on a WisBlock Base board, a platform carrier that allows easy plug-in of one WisBlock Core processing board and multiple WisBlock modules. WisBlock Base Board with Power Slot that connects WisBlock Core and other WisBlock Modules. The power slot of WisBlock Base is required to have an attached WisBlock Power Slot module that provides power supply to the core and other modules. There are many different types of power slot modules, such as RAK19012, RAK19013, RAK19014, RAK19015, RAK19016, and RAK19017, to provide you with diversified power options.

High-Speed Board-to-Board Connectors

Each module is designed to connect and fasten easily. High-speed board-to-board connectors provide signal integrity for each data bus. A set of screws are used for attaching the module under the environment with vibrations.

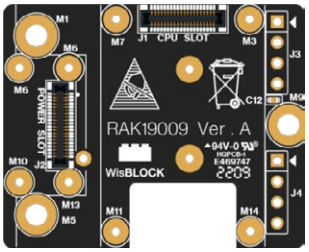
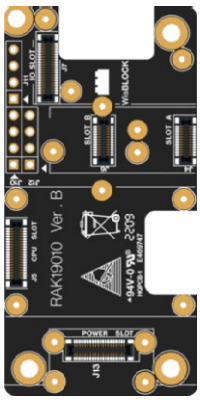
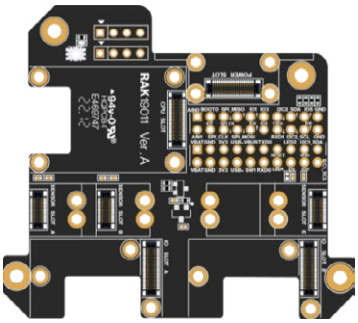
Connect Modules with High Flexibility

The modular design makes it easier to implement your IoT solution by simple clicking blocks together. It supports different types of MCUs, sensor modules, and power modules.

Multiple Industrial-Level Design

The standard interface WisBlock Base of different sizes meets the industrial level design and can meet the solutions of different deployment spaces.

Module Overview

Model	RAK19009 WisBlock Mini Base Board with Power Slot	RAK19010 WisBlock Base Board with Power Slot	RAK19011 WisBlock Dual IO Base Board with Power Slot
Board Overview			
Size	30 x 35 mm	60 x 30 mm	60 x 67 mm

Environmental Characteristic

Model	RAK19009 WisBlock Mini Base Board with Power Slot	RAK19010 WisBlock Base Board with Power Slot	RAK19011 WisBlock Dual IO Base Board with Power Slot
Operational temperature range	–35°C ~ 75°C		
Extended temperature range	–40°C ~ 80°C		
Storage temperature range	–40°C ~ 80°C		

Interface Specifications

Model	RAK19009 WisBlock Mini Base Board with Power Slot	RAK19010 WisBlock Base Board with Power Slot	RAK19011 WisBlock Dual IO Base Board with Power Slot
CPU Slot	1	1	1
WisBlock Sensor Slot (24-pin)	2	4	6
WisBlock I/O Slot (40-pin)	-	1	2
WisBlock Power Slot (40-pin)	1	1	1
IO Extension Header (4-pin 2.54 mm)	2	3	2
IO Extension Header (40-pin 2.54 mm)	-	-	1
User-defined Button	-	-	1

Electrical Characteristics

Model	RAK19009 WisBlock Mini Base Board with Power Slot	RAK19010 WisBlock Base Board with Power Slot	RAK19011 WisBlock Dual IO Base Board with Power Slot
IOs of WisConnector	–0.3 ~ VDD + 0.3		
ESD	2,000		

Power Slot Module Compatibility

Model	RAK19009 WisBlock Mini Base Board with Power Slot	RAK19010 WisBlock Base Board with Power Slot	RAK19011 WisBlock Dual IO Base Board with Power Slot
Solar Power Slot Module	RAK19012 WisBlock USB LiPo Solar Power Slot Module		
	RAK19013 WisBlock LiPo Solar Power Slot Module		
Battery Power Slot Module	RAK19014 WisBlock Battery USB Power Slot Module		
	RAK19015 WisBlock Battery Power Slot Module		
PoE / 5 ~ 24 V Power Slot Module	RAK19016 WisBlock 5-24V Power Slot Module		
	RAK19017 WisBlock POE Slot Module		

Power Slot

WisBlock Power Slot Module is a power board designed for WisBlock Base with power slots. We provide a variety of WisBlock power modules, and their standard WisBlock Power connectors are compatible with a variety of WisBlock Base, providing users with diverse power options.

Standard WisBlock Power Connector

Each WisBlock power module has a unified standard interface, that is, a high-speed board-to-board connector, which provides a safe and reliable interconnection between WisBlock Power module and WisBlock Base Board, ensuring the signal integrity of each data bus.

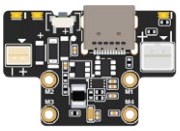
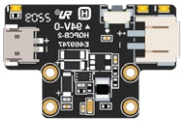
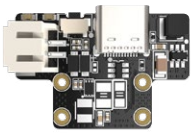
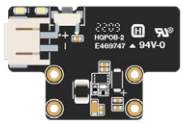
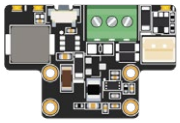
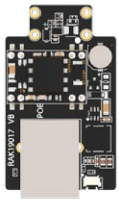
Flexible and Compatible

Based on a standard 40-pin connector, all power modules are compatible with different sizes of WisBlock substrates, providing more possibilities for user solutions.

Diversified Power Supply Options

We provide different types of power options, such as solar, battery, and PoE, to meet the needs of different applications of users to the greatest extent.

Module Overview

Model	RAK19012 USB LiPo Solar Power Slot Module	RAK19013 LiPo Solar Power Slot Module	RAK19014 Battery USB Power Slot Module	RAK19015 Battery Power Slot Module	RAK19016 5 ~ 24 V Power Slot Module	RAK19017 PoE Slot Module
Board Overview						
Size	30 x 20 mm	30 x 20 mm	30 x 20 mm	30 x 20 mm	30 x 20mm	30 x 50 mm
Features	• USB C connector for programming and debugging of WisBlock Core • Compatible to LiPo rechargeable battery • Solar panel connector for battery charging • Onboard battery charger chip • Low Power Consumption	• Supports lithium battery charging • Supports solar charging • Onboard battery charger chip • Low power battery power supply	• Designed for battery powered applications • Support reprogramming of WisBlock Core via USB connector • High-efficiency switching regulator • Optimized for low-power devices	• High-efficiency switching regulator • Designed for battery-only powered applications • Optimized for low-power devices	• Supports 5 V to 24 V DC voltage supply input • Uses three-pin screw terminal connector • Compatible with LiPo rechargeable battery • On-board battery charger chip • Applicable to industrial and enterprise setting	• POE Power Module (power supply only, no Ethernet connection capability) • Short-circuit protection and Over temperature protection • 36 V to 57 V Input voltage range

Interface Specifications

Model	RAK19012 USB LiPo Solar Power Slot Module	RAK19013 LiPo Solar Power Slot Module	RAK19014 Battery USB Power Slot Module	RAK19015 Battery Power Slot Module	RAK19016 5 ~ 24 V Power Slot Module	RAK19017 PoE Slot Module
WisBlock Power Connector	1	1	1	1	1	1
Type-C USB	1	-	1	-	-	-
Battery Connector(2-pin)	1	1	1	1	1	-
Solar Connector	1	1	-	-	-	-
Power Input Connector	-	-	-	-	1	-
PoE	-	-	-	-	-	1
LED	3	3	2	2	3	-
RESET Push Button	1	1	1	1	1	1

Electrical Characteristics

Model	RAK19012 USB LiPo Solar Power Slot Module	RAK19013 LiPo Solar Power Slot Module	RAK19014 Battery USB Power Slot Module	RAK19015 Battery Power Slot Module	RAK19016 5 ~ 24 V Power Slot Module	RAK19017 PoE Slot Module
Battery Voltage (VBAT) Rating	–0.3 ~ 4.3 V	–0.3 ~ 4.3 V	–0.3 ~ 4.3 V	–0.3 ~ 4.3 V	–0.3 ~ 4.3 V	-
Solar Panel voltage (VIN) Rating	–0.3 ~ 5.5 V	–0.3 ~ 5.5 V	-	-	-	36 ~ 57 V
Power In Voltage (VCC-IN) Rating	-	-	-	-	5~24 V	-
IOs of WisConnector	–0.3 ~ VDD + 0.3 V	–0.3 ~ VDD + 0.3 V	–0.3 ~ VDD + 0.3 V	–0.3 ~ VDD + 0.3 V	–0.3 ~ VDD + 0.3 V	-
Battery Supply Voltage	3.3 ~ 4.3 V	3.3 ~ 4.3 V	3.3 ~ 4.3 V	3.3 ~ 4.3 V	3.3 ~ 4.3 V	-
Power In Voltage	-	-	-	-	5 ~ 24 V	-
Battery Specification	Standard voltage: 3.7 V; Charging voltage: 4.2 V; Capacity: As required; Discharge current: At least 500 mA					-

Environmental Characteristics

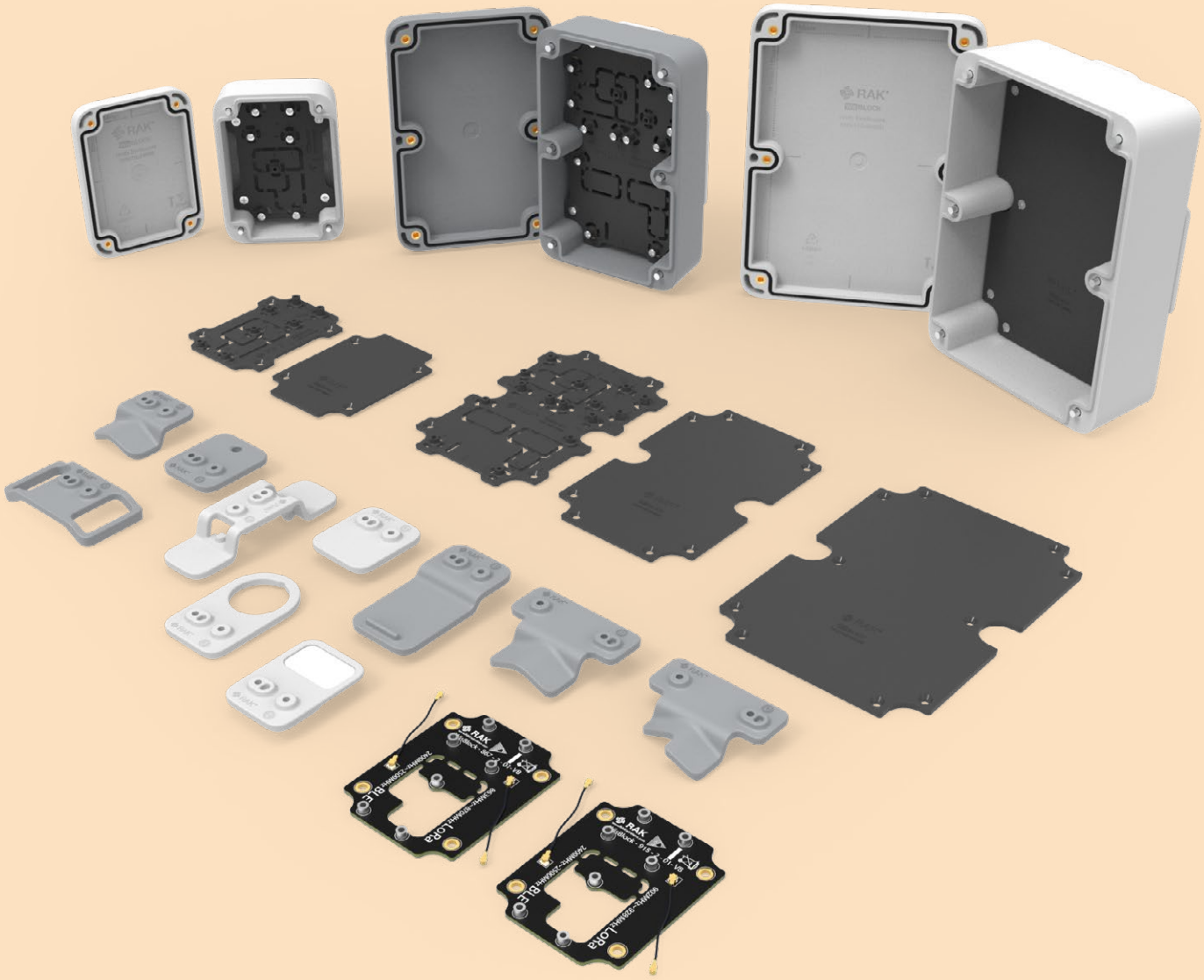
Model	RAK19012 USB LiPo Solar Power Slot Module	RAK19013 LiPo Solar Power Slot Module	RAK19014 Battery USB Power Slot Module	RAK19015 Battery Power Slot Module	RAK19016 5 ~ 24 V Power Slot Module	RAK19017 PoE Slot Module
Operational temperature range	–35°C ~ 75°C					
Extended temperature range	–40°C ~ 80°C					
Storage temperature range	–40°C ~ 80°C					

WisBlock Base (with power slot) Compatibility

Model	RAK19012 USB LiPo Solar Power Slot Module	RAK19013 LiPo Solar Power Slot Module	RAK19014 Battery USB Power Slot Module	RAK19015 Battery Power Slot Module	RAK19016 5 ~ 24 V Power Slot Module	RAK19017 PoE Slot Module
WisBlock Base	RAK19009 WisBlock Mini Base Board with Power Slot					
	RAK19010 WisBlock Base Board with Power Slot					
	RAK19011 WisBlock Dual IO Base Board with Power Slot					

WisBlock Enclosure

102-111



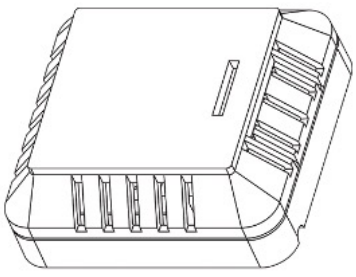
RAKBox-B3 Indoor Enclosure

RAKBox-B3 is an IP20 rated enclosure for indoor usage. It is designed specifically for the WisBlock products. The enclosure is a small and lightweight design. Perfect for setups where space is limited. The slots in the cover allow airflow through the enclosure for applications that measure air temperature and humidity.

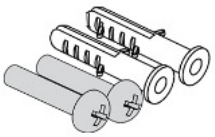
- Dimensions W x L x H: 90mm x 85mm x34mm
- Weight: approximately 3.87oz (110g)
- Material thickness: 3mm
- Support wall mounting
- Ingress Protection: IP20

Supported Modules			
RAK19007	WisBlock Base Board 2nd Gen	**RAK1902**	WisBlock Barometer Pressure Sensor
RAK4631	WisBlock LPWAN Module	**RAK1904**	WisBlock 3-axis Acceleration Sensor
RAK1901	WisBlock Temperature and Humidity Sensor	**RAK1906**	WisBlock Environmental Sensor

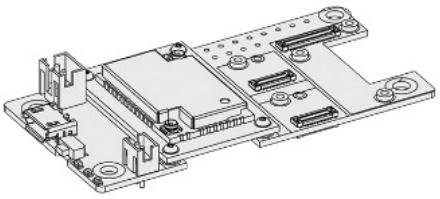
Package Inclusion



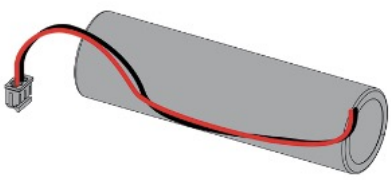
Enclosure



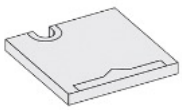
Assembly screws



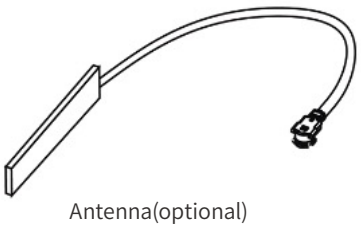
Your choice of WisBlock Base



Battery(optional)



Your choice of WisBlock Core/ Sensor



Antenna(optional)

Unify Enclosure with Solar Panel

The Unify Enclosures are modular IP65 rated outdoor enclosures that include tailored features to support WisBlock baseboards and WisBlock modules, but are highly adaptable to any application with spacious internals and thoughtfully designed universal mounting options. The variant with solar panel has an 80 x 45 mm size solar panel integrated in the lid and a matching cable for the solar panel connector of WisBlock baseboards. Depending on the power consumption of your application it can recharge a battery and make the product independent of an external power source.

Accessories supported:

- Unify WisBlock Mounting Plate 100x75x38mm - Allowing you to create your own custom internal mounting solution easily with WisBlock hardware
- Unify WisBlock Mounting Plate 100x75x38mm with integrated LoRa® antenna, 863 - 870 MHz for RU864, IN865 and EU868
- Unify WisBlock Mounting Plate 100x75x38mm with integrated LoRa® antenna, 902 - 928 MHz for AU915, US915, KR920 and AS923
- Unify Mounting Plate Blank 100x75x38mm - Allowing you to create your own custom internal mounting solution for any hardware
- Unify Pole Mounting Vertical Kit (Type A)
- Unify Wall Mounting Kit (Type D)
- Unify Belt Clip Kit (Type E)
- Unify DIN Rail Mounting Kit (Type F)
- Unify Magnet Mounting Kit (Type G)
- Unify Belt Loop Kit (Type H)
- Unify Label Kit (Type I)
- Unify Hook Loop Kit (Type J)

Enclosure Specifications	
Material	ABS UL94V-0
External Size	100x75x38mm(including lid)
Internal Space	Approx 86x61x29mm (Usable space varies due to internal features)
General Wall Thickness	4.5mm
Silicone waterproof seal (square profile to prevent twisting upon install)	
Brass threaded inserts throughout (blind type)	

Solar Panel Specifications	
Open circuit voltage	6.1V (±10%)
Short circuit current	95mA (±5%)
Voltage at nominal power	5V (±10%)
Current at nominal power	90mA (±5%)
Cell efficiency	18%
Size	80 x 45 x 1.7 mm (±0.2 mm)
Temperature range	-20-65°C
Humidity range	45-85%

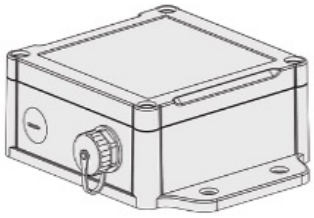
RAKBox-B4 Outdoor Enclosure

RAKBox-B4 is an IP67 rated enclosure for outdoor usage. It is designed specifically for the WisBlock products. The enclosure is a small, lightweight, yet very rigid design. Perfect for setups where space is limited. It is rated I67/ NEMA-6, so it is a weather proof.

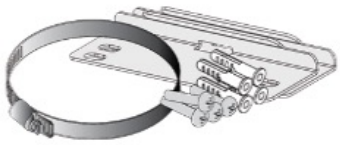
- Dimensions W x L x H: 168mm (include mount ears) x 120mm x 55mm
- Weight: approximately 8.46oz (240g)
- Material thickness: 3mm
- Pole and wall-mounting: 50 ~ 75mm pole diameter
- Logo customization possibility
- Support for Logo printing and custom color painting
- Support opening as required.

Supported Modules			
RAK19007	WisBlock Base Board 2nd Gen	**RAK1906**	WisBlock Environmental Sensor
RAK4631	WisBlock LPWAN Module	**RAK1910**	WisBlock GNSS Location Module
RAK2305	WisBlock WiFi Interface Module	**RAK1920**	WisBlock Sensor Adapter Module
RAK5860	WisBlock NB-IoT Interface Module	**RAK5801**	WisBlock 4-20mA Interface Module
RAK1901	WisBlock Temperature and Humidity Sensor	**RAK5802**	WisBlock RS485 Interface Module
RAK1902	WisBlock Barometer Pressure Sensor	**RAK5804**	WisBlock Interface Extension Module
RAK1904	WisBlock 3-axis Acceleration Sensor	**RAK5811**	WisBlock 0-5V Interface Module

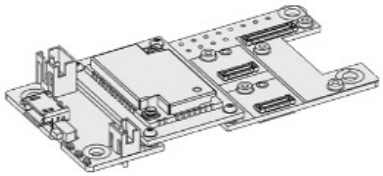
Package Inclusion



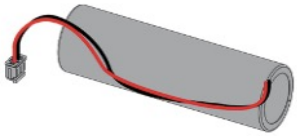
Enclosure



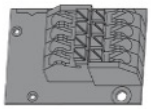
Installation Kit



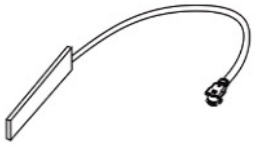
Your choice of WisBlock Base



Battery(optional)



Your choice of WisBlock Core/ Sensor/ I/O



Antenna(optional)

RF Cable(optional)

Unify Enclosure

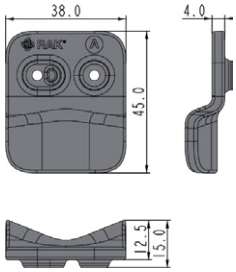
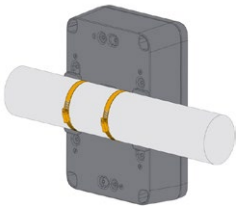
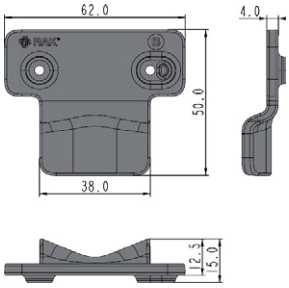
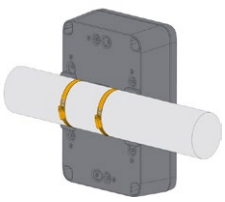
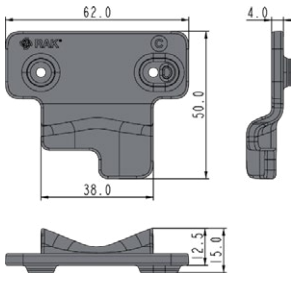
The Unify Enclosures are modular IP67 rated outdoor enclosures that include tailored features to support WisBlock Base Boards and WisBlock Modules, but are highly adaptable to any application with spacious internals and thoughtfully designed universal mounting options.

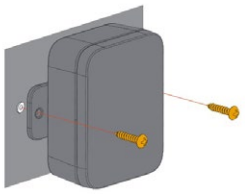
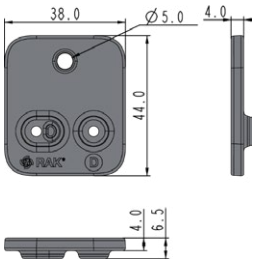
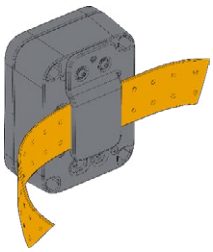
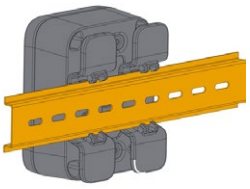
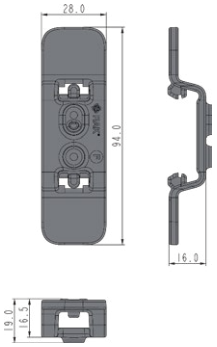
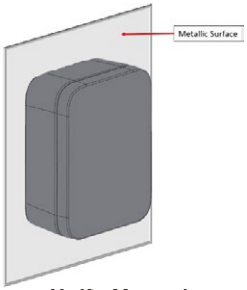
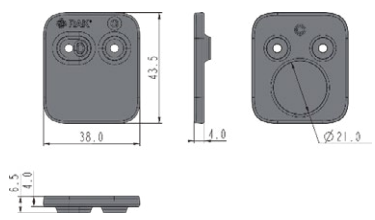
Specifications

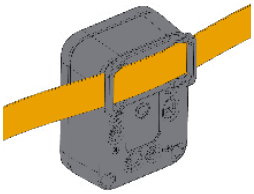
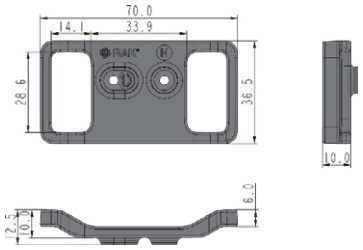
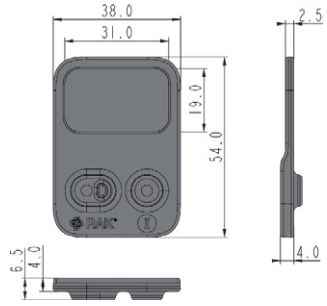
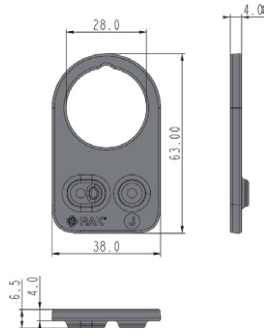
Model	RAKBox-UO 180x130x60	RAKBox-UO 150x100x45	RAKBox-UO 100x75x38
Module Diagram			
External Size	180 x 130 x 60 mm	150 x 100 x 45 mm	100 x 75 x 38 mm
Internal Space	165 x 115 x 50 mm	138 x 88 x 35 mm	86 x 61 x 29 mm
General Wall Thickness	4.5 mm		
Ingress Protection	IP67		
Material	ABS UL94V-0		
Color	Cool gray / White color		
Board Supported	RAK19001 RAK19003 RAK19007 RAK5005-O	RAK19001 RAK19003 RAK19007 RAK5005-O	RAK19003 RAK19007 RAK5005-O
Accessories supported	✔ Unify Pole Mounting Vertical Kit (Type A) ✔ Unify Pole Mounting Horizontal Kit (Type B) ✔ Unify Pole Mounting Horizontal Kit (Type C) ✔ Unify Wall Mounting Kit (Type D) ✔ Unify Belt Clip Kit (Type E) ✔ Unify DIN Rail Mounting Kit (Type F) ✔ Unify Magnet Mounting Kit (Type G) ✔ Unify Belt Loop Kit (Type H) ✔ Unify Label Kit (Type I) ✔ Unify Hook Loop Kit (Type J)	✔ Unify Pole Mounting Vertical Kit (Type A) ✔ Unify Pole Mounting Horizontal Kit (Type C) ✔ Unify Wall Mounting Kit (Type D) ✔ Unify Belt Clip Kit (Type E) ✔ Unify DIN Rail Mounting Kit (Type F) ✔ Unify Magnet Mounting Kit (Type G) ✔ Unify Belt Loop Kit (Type H) ✔ Unify Label Kit (Type I) ✔ Unify Hook Loop Kit (Type J)	✔ Unify Pole Mounting Vertical Kit (Type A) ✔ Unify Wall Mounting Kit (Type D) ✔ Unify Belt Clip Kit (Type E) ✔ Unify DIN Rail Mounting Kit (Type F) ✔ Unify Magnet Mounting Kit (Type G) ✔ Unify Belt Loop Kit (Type H) ✔ Unify Label Kit (Type I) ✔ Unify Hook Loop Kit (Type J)
LiPo Battery Mount Space	165 x 115 x 6mm	107 x 57 x 6mm	55 x 34 x 6mm
Waterproof	Silicone waterproof seal (square profile to prevent twisting upon install)		
Windproof/ Dustproof	Supported		
Installation	Brass threaded inserts throughout (blind type)		

Unify Enclosure Accessories

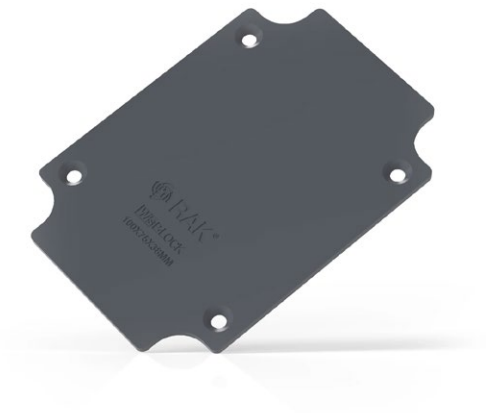
The WisBlock Unify Enclosure supports different types of mounting accessories.

Mounting Type	Package Inclusion	Mechanical Specifications	Unify Enclosure Compatibility
 **Unify Pole Mounting Vertical Kit (Type A)**	 ✔ 2pc Unify Pole Mount Vertical (Type A) accessories ✔ 4pc M3x8mm Stainless Steel Screw (to mount the accessory to the enclosure) ✔ 2pc Mechanical adjustable strap (stainless steel) for pole diameters 65-80mm	 Materia: ABS (UL94V-0) General Wall Thickness: 4 mm Colour: Cool Grey / Pure White Unit: mm	✔ Compatible with Unify Enclosure 100x75x38mm ✔ Compatible with Unify Enclosure 150x100x45mm ✔ Compatible with Unify Enclosure 180x130x60mm ✔ Compatible with mechanical adjustable straps with strap width of up to 16mm
 **Unify Pole Mounting Horizontal Kit (Type B)**	 ✔ 2 pc Unify Pole Mounting Horizontal (Type B) accessories ✔ 4 pc M3x8mm Stainless Steel Screw (to mount the accessory to the enclosure) ✔ 2 pc Mechanical adjustable strap (stainless steel) for pole diameters 65-80mm	 Materia: ABS (UL94V-0) General Wall Thickness: 4 mm Colour: Cool Grey / Pure White Unit: mm	✔ Compatible with ONLY Unify Enclosure 180x130x60mm ✔ Compatible with mechanical adjustable industrial straps with strap width of up to 16mm
 **Unify Pole Mounting Horizontal Kit (Type C)**	 ✔ 2pc Unify Pole Mount Horizontal (Type C) accessories ✔ 4pc M3x8mm Stainless Steel Screw (to mount the accessory to the enclosure) ✔ 2pc Mechanical adjustable strap (stainless steel) for pole diameters 65-80mm	 Material: ABS UL94V-0 General Wall Thickness: 4.0mm Colour: Cool Grey / Pure White Unit: mm	✔ Compatible with Unify Enclosure 150x100x45mm ✔ Compatible with Unify Enclosure 180x130x60mm ✔ Compatible with mechanical adjustable industrial straps with strap width of up to 16mm

Mounting Type	Package Inclusion	Mechanical Specifications	Unify Enclosure Compatibility
 **Unify Wall Mounting Kit (Type D)**	 ✔ 2pc Unify Wall Mount (Type D) accessories ✔ 4pc M3x8mm Stainless Steel Screw (to mount Accessory to the enclosure) ✔ 2pc 3.5x25mm Self-Tapping Screw (for wall fixing) ✔ 2pc Wall plug for Self-tapping screw (requires 5mm drill hole in typical wall materials)	 Material: ABS UL94V-0 General Wall Thickness: 4.0mm Colour: Cool Grey / Pure White Unit: mm	✔ Compatible with Unify Enclosure 100x75x38mm ✔ Compatible with Unify Enclosure 150x100x45mm ✔ Compatible with Unify Enclosure 180x130x60mm ✔ Compatible with fixing screw of maximum diameter 5mm
 **Unify Belt Clip Kit (Type E)**	 ✔ 1 pc Unify Belt Clip (Type E) accessories ✔ 2 pc M3x8mm Stainless Steel Screw (to mount the accessory to the enclosure)	 Material: ABS UL94V-0 General Wall Thickness: 4.0mm Colour: Cool Grey / Pure White Unit: mm	✔ Compatible with Unify Enclosure 100x75x38mm ✔ Compatible with Unify Enclosure 150x100x45mm ✔ Compatible with Unify Enclosure 180x130x60mm ✔ Typical belt/strap width supported: 35mm ✔ Typical belt/strap thickness supported: 5mm
 **Unify DIN Rail Mounting Kit (Type F)**	 ✔ 2 pc Unify DIN Rail Mounting (Type F) accessories ✔ 4 pc M3x8mm Stainless Steel Screw (to mount the accessory to the enclosure)	 Material: PP UL94V-0 General Wall Thickness: 4.0mm Colour: Cool Grey / Pure White Unit: mm	✔ Compatible with Unify Enclosure 100x75x38mm ✔ Compatible with Unify Enclosure 150x100x45mm ✔ Compatible with Unify Enclosure 180x130x60mm ✔ DIN Rail Supported: IEC/EN 60715 35 x 7.5 ✔ DIN Rail Supported: IEC/EN 60715 35 x 15 ✔ Compatible DIN rail may have different names / references in different countries. DIN Rail Equivalents are: TH35/Type O/Type Ω/TS35
 **Unify Magnet Mounting Kit (Type G)**	 ✔ 2 pc Unify Magnet Mount (Type G) accessories ✔ 4 pc M3x8mm Stainless Steel Screw (to mount the accessory to the enclosure) ✔ 2 pc double-sided tape to bond magnet in place	 Material: ABS UL94V-0 General Wall Thickness: 4.0mm Colour: Cool Grey / Pure White Unit: mm	✔ Compatible with Unify Enclosure 100x75x38mm ✔ Compatible with Unify Enclosure 150x100x45mm ✔ Compatible with Unify Enclosure 180x130x60mm ✔ Magnet diameter supported: 20mm max ✔ Magnet thickness supported: 3mm min (when bonded with 1mm double-sided tape)

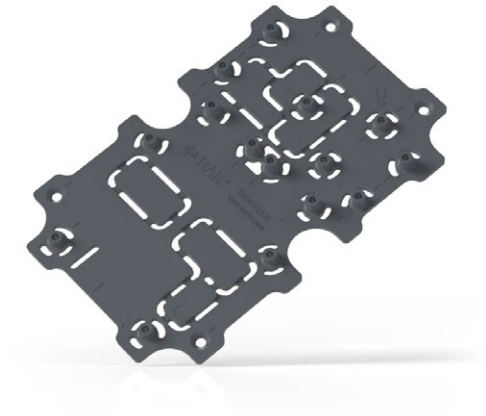
Mounting Type	Package Inclusion	Mechanical Specifications	Unify Enclosure Compatibility
 **Unify Belt Loop Kit (Type H)**	 ✔ 1 pc Unify Belt Loop (Type H) accessories ✔ 2 pc M3x8mm Stainless Steel Screw (to mount the accessory to the enclosure)	 Material: ABS UL94V-0 General Wall Thickness: 4.0mm Colour: Cool Grey / Pure White Unit: mm	✔ Compatible with Unify Enclosure 100x75x38mm ✔ Compatible with Unify Enclosure 150x100x45mm ✔ Compatible with Unify Enclosure 180x130x60mm ✔ Typical belt / strap width supported: 27mm max ✔ Typical belt / strap thickness supported: 5mm max
 **Unify Label Kit (Type I)**	 ✔ 1 pc Unify Label Kit (Type I) accessories ✔ 2 pc M3x8mm Stainless Steel Screw (to mount the accessory to the enclosure)	 Material: ABS UL94V-0 General Wall Thickness: 4.0mm Colour: Cool Grey / Pure White Unit: mm	✔ Label size supported: 30x18mm with 4mm corner radius on all 4 corners (self-adhesive type) ✔ Compatible with Unify Enclosure 100x75x38mm ✔ Compatible with Unify Enclosure 150x100x45mm ✔ Compatible with Unify Enclosure 180x130x60mm
 **Unify Hook Loop Kit (Type J)**	 ✔ 1 pc Unify Hook Loop Kit(Type J) accessories ✔ 2 pc M3x8mm Stainless Steel Screw (to mount the accessory to the enclosure)	 Material: ABS UL94V-0 General Wall Thickness: 4.0mm Colour: Cool Grey / Pure White Unit: mm	✔ Compatible with Unify Enclosure 100x75x38mm ✔ Compatible with Unify Enclosure 150x100x45mm ✔ Compatible with Unify Enclosure 180x130x60mm ✔ Hook loop hole diameter: 27mm

There are 3 types of mounting plates to serve multiple requirements:



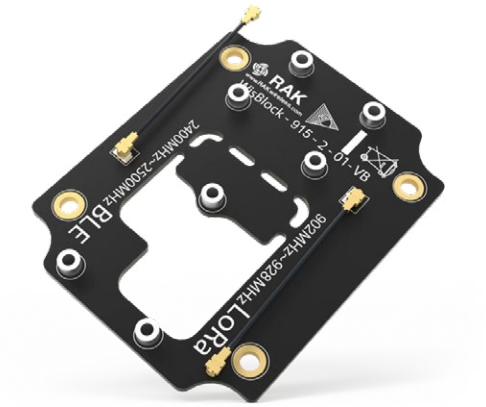
Blank Mounting Plate

These blank mounting plates allow to use any electronic board or other devices inside the Unify enclosures. Mounting bosses matching with your electronics can be placed anywhere on the mounting plate.



Mounting Plate with Screw Bosses for WisBlock

These mounting plates include dedicated screw bosses tailored for a range of WisBlock Baseboards.



Mounting Plate with Integrated Antennas for LoRa® and BLE

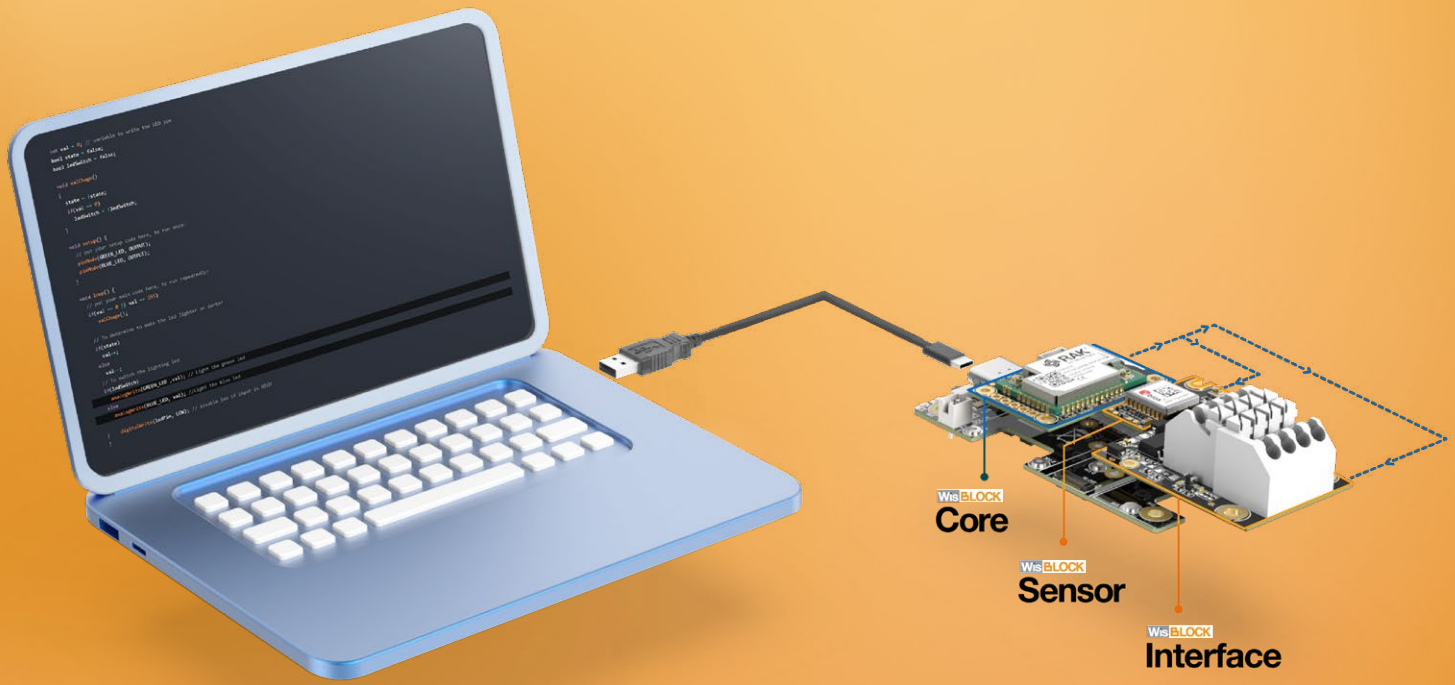
This mounting plate eliminates the need to add antennas inside or outside the enclosure. The antennas are optimized for 868 to 870 MHz (RU864/IN865/EU868) or 902 to 928 MHz (US915/AU915/KR920/AS923). In addition these mounting plates include dedicated screw bosses tailored for a range of WisBlock Baseboards.

Enclosure Size	Parameters	Mounting Plate		
		Blank mounting plate	Mounting plate with Screw Bosses for WisBlock	Mounting plate with integrated antennas for LoRa® and BLE
100x75x38 mm	LiPo Battery Mount Space	55 x 34 x 6 mm	55 x 34 x 6 mm	55 x 34 x 6 mm
	Mounting Plate Specifications	• Material: ABS UL94V-0 • Size: 88x63x2mm • Thickness: 2mm • Colour: Medium Gray • Compatible only with Unify Enclosure IP67 100x75x38mm	• Material: ABS UL94V-0 • Size: 80x63x6.8mm* (*To tallest screw boss) • General Thickness: 2mm • WisBlock Base Board PCB bottom surface offset from plate top surface: 3mm • Colour: Medium Gray • Compatible only with Unify Enclosure IP67 100x75x38mm • Includes self-tapping screws to mount the WisBlock Base Board to the mounting plate	• Material: FR4 • Size: 80x63x6.8mm* (*To tallest screw boss) • General Thickness: 1.2mm • WisBlock Base Board PCB bottom surface offset from plate top surface: 3mm • Colour: Medium Gray • Compatible only with Unify Enclosure IP67 100x75x38mm • Includes screws to mount the WisBlock Base Board to the mounting plate Edited
	WisBlock Baseboards Supported	—	• RAK5005 • RAK19007 • RAK19003	• RAK5005 • RAK19007 • RAK19003
150x100x45 mm	LiPo Battery Mount Space	107x57x6mm	107x57x6mm	—
	Mounting Plate Specifications	• Material: ABS UL94V-0 • Size: 137x87x6.8mm (To tallest screw boss) • General Thickness: 2mm • Colour: Medium Gray • Compatible only with Unify Enclosure IP67 150x100x45mm	• Material: ABS UL94V-0 • Size: 137x87x6.8mm* (*To tallest screw boss) • General Thickness: 2mm • WisBlock Base Board PCB bottom surface offset from plate top surface: 3mm • Colour: Medium Gray • Compatible only with Unify Enclosure IP67 150x100x45mm • Includes self-tapping screws to mount the WisBlock Base Board to the mounting plate	
	WisBlock Baseboards Supported	—	• RAK19001 and simultaneously one of the following • RAK5005 • RAK19007 • RAK1900	—
180x130x60 mm	LiPo Battery Mount Space	165x115x6mm	—	—
	Mounting Plate Specifications	• Material: ABS UL94V-0 • Size: 165x115x2mm • Thickness: 2mm • Colour: Medium Gray • Compatible only with Unify Enclosure IP67 180x130x60mm	—	—

WisBLOCK × RUI

RUI3 Framework & Open Source

Create, compile, and deploy your firmware.
Compatible with Arduino libraries.
Supports major IoT protocols.



e-Version

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