WisBlock Quick Start Guide

Figure 1: WisBlock Ecosystem

Overview

Description

WisBlock is a modular system that makes it easy to implement a low power wide area network (LPWAN) into your IoT solution. WisBlock is going with your solution from rapid prototyping to mass production without the need to create new hardware modules for each step.

- In the development phase, WisBlock modularity allows you to test different microcontrollers, sensors, communication technology, IO options by changing modules with the simple plug-in modules.
- WisBlock industrial-grade modules can be used in mass production without the need to redesign the prototypes.
- Even once deployed, devices can be modified or repaired with minimal waste and effort

Key Features

Click. Code. Connect.

WisBlock is created with 4 modular blocks.

1. **WisBlock Base** is the baseboard that connects everything.
2. **WisBlock Core** is the computation and communication module

3. **WisBlock Sensor** is a selection of sensor and input modules
4. **WisBlock IO** extends the output and communication possibilities of the WisBlock Core

WisBlock Highlights

- With the use of a compact connector, this makes its size exceptionally small. A WisBlock Base board, which is the base carrier, is only **30mm by 60mm** in size.
- Using an industrial rated connector, it enables you to use the same modules from rapid prototyping to testing to final product.
- WisBlock is not only modular on the hardware base but with ready to use software blocks it is simple to create an application to match your solution requirements.

WisBlock Base

- WisBlock Base is the **carrier** for all WisBlock modules.
- It contains the power supply for all modules, **USB/5V connector**, **battery charger**, **solar charger**, **status LED**, and **reset button**.
- One WisBlock Base can hold one microcontroller module (WisBlock Core), one IO module (WisBlock IO), and up to 4 sensor modules (WisBlock Sensor).application to match your solution requirements.

WisBlock Core

- WisBlock Core is the **data processing center** of WisBlock.
- Some WisBlock Core modules also offer LoRa/LoRaWan® communication and additional communication means like Bluetooth, Bluetooth Low Energy, or Wi-Fi.

WisBlock Sensor

- WisBlock Sensor is the **data acquisition module** of WisBlock.
- It includes analog, digital, and environmental as well as location acquisition sensors.

WisBlock IO

- WisBlock IO modules **extend the input and output possibilities** of WisBlock.
- Options include cellular, displays, LEDs, button interfaces, and additional USB and GPIO ports as well as Wi-Fi.

Quick Start Guide

Software Setup

Getting started with the WisBlock products is simple and straight forward. The first thing you need is to set up your software development environment. We have made detailed tutorials on how to setup Arduino™ IDE and the PlatformIO extension to be ready to use the WisBlock RAK4630:

1. Setup Arduino™ IDE
2. Setup PlatformIO

Hardware Setup

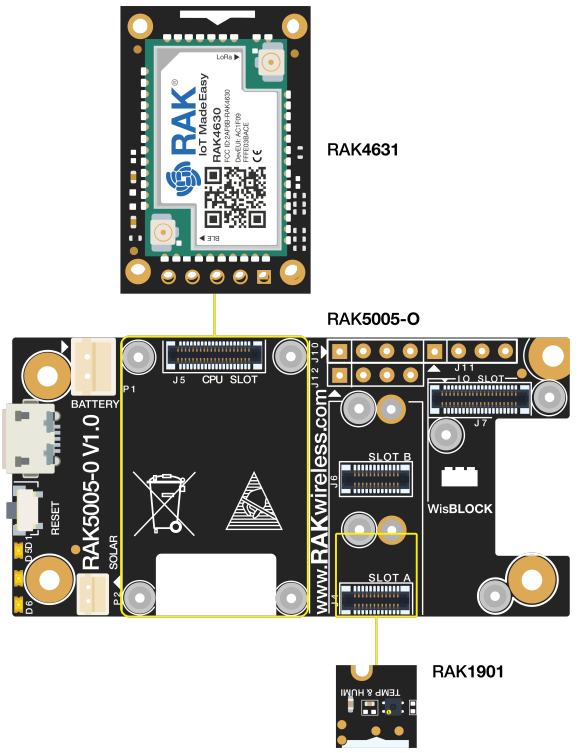

Figure 2: WisBlock Hardware Setup

WisBlock Base

WisBlock Base is the baseboard which connects the WisBlock Core board with the WisBlock IO and WisBlock Sensor modules.

The standard WisBlock Base has a USB interface that connects with the core MCU's USB pins so that you can use Arduino™ IDE to upload and debug it directly. Depending on the version a WisBlock Base has 3 to 6 module slots.

- One “CPU-SLOT” which is used for the WisBlock Core module.
- One to eight slots for WisBlock Sensor modules, named “SLOT A”, “SLOT B”, “SLOT C” and so on.
- One or two “IO SLOT” for WisBlock IO modules like the RS485 board, 4~20mA or 0~5V board, Wi-Fi board, Cellular board.

WisBlock Base is as well the power supply for all WisBlock modules. It supports 5V USB input, battery supply, and a solar panel to recharge the battery.

WisBlock Core, WisBlock Sensor, and WisBlock IO modules are connected to WisBlock Base by just plugging them into the corresponding slots.

To make sure the modules are properly connected, use screws to keep them in their slots.

> ⚠ **WARNING**
>
> - Only 3.7-4.2V Rechargeable LiPo batteries are supported. Do not use other types of batteries with the system.
> - Only 5V solar panels are supported. Do not use 12V solar panels. It will destroy the charging unit and eventually other electronic parts.
> - Make sure the battery wires are matching the polarity on the RAK5005-O board. Not all batteries have the same wiring.

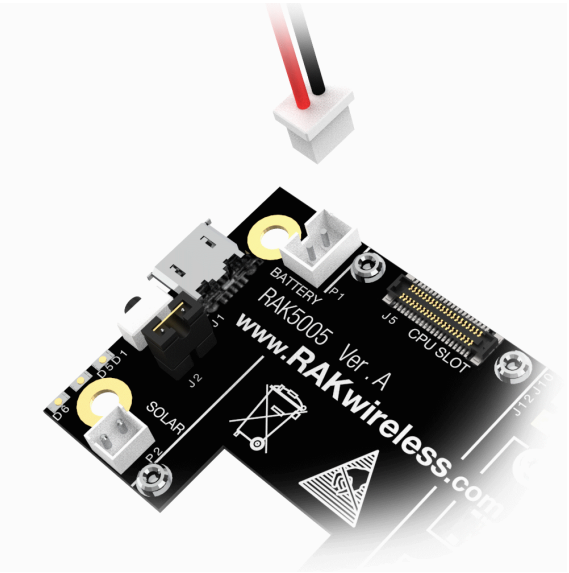

Figure 3: WisBlock Base Connection

WisBlock Core

WisBlock Core is the processing unit of the WisBlock system.

WisBlock Core is the processing unit of your IoT solution. It selects the processing power based on the requirements of your application from a range of processing boards which starts with a low single core to high dual-core processing power units are available.

All WisBlock Core modules have LoRa©/LoRaWan© communication capability, some of them offer also Wi-Fi, Bluetooth, or Bluetooth Low Energy. All are designed for battery optimized low power consumption.

Programming of the WisBlock Core modules is done over the USB connector on the WisBlock Baseboard. For flashing a custom bootloader or to debug your application the WisBlock Core modules have as well a J-Link interface.

> ⚠ **WARNING**
>
> When using the LoRa or Bluetooth Low Energy transceivers, make sure that always an antenna is connected. Using these transceivers without an antenna can damage the system. Make sure to fix the module with the screws to ensure a proper function.

> 📝 **NOTE:**
>
> Check the section **WisBlock Core** for all available variants.

WisBlock Sensor

WisBlock Sensor offers a range of sensors for sensing environmental conditions (temperature and humidity), location, and movement conditions (GNSS location and accelerometer) that you just plug into WisBlock Base. This provides an easier way of completing your application with the required sensors. WisBlock Sensor modules are with 10 x 10mm size small sensor breakout boards. Only the GNSS module is larger with 10 x 22mm and occupies 2 sensor slots on the baseboard. WisBlock Sensor modules in Slot A or Slot C can be placed in two directions. Either being above the WisBlock Base board or sticking out of the WisBlock Base board. This way sensors that are sensitive to the heat dissipated from the WisBlock Base can give better measurement results.

> ⚠ **WARNING**
>
> Make sure to fix the module with the screws to ensure a proper function.

> 📝 **NOTE:**
>
> Check the section **WisBlock Sensor** for all available modules.

WisBlock IO

WisBlock IO extensions provide your application with interfaces and communication extensions that are not covered by WisBlock Core or WisBlock Sensor blocks. This includes the following:

- IO connectors to add user interfaces like keyboards, buttons, and displays.
- Adapter for third party sensor boards from **Seeed Grove**, **Sparkfun QWICC**, and **MikroElektronika Click!** Boards.
- Sensor interfaces like **4-20mA**, **5V analog input**, **I2C**, **RS232** or **RS485**.
- Communication modules with **LTE NB-IoT**, **Wi-Fi**, **Bluetooth**, and **NFC**.
- Alternative power supplies like **POE**, **24V**.

WisBlock IO modules are around 25 x 35 mm in size.

> ⚠ **WARNING**
>
> Make sure to fix the module with the screws to ensure a proper function.

> **NOTE:**
>
> Check the section **WisBlock IO** for all available modules.

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