RAK12006 WisBlock PIR Module Datasheet

Overview

Description

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.

Features

- Digital signal processing
- Built-in filter, screen the interference by other frequency
- Schmitt Trigger Output REL
- 3.3 V Power supply
- Module size: 15 X 25 mm

Specifications

Overview

Mounting

The RAK12006 module can be mounted on the IO slot of the WisBlock Base board. **Figure 1** shows the mounting mechanism of the RAK12006 on a WisBlock Base module, such as the RAK5005-O.



Figure 1: RAK12006 mounting mechanism on a WisBlock Base module

Hardware

The hardware specification is categorized into five parts. It shows the chipset of the module and discusses the pinouts and its corresponding functions and diagrams. It also covers the electrical and mechanical parameters that include the tabular data of the functionalities and standard values of the RAK12006 WisBlock PIR Module.

Chipset

Vendor

Part number

AM312

Senba Sensing Technology Co., Ltd

Pin Definition

The RAK12006 module has a 40-pin WisConnector that is compatible to the WisBlock Base IO Slot. The pin order of the connector and the pinout definition is shown in **Figure 2**.



NC	2		NC
GND	4	3	GND
V3_S (optional)	6	5	NC
NC	8	7	NC
NC	10	9	NC
NC	12	11	NC
NC	14	13	NC
NC	16	15	NC
3V3	18	17	NC
NC	20	19	NC
NC	22	21	NC
NC	24	23	NC
NC	26	25	NC
NC	28	27	NC
NC	30	29	NC
NC	32	31	NC
NC	34	33	NC
NC	36	35	NC
OUT (IO4)	38	37	NC
GND	40	39	GND

Figure 2: RAK12006 Pinout Schematic

📝 NOTE

- Only **Digital OUT**, **3V3**, and **GND** are connected to WisConnector.
- An optional **3V3_S** supply voltage can be used to turn ON or OFF the RAK12006 module through the IO2 pin. This can be helpful on low power application.
- To disable the default 3V3 supply and use the alternative 3V3_S supply source, the resistor jumpers R1 must be 0 Ω and R2 must be NC (not connected).

Electrical Characteristics

This section shows the maximum and minimum ratings of the RAK12006 module and its recommended operating condition. Refer to the table presented below.

Recommended Operating Condition

Symbol	Description	Min.	Nom.	Max.	Unit
VDD	Power Supply Voltage	-	3.3	-	V

Mechanical Characteristics Board Dimensions

Figure 3 shows the mechanical dimensions of the RAK12006 Module.

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Figure 3: RAK12006 Mechanical Dimensions

WisConnector PCB Layout



Figure 4: WisConnector PCB Footprint and Recommendations

Schematic Diagram

Figure 5 shows the schematic of the RAK12006 module.

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Figure 5: RAK12006 WisBlock PIR Module Schematic

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RAK12006 Quick Start Guide

Prerequisite

What Do You Need?

Before going through each and every step on using the RAK12006 WisBlock module, make sure to prepare the necessary items listed below:

Hardware

- RAK12006 WisBlock PIR Module
- Your choice of WisBlock Base
 If the second seco
- Your choice of WisBlock Core
 ☐
- USB Cable
- Li-Ion/LiPo battery (optional)

Software

- Download and install $\mathsf{ArduinoIDEE}$.
- To add the RAKwireless Core boards on your Arduino board, install the RAKwireless Arduino BSP. Follow the steps in the Github repo □ .

Product Configuration

Hardware Setup

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

For more information about RAK12006, refer to the Datasheet.



Figure 1: RAK12006 connection to WisBlock Base

Assembling and Disassembling of WisBlock Modules Assembling

The RAK12006 module can be mounted on the IO slot of the WisBlock Base board, as shown in **Figure 2**. Also, always secure the connection of the WisBlock module by using compatible screws.



Figure 2: RAK12006 mounting connection to WisBlock Base module

Disassembling

The procedure in disassembling any type of WisBlock modules is the same.

1. First, remove the screws.

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Figure 3: Removing screws from the WisBlock module

2. Once the screws are removed, check the silkscreen of the module to find the correct location where force can be applied.



Figure 4: Detaching silkscreen on the WisBlock module

3. Apply force to the module at the position of the connector, as shown in **Figure 5**, to detach the module from the baseboard.



Figure 5: Applying even forces on the proper location of a WisBlock module

NOTE

If you will connect other modules to the remaining WisBlock Base slots, check on the WisBlock Pin Mapper 12 tool for possible conflicts.

After all this setup, you can now connect the battery (optional) and USB cable to start programming your WisBlock Core.

Software Configuration and Example Initial Test of the RAK12006 WisBlock Module

If you already installed the RAKwireless Arduino BSP 🗹 , the WisBlock Core and example code should now be available on the Arduino IDE.

1. You need to select first the WisBlock Core you have, as shown in Figure 6 to Figure 8.



Figure 6: Selecting RAK4631 as WisBlock Core

ile Edit Sketch Too	ols Help				
	Auto Format	Ctrl+T			
	Archive Sketch				
sketch_nov21a	Fix Encoding & Reload				
void setup	Manage Libraries	Ctrl+Shift+I			
// put y	Serial Monitor	Ctrl+Shift+M			
	Serial Plotter	Ctrl+Shift+L			
}	WiFi101 / WiFiNINA Firmware Updater				
void loop(Board: "WisCore RAK11200 Board"	3	Boards Manager		
// put y	Upload Speed: "921600"	2	Arduino AVR Boards		
	Flash Frequency: "80MHz"	2	RAKwireless ESP32 Modules	WisCore RAK11200 Board	
3	Flash Mode: "QIO"	1	RAKwireless nRF Modules		
	Partition Scheme: "Default 4MB with spiffs (1.2MB APP/1.5MB SPIFFS)"	1	Rakwireless Raspberry Modules $ ightarrow$		
	Core Debug Level: "None"	>			
	Port	>			
	Get Board Info				
	Programmer	>			
	Burn Bootloader				
					W6-C+++ D41(1990-D
1					WisCore RAK11200 B

Figure 7: Selecting RAK11200 as WisBlock Core

File Edit Sketch Too	ls Help		
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sketch_nov21a	Fix Encoding & Reload		
void setup	Manage Libraries	Ctrl+Shift+I	
// put y	Serial Monitor	Ctrl+Shift+M	
	Serial Plotter	Ctrl+Shift+L	
}			
	WiFi101 / WiFiNINA Firmware Update	r	
void loop(Board: "WisBlock RAK11300"	;	Boards Manager
// put y	Port	2	Arduino AVR Boards
	Get Board Info		RAKwireless ESP32 Modules >
}	Programmer		RAKwireless nRF Modules >
	Burn Bootloader		Rakwireless Raspberry Modules 2 • WisBlock RAK11300
	Bum Bootioader		
1			

Figure 8: Selecting RAK11310 as WisBlock Core

2. Next, copy the following sample code into your Arduino IDE.

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```
* @file RAK12006_MotionDetection.ino
* @author rakwireless.com
#include <Wire.h>
#define SENSOR_PIN WB_IO6 // Attach AM312 sensor to Arduino Digital Pin WB_IO6
int gCurrentStatus = 0;
                            // variable for reading the pin last status
int gLastStatus = 0;
void setup()
  pinMode(SENSOR_PIN, INPUT); // The Water Sensor is an Input
  pinMode(LED_GREEN, OUTPUT); // The LED is an Output
  pinMode(LED_BLUE, OUTPUT); // The LED is an Output
  Serial.begin(115200);
  time_t timeout = millis();
  while (!Serial)
    if ((millis() - timeout) < 5000)</pre>
      delay(100);
      break;
  Serial.println("=========");
  Serial.println(" RAK12006 test");
  Serial.println("=========");
void loop() {
 gCurrentStatus = digitalRead(SENSOR_PIN);
 if(gLastStatus != gCurrentStatus)
   if(gCurrentStatus == 0)
     Serial.println("IR detected ...");
    digitalWrite(LED_GREEN, HIGH); //turn on
    digitalWrite(LED_BLUE, HIGH);
     digitalWrite(LED_GREEN,LOW);
     digitalWrite(LED_BLUE,LOW);
   gLastStatus = gCurrentStatus;
   delay(100);
```

NOTE

If you experience any error in compiling the example sketch, check the updated code for your WisBlock Core Module that can be found on the RAK12006 WisBlock Example Code Repository 🖾 and this sample code in Github will work on all WisBlock Core.

3. Once the example code is open, you can now select the right serial port and upload the code, as shown in **Figure 9** and **Figure 10**.

📝 NOTE

If you're using the RAK11200 as your WisBlock Core, the RAK11200 requires the **Boot0** pin to be configured properly first before uploading. If not done properly, uploading the source code to RAK11200 will fail. Check the full details on the RAK11200 Quick Start Guide 2.

File Edit Sketch Too	ls Help						
	Auto Format	Ctrl+T					
	Archive Sketch						
sketch_nov21a	Fix Encoding & Reload						
/**	Manage Libraries	Ctrl+Shift+I					
* @file R	Serial Monitor	Ctrl+Shift+M					
* @author	Serial Plotter	Ctrl+Shift+L					
* @brief : * @versio	WiFi101 / WiFiNINA Firmware Update	er					
* @date 2	Board: "WisBlock RAK4631"	>					
* @copyri	SoftDevice: "S140 6.1.1"	>					
*/	Debug: "Level 0 (Release)"	>					
<pre>#include <</pre>	Port: "COM5 (WisBlock RAK4631)"	3	Serial ports				
<pre>#define SE</pre>	Get Board Info		COMI	tal Pin WB_IO6			
			 COM5 (WisBlock RAK4631) 				
int gCurre	Programmer	1	. reading the pin cur	rent status			
int gLastS	Burn Bootloader		reading the pin las	t status			
<pre>void setup() { pinMode(SE pinMode(LE Serial.beg time_t tim while (!Se { if ((mil { delay(} else { break; } } Serial.pri Serial.pri </pre>	<pre>NNSOR_PIN, INPUT); // ID_GREEN, OUTPUT); // T ID_BLUE, OUTPUT); // T in(115200); weout = millis(); irial) lis() - timeout) < 5000 (100); mulln("===================================</pre>	The Water 2 the LED is a the LED is a))); "); ");	Bensor is an Input an Output an Output				
1.1.5 A. F.	1				 	 	

Figure 9: Selecting the correct Serial Port

File Edit Sketch Tools Help	
raki 2006-code	
/++	
* @file RAK12006_MotionDetection.ino	
* Gauthor rakwireless.com	
* Obrief motion detection example	
* gydraion 0.1 * 8date 2021-06-15	
* @copyright Copyright (c) 2021	
*/	
<pre>#include <wire.h></wire.h></pre>	
<pre>\$define SENSOR_FIN WB_IO6 // Attach AM312 sensor to Arduino Digital Fin WB_IO6</pre>	
int gCurrentStatus = 0; // variable for reading the pin current status	
<pre>int gLastStatus = 0; // variable for reading the pin last status</pre>	
void setup()	
pinMode (SENSOR PIN, INPUT); // The Water Sensor is an Input	
pinMode (LED_GREEN, OUTPUT); // The LED is an Output	
pinMode(LED_BLUE, OUTPUT); // The LED is an Output	
Serial.begin(115200);	
<pre>time_t timeout = millis();</pre>	
while (!Serial)	
if ((millis() - timeout) < 5000)	
{	
delay(100);	
}	
else	
DIGAX,	
}	
Serial.println("====================================	
<pre>Serial.println(" RAR12006 test");</pre>	
Serial.println("===========""");	
}	
Device programmed.	

Figure 10: Uploading the RAK12006 example code

4. When you successfully uploaded the example sketch, open the Serial Monitor of the Arduino IDE to see the sensor's reading logs, as shown in Figure 11, and you will also see the green LED and blue LED from the WisBlock Base lights up whenever it detects motion based on changes in infrared light in the environment. Therefore, your RAK12006 is properly communicating to the WisBlock core.

	Send	
		^
RAK12006 test		
IR detected		
		¥
V Autoscroll Show timestamp Newline V 115200 baud V Clear	output	

Figure 11: RAK12006 PIR detection readings