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](image)

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

<table>
<thead>
<tr>
<th>Vendor</th>
<th>Part number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senba Sensing Technology Co., Ltd</td>
<td>AM312</td>
</tr>
</tbody>
</table>

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.
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

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
<th>Min.</th>
<th>Nom.</th>
<th>Max.</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>VDD</td>
<td>Power Supply Voltage</td>
<td>-</td>
<td>3.3</td>
<td>-</td>
<td>V</td>
</tr>
</tbody>
</table>

Mechanical Characteristics

Board Dimensions

Figure 3 shows the mechanical dimensions of the RAK12006 Module.
WisConnector PCB Layout

Figure 4: WisConnector PCB Footprint and Recommendations

Schematic Diagram

Figure 5 shows the schematic of the RAK12006 module.
Figure 5: RAK12006 WisBlock PIR Module Schematic
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
- Your choice of WisBlock Core
- USB Cable
- Li-Ion/LiPo battery (optional)
- Solar charger (optional)

Software

- Download and install ArduinoIDE.
- 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.
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.

Disassembling

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

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

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

NOTE
If you will connect other modules to the remaining WisBlock Base slots, check on the WisBlock Pin Mapper 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
2. Next, copy the following sample code into your Arduino IDE.
/**
 * @file RAK12006_MotionDetection.ino
 * @author rakwireless.com
 * @brief motion detection example
 * @version 0.1
 * @date 2021-06-15
 * @copyright Copyright (c) 2021
 */

#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 current status
int gLastStatus = 0;      // variable for reading the pin last status

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))
    {
      delay(100);
    }
    else
    {
      break;
    }
  }
  Serial.println("========================");
  Serial.println("    RAK12006 test");
  Serial.println("========================");
}

void loop()
{
  gCurrentStatus = digitalRead(SENSOR_PIN);
  if(gLastStatus != gCurrentStatus)
  {
    if(gCurrentStatus == 0)
    {//0: detected 1: not detected
      Serial.println("IR detected ...");
      digitalWrite(LED_GREEN, HIGH);  // turn on
      digitalWrite(LED_BLUE, HIGH);
    }
    else
    {
      digitalWrite(LED_GREEN, LOW);
      digitalWrite(LED_BLUE, LOW);  // turn LED OFF
    }
    gLastStatus = gCurrentStatus;
  }
  else
  {
    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.

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Figure 9: Selecting the correct Serial Port
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.