Overview

Introduction

AW9523B uses an I2C interface and allows using 4 expansion boards at the same time by modifying the i2c address, expanding up to 64 I/O ports.





Specification

Controller	AW9523B
Operating voltage	3.3V/5V
IOs	16
Interface	I2C

Interfaces

PIN	FUNTION
VCC	Power input(3.3V/5V)
GND	GND
SDA	I2C Data input
SCL	I2C Clock input
INT	Intrrupt output
RST	Reset

RPI User Guides

Enable I2C Interface

Open a terminal and run the following commands:

```
sudo raspi-config
Choose Interfacing Options -> I2C -> Yes.
```

Reboot Raspberry Pi:

sudo reboot



Install Libraries

• Install BCM2835 libraries:

```
#Open the Raspberry Pi terminal and run the following command
wget http://www.airspayce.com/mikem/bcm2835/bcm2835-1.71.tar.gz
tar zxvf bcm2835-1.71.tar.gz
cd bcm2835-1.71/
sudo ./configure && sudo make && sudo make check && sudo make install
# For more, you can refer to the official website at: http://www.airspayce.com/m
ikem/bcm2835/
```

• Install WiringPi libraries:

```
#Open the Raspberry Pi terminal and run the following command
cd
sudo apt-get install wiringpi
#For Raspberry Pi systems after May 2019 (earlier than that can be executed with
out), an upgrade may be required:
wget https://project-downloads.drogon.net/wiringpi-latest.deb
sudo dpkg -i wiringpi-latest.deb
gpio -v
# Run gpio -v and version 2.52 will appear, if it doesn't it means there was an
installation error
# Bullseye branch system using the following command:
git clone https://github.com/WiringPi/WiringPi
cd WiringPi
. /build
gpio -v
# Run gpio -v and version 2.70 will appear, if it doesn't it means there was an
installation error
```

Download Examples

Open the Raspberry Pi terminal and run the following commands to download the examples:

```
sudo apt-get install p7zip-full -y
sudo wget https://files.waveshare.com/upload/b/b8/AW9523B-IO-Expansion-Board-Co
de.7z
7z x AW9523B-IO-Expansion-Board-Code.7z -0./AW9523B-IO-Expansion-Board-Code
cd AW9523B-IO-Expansion-Board-Code/RaspberryPi/
```

Hardware connection

Connect to Raspberry Pi

PCF8574	Raspberry Pi Board order	Function	
VCC	5V	Power input	
GND	GND	GND	
SDA	3	I2C Data input	
SCL	5	I2C clock input	
INT	16	Interrupt input (could NC)	
RST	18	Reset module (could NC)	







Test the example

Please first negative to 'AW9523B-IO-Expansion-Board-Code/RaspberryPi/' directly by cd command before you run the codes;

C codes

• Compile the codes and run it.

```
cd C
sudo make clean
sudo make
sudo ./main
```

The examples use interrupt by default, if you want to disable the interrupt function, please add the following lines to /boot/config.txt, it will set the gpio23 to pull-up mode.

gpio=23=pu

```
pi@raspberrypi:~/C $ sudo ./main
set wiringPi lib success !!!
Current environment: Raspbian
set wiringPi lib success !!!
Current environment: Raspbian
WIRINGPI I2C Device
AW9523B Init
find AW9523B, ID = 0x23
int pin 0
interrupted:read is change, time:1
output: pin0 = 1
input : pin0 = 1
int pin 0
interrupted:read is change, time:2
output: pin1 = 2
input : pinl = 2
int pin 0
```

```
interrupted:read is change, time:3
output: pin2 = 4
input : pin2 = 4
int pin 0
interrupted:read is change, time:4
output: pin3 = 8
input : pin3 = 8
int pin 0
interrupted:read is change, time:5
output: pin4 = 16
input : pin4 = 16
int pin 0
interrupted:read is change, time:6
output: pin5 = 32
input : pin5 = 32
int pin 0
interrupted:read is change, time:7
output: pin6 = 64
input : pin6 = 64
int pin 0
interrupted:read is change, time:8
output: pin7 = 128
input : pin7 = 128
```

python

Run the following commands:

cd python sudo python AW9523B.py

Expected result

Connect the PAx pin to PBx pin, for example, connect PA0 to PB0 by cables. The PAx pins are set as output, and PBx are set as input. The status of PAx pins output toggle every 550ms in order like a water lamp, every time the PAx pins toggle, it all cause the PBx pin to interrupt and printed the status to the terminal.

Arduino User Guides

The provided examples and hardware connections are based on Arduino UNO R3. For other Arduino boards, you may need to modify the connection or codes

Hardware Connection

You can connect the board according to the table

Connect to Arduino

PCF8574	Arduino	Function
VCC	5V	Power input
GND	GND	GND
SDA	SDA	I2C data input
SCL	SCL	I2C clock input

INT	D3	interrupt output
RST	D4	reset



Install Arduino IDE (Windows)

arduino IDE Installation Guides

Run the Codes

Download the examples from Demo codes , unzip the archive, and enter the AW9523B-IO-Expansion-Board-Code directory. Copy the AW9523B-Arduino-Library folder to the libraries directory which is under the installation path, generally, the path is C:\Program Files (x86)\Arduino\libraries Open the Arduino IDE software, Tools choose UNO, then open the examples from

File-> Example

AW95238	Arduino 1.8.9				-	
文件 编辑 项目	工具報助					
新建 打开 打开最近的	Ctrl+N Ctrl+O					0 •
项目文件实	E >					
示例 关闭 保存 另存为	Ctrl+W Ctrl+S Ctrl+Shift+S	內重示例 01.Basics 02.Digital 03.Analog	>			
页面设置 打印	Ctrl+Shift+P Ctrl+P	04.Communication 05.Control 05.Sensors	>			
首选项	Ctrl+逗号	07.Display	> 17			
关闭 // PortMod // PortOut // PortOut	Ctrl+Q put(y, 0xr0); le(1, 0); put(1, 0xff); ut(1);	08.Strings 09.USB 10.StarterKit_BasicKit 11.ArduinoISP	> > >			
//input PortMode(1 UBYTE tm = UBYTE read for(UBYTE PortOutp if(ReadI	<pre>, 1); pin; x =0; x<8; x+ ut(0, 1<<x); ntPin() == 0)</x); </pre>	所有开发短的子例。 Bridge Esplora Ethernet Firmata GSM LiauidCrystal	>			



Build and upload the examples, then open the serial monitor to check the logs

Expected

Connect the PAx pin to PBx pin, for example, connect PA0 to PB0 by cables. The PAx pins are set as output, and PBx are set as input. The status of PAx pins output toggle every 550ms in order like water lamp, every time the PAx pins toggle, it all causes the PBx pin to interrupt and printed the status to the serial monitor.

STM32 User Guides

The example and related hardware connection are based on STM32F103RBT6. If you want to use other STM32 board, you may need to change the hardare connection and codes.

Hardware Connection

PCF8574	STM32	Function
VCC	3.3V	Power input
GND	GND	GND
SDA	PB9	I2C data input
SCL	PB8	I2C clock input
INT	PB8	Interrupt
RST	PB8	Reset

Connect to STM32F103RB

AW9523B-IO-Expansion-Board-wiki3.png

Run the codes

The examples are based on HAL libraries. Download the Demo codes and find the STM32 directory. Open the PCF8574 IO Expansion Board.uvprojx file from STM32\STM32F103RB\MDK-ARM folder.



Open the main.c file, rebuild the codes, and download.

MQ 5 Eas Seraar under/Chil	U // THE U TO BRID / MAR / JAMP (as Tensor superiji - y Alvien	- 0 X
Por Data tions Reput Flath Debug Proph	an han bCl Menter Pap	
On The Case of the second		
a di Daint da lama	a and and and a second and a second and and and and and and and and and a	
in an fire Server	a (* visa koka skuta skala (*) 2 juni	
In the Application/MEX-ABM	3	
1) in Application/IntelSam	6 Efile : Main-F	
iii iii maine 1	A second seco	
iii 🛄 geore	1 * Battennian	
an in add.c	8 Solution of the second se	
() () waste	18 - 113 regions remercing (copyright ()) and interferences.	
i i ster LY har, it a	12 *	
in in investments	12 This service component is invested by 51 modes high accelerate, 13 the filterate?: You may not use this filterates and investigation with the	
is the Drivers Strength Lot AML Driver	14 · Lionnan. Thu may obtain a copy of the Lionnan au:	
Colline Colline	18 · openance or Givenano/Mile lo Gause	
	in L sy	
	18 /* URIS COLE SED Smadeg */ 18 /* Turbins	
	22 Similar Page 34	
	22 diambate Pade, 6*	
	20 Biologie Paster Nº 24 Biologie Paster Nº	
	24	
	26 /* Private includes includes and	
	41 / Viele Viele Rever Inclusion 12	
	28 /* DEER CODE ERD Inclusion */	
	Mail Market and Andrew State and Andrew	
	A / PERMAN ADDRESS ADDRES ADDRESS ADDRESS ADDR	
	<u>54</u>	
	14 (* 088 008 89 99 */	
	14 /* Televane define	
	at /* come come model House to */	
	AN IN DEEL COME THE POINT	
	41 /* Televise manual	
	45 /* DEER CODE MECTA PH */	
	43 /* CHER CODE END PH */	
	14	
	48 /* Feinere variables	
	4T /* UNER CODE BRUES BY */	
	18	
	18 /* OBE OVER 189 PC */	
	15 // holoane function prototypes	
	12 weak Symmetric Conduct (symmetric))	
	In a state when seven may be	
	AN /* CHER CORE HAD PPP */	
	16 IV Delener ware only conversion of the second se	
	AN /* UNER COME MODES 0 */	
	An diaminate ferdia.b*	
	88 63 Divider (975)	
	42 Montow PUTCHE RECETTE an _in putcher(ins ob)	
	C State	
There Barris Handson B. Service	45 Sector Foundation Foundation on Faith (and or Faith 19)	
and a grant in some of some of		
tere Course Coursellan all it and the ball	and the second se	
Partic narras "Gas Sanaor"	Nello INN - DOGRI -LUNEIT-AUMAUNDINI.	
compiling main.c		
linking	A second by description	
FromfLF: greating has file	AR-INDERLE EL-UNITETLETY	
"Gas Sensuri/Gas Sansor.axt" - 0 firm	risi. O Werningisi -	
Dallo Time Elepsed: B0r08182		
The section of the se		
		Galadiateses PR.O. Of MALCO INC.
		100 CT 100 CT 100 CT

After downloading, Run the SSCOM software, choose the related COM and set the baud rate to 115200, check the logs.



Exptect result

1. Use a multimeter to measure the voltage of every IOs, the P0~P3 are High and

P4 ~ P7 are Low.

2. Open the SSCOM software, the status of IOs is printed on the software.

Resource

Documents

- Schematic
- AW9523B-EN

Demo Codes

• Demo Codes 🖉

Support

Technical Support

If you need technical support or have any feedback/review, please click the **Submit Now** button to submit a ticket, Our support team will check and reply to you within 1 to 2 working days. Please be patient as we make every effort to help you to resolve the issue.

Working Time: 9 AM - 6 AM GMT+8 (Monday to Friday)

Submit Now