

GAPuino Multisensor Board User's Manual

Greenwaves Technologies

Version 1.1

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1 Introduction

Greenwaves Technologies has designed the GAPuino Multisensor Board in order to facilitate the development of application prototypes using GAP8.

2 Description

The following picture show the up side of the GAPuino Multisensor Board

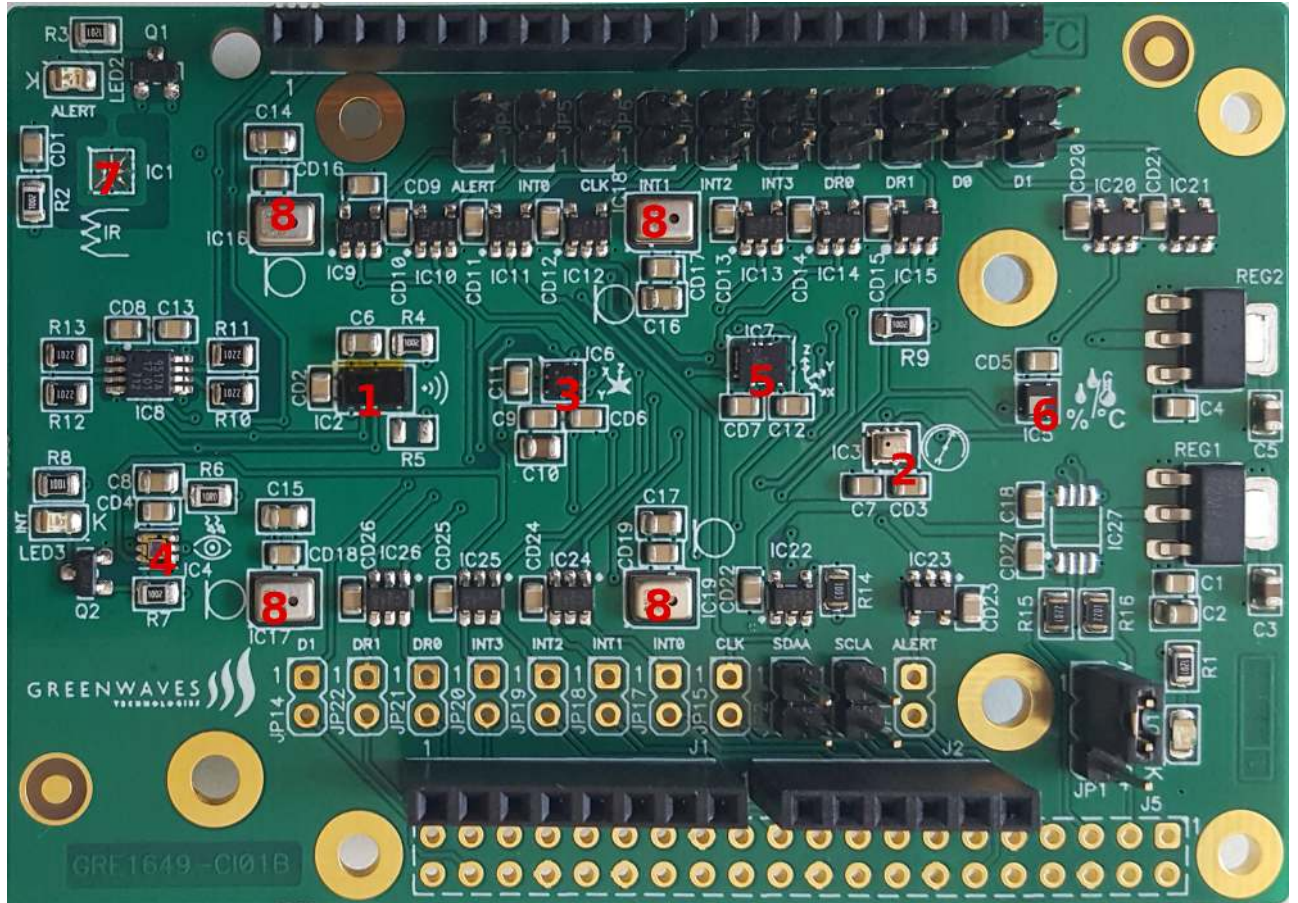


Figure 1: GAPuino Multisensor Board

The following table describes the numbered blocks in the previous picture :

Number	Bloc	Remarks
1	VL53	Time of flight and gesture detection
2	BMP280	Pressure sensor
3	LIS3MDL	3 axis magnetometer
4	VEML6030	Ambient light sensor
5	LSM6DSL	3D accelerometer and 3D gyroscope
6	HTS221	Temperature and Humidity sensor
7	TMP007	Optional : IR temperature sensor
8	MP04DT01	Digital Microphones

3 Configuration

There are several jumpers that can be used to configure the GAP8 Multisensor board.

3.1 Arduino Voltage selection

Older Arduino digital interfaces only support 5V. The newer ones are 3.3V compatible too. JP1 allows you to select the correct I/O voltage

Pos	Description
1-2	Arduino Interface is 3.3V (VA is set to 3.3V)
2-3	Arduino Interface is 5V (VA is set to 5V)

3.2 Optional I2C port selection

JP2 and JP3 jumpers allow use of the I2C port from J2

3.2.1 Jumper JP2

Pos	Description
Short	J2 A4 is connected to SDA

3.2.2 Jumper JP3

Pos	Description
Short	J2 A4 is connected to SCL

3.3 Arduino ports configuration

3.3.1 TPM007 Interface

The jumper JP4 is used to connect signals other than the I2C port to the GAPuino board

3.3.1.1 Jumper JP4

Pos	Description
Short	TMP007 ALERT signal is connected to J3-9

3.3.2 LIS3 Interface

Jumpers JP5 and JP10 are used to connect signals other than the I2C port to the GAPuino board

3.3.2.1 Jumper JP5

Pos	Description
Short	LIS3 INT0 signal is connected to J3-10

3.3.2.2 Jumper JP10

Pos	Description
Short	LIS3 DRDY signal is connected to J4-5

3.3.3 LSM6 Interface

Jumpers JP7 and JP8 are used to connect signals other than the I2C port to the GAPuino board

3.3.3.1 Jumper JP7

Pos	Description
Short	LSM6 INT1 signal is connected to J4-2

3.3.3.2 Jumper JP8

Pos	Description
Short	LSM6 INT2 signal is connected to J4-3

3.3.4 VEML6030 Interface

The jumper JP9 is used to connect signals other than the I2C port to the GAPuino board

3.3.4.1 Jumper JP9

Pos	Description
Short	VEML6030 INT signal is connected to J4-4

3.3.5 HTS221 Interface

The jumper JP11 is used to connect signals other than the I2C port to the GAPuino board

3.3.5.1 Jumper JP11

Pos	Description
Short	HTS221 DRDY signal is connected to J4-6

3.3.6 Digital Microphones MP34DT01 Interface

Jumpers JP16, JP12 and JP13 are used to connect signals other than the I2C port to the GAPuino board

3.3.6.1 Jumper JP6

Pos	Description
Short	J4-1 is connected to the CLK signal of the microphones

3.3.6.2 Jumper JP12

Pos	Description
Short	DOUT signals of microphones IC16 and IC17 are connected to J4-7

3.3.6.3 Jumper JP13

Pos	Description
Short	DOUT signals of microphones IC18 and IC19 are connected to J4-8

3.4 Arduino Connectors

The following table describes the J1 connector (POWER)

Pin	Description
1	NC
2	NC
3	NC
4	3.3V
5	5V
6	GND
7	GND
8	NC

The following table describes the J2 connector (ANALOG)

Pin	Description
1	NC
2	NC
3	NC
4	NC
5	Optional I2C SDA
6	Optional I2C SCL

The following table describes the J3 connector

Pin	Description
1	I2C SCL
2	I2C SDA
3	NC
4	GND
5	NC
6	NC
7	NC
8	NC
9	ALERT from TMP007
10	INT0 from LIS3MDL

The following table describes the P4 connector

Pin	Description
1	I2S CLK
2	INT1 from LSM6DSL
3	INT2 from LSM6DSL
4	INT from VEML6030
5	DRDY from LIS3MDL
6	DRDY from HTS221
7	I2S0_SDI
8	I2S1_SDI

4 Getting started

- Configure the GAPuino board voltage as 3.3V
- Configure the Multisensor board voltage as 3.3V
- Plug the Multisensor board into the GAPuino board

4.1 Sensors communication tests

Go to the example directory :

```
cd examples/pulp-examples/periph/i2c/sensorboard
```

run the test :

```
make clean run
```

You can see that the sensors are responding with their addresses

4.2 I2S acquisition

The I2S acquisition example uses `vlc` to play the recorded audio. If you do not have VLC installed then install it :

```
sudo apt-get install vlc
```

Plug 3 jumpers into the I2S clock and the 2 I2S data lines (JP6, JP12, JP13). The card comes with these inserted.

Go to the example directory :

```
cd examples/pulp-examples/periph/i2s
```

run the test :

```
make clean run
```

When you hit ENTER on your PC 2 seconds of sound are recorded and transferred to the `wavOut.wav` file on your PC and played using VLC.

5 History

Version	Date	Remarks
0.1	2018 05 11	Initial draft version
1.0	2018 05 16	Cleanup for release
1.1	2018 05 28	Fix incorrect test commands and typos