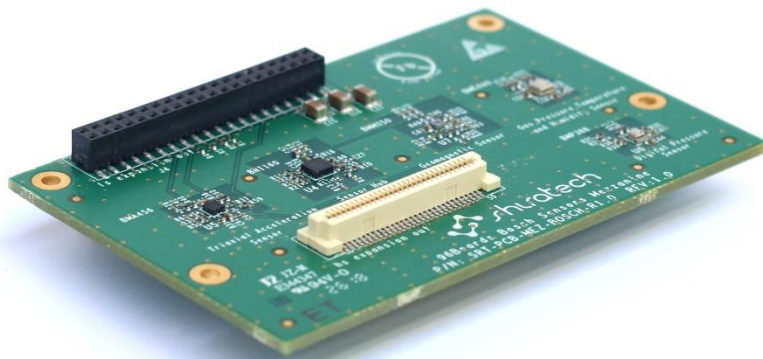


Bosch Sensors Mezzanine for 96Boards

User Manual V0.1



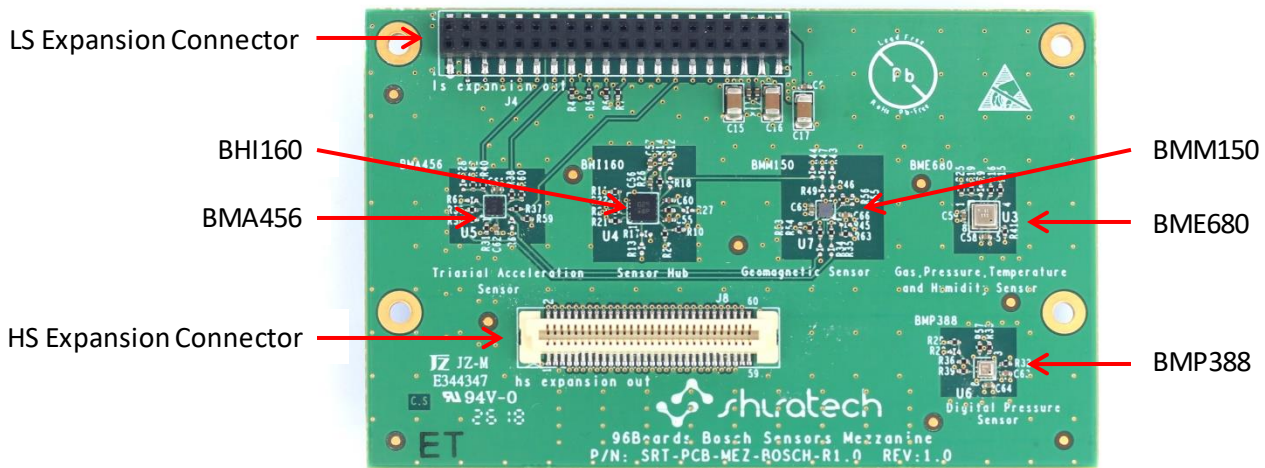
1. Introduction

Shiratech Solutions Bosch Sensors Mezzanine is a 96Boards compatible mezzanine board that adds a set of sensors to any 96Boards compatible board, both consumer addition (CE) and enterprise edition (EE).

96Boards High speed and low speed expansion connectors make it possible to stack additional mezzanine boards on top of the Bosch sensors mezzanine .

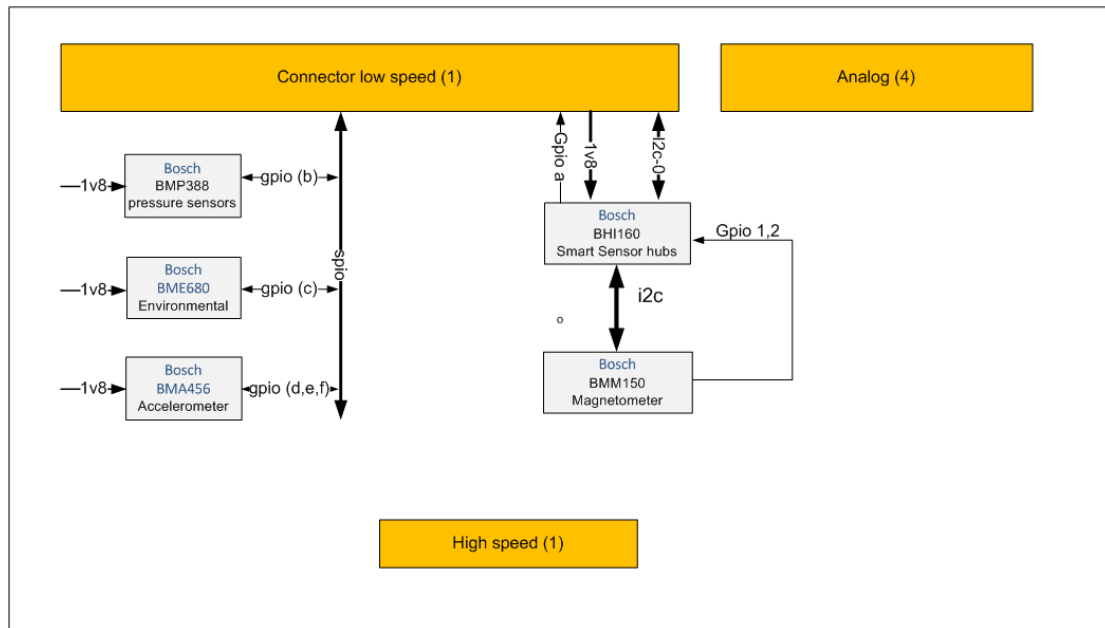
The following Bosch sensors are assembled on the mezzanine:

- BHI160 – Sensor HUB with integrated IMU
- BMM150 – Geomagnetic sensor
- BMP388 – Digital pressure sensor
- BME680 – Gas, pressure, temperature and humidity sensor
- BMA456 – Triaxial acceleration sensor



2. Functional Block Diagram

New bosch sensor balcony



- The mezzanine is connected to 96Boards carrier board through Low Speed and High Speed Connectors (left). 96Boards Expansion connectors allows to plugin additional 96Boards mezzanines as needed.
- The board is connected to 1.8V power feed to power all sensors.
- I2CO bus, SPI0 bus and GPIOs are used to control the sensors.

3. Address Map

Bosch mezzanine utilizes two buses from the 96Boards low speed expansion connector: I2C0 and SPI0.

I2C0 Bus Address Map:

1. BHI160 (U4) – Sensor HUB with integrated IMU
Device address: I2C00x29
2. BMM150 (U7): Geomagnetic sensor
Device address: BHI160 I2C bus (local I2C bus) 0x10

SPI0 Bus Address Map:

3. BMP388 (U6) – Digital pressure sensor.
CS signal: SPI0_CS_N
4. BME680 (U3) – Gas, pressure, temperature and humidity sensor.
CS signal: LS_EXP_GPIO_C
5. BMA456 (U5) – Triaxial acceleration sensor.
CS signal: LS_EXP_GPIO_D

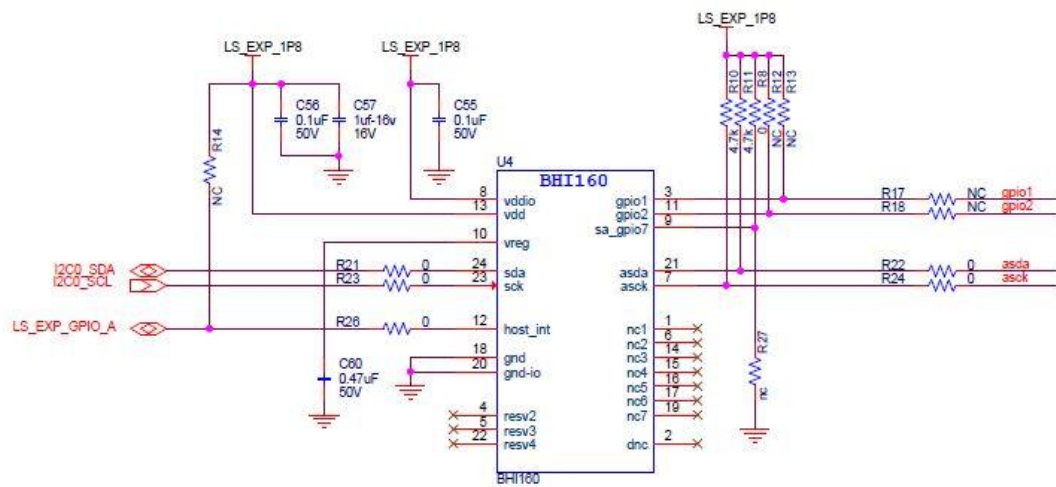
6. BHI160

The BHI160 is a small, low power smart hub with an integrated three axis gyroscope plus an integrated three axis accelerometer plus a programmable microcontroller.

It is connected directly to I2C0 bus and uses I2C address 0x29.

The device interrupt signal is connected to the carrier board GPIO_A pin.

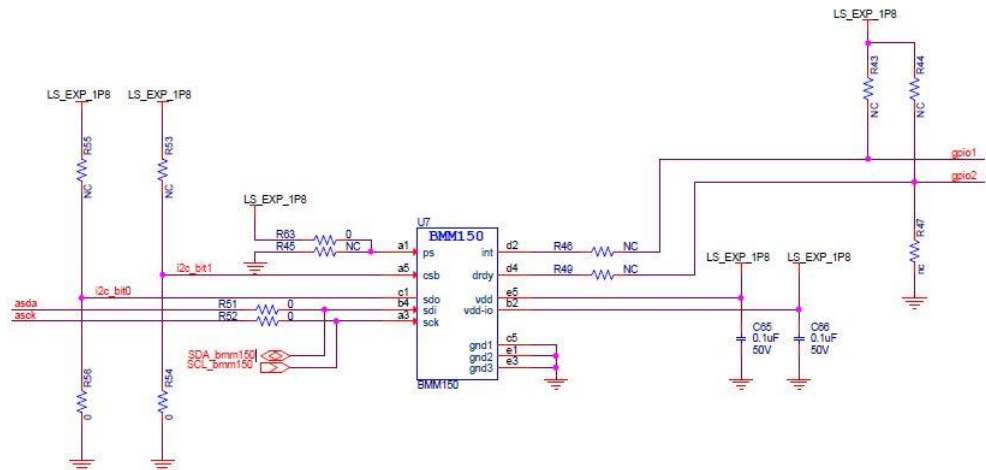
Serving as sensor hub the device uses signal pins ASDA and ASCK to drive I2C master functionality and GPIO1, 2 and 7.



7. BMM150

The BMM150 is a standalone geomagnetic sensor for consumer market applications. It allows measurements of the magnetic field in three perpendicular axes.

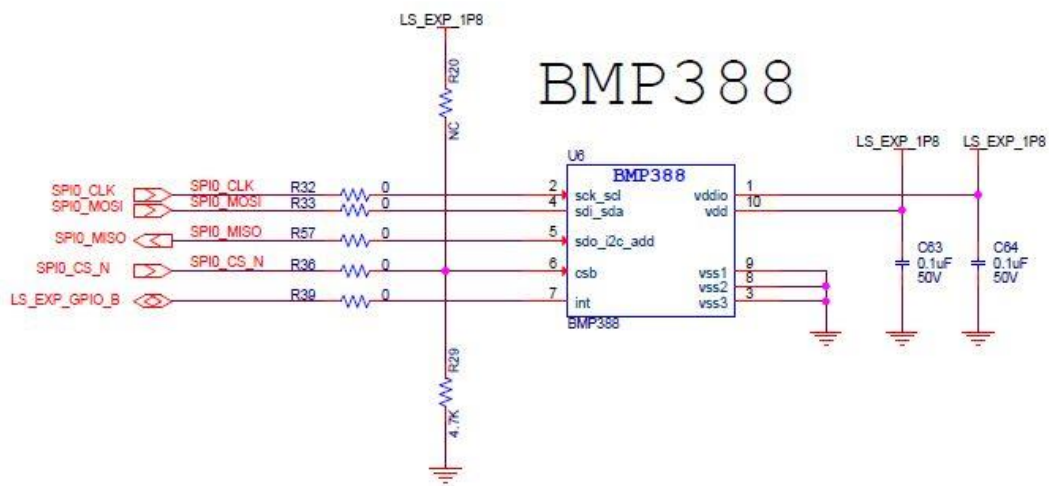
It is connected to the BHI160 I2C local sensor bus and uses I2C address 0x10.



8. BMP388

The BMP388 is a digital sensor with pressure and temperature measurement based on proven sensing principles.

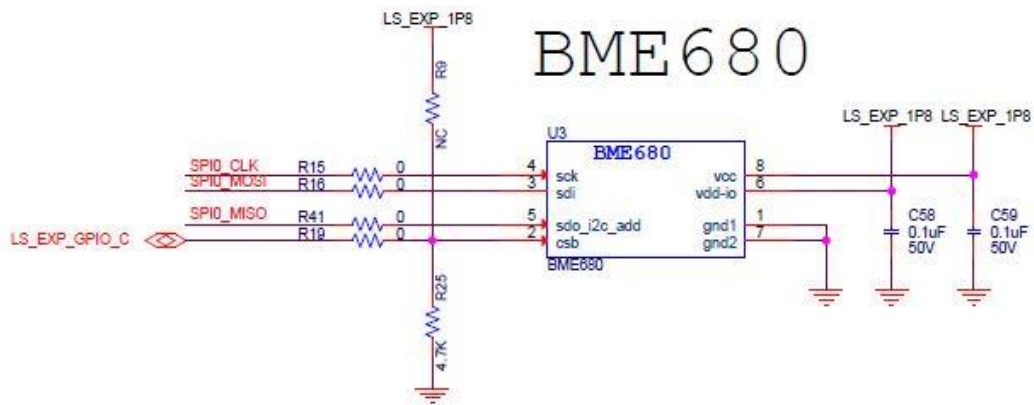
It is connected to the board SPI0 bus and uses SPI0_CS_N signal for CS.



9. BME680

The BME680 is a digital 4-in-1 sensor with gas, humidity, pressure and temperature measurement based on proven sensing principles.

It is connected to the board SPI0 bus and uses GPIO_C signal for CS.



10. BMA456

The BMA456 is 16bit, digital, triaxial acceleration sensor with intelligent on-chip motion triggered interrupt features optimized for wearable applications.

It is connected to the board SPI0 bus and uses GPIO_D signal for CS.

GPIO_E and GPIO_F are used for interrupt signals.

