BOSCH

BHA260AB
Shuttle Board

GENERAL DESCRIPTION

Bosch Sensortec's BHA260AB shuttle board is a PCB with the BHA260AB, a smart sensor sub with integrated acceleration sensor, mounted on it.
In addition to the BHA260AB, the board includes

▶ on M2 master interface (configured as SPI):

  ▶ a BMG250 Gyroscope

▶ on M3 master interface (configured as I2C):

  ▶ a BME280 environmental sensor (p, rH, T)

 ▶ a BMM150 magnetometer

  ▶ an AK09915 magnetometer

connected to the BHA260AB. Additional sensors can be connected to the M3 I2C bus, using connector J6.

The shuttle board allows easy access to pins of the smart sensor hub via a simple socket. The shuttle board comes pre-mounted on a level-shifter board, which allows the PCB stack to be directly plugged into Bosch Sensortec's advanced development tool (application board).
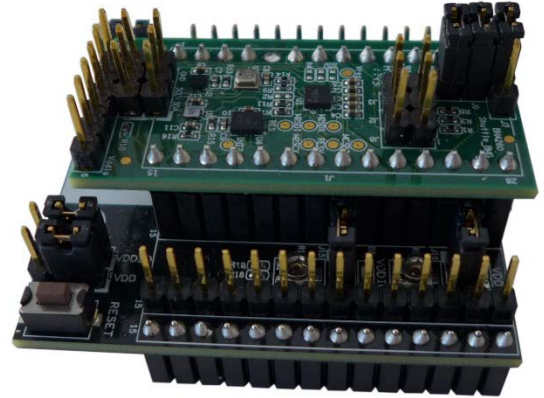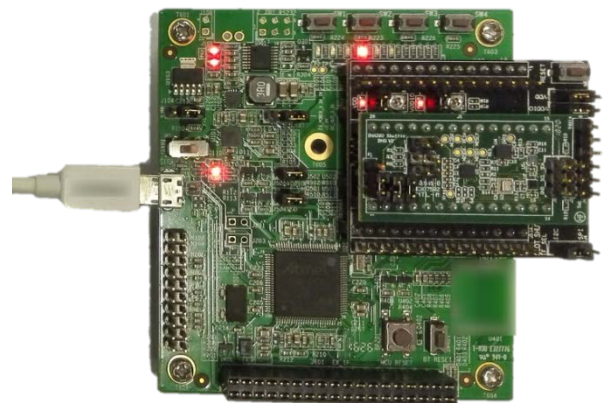

BHA260AB shuttle board mounted on level-shifter board (product photo may differ from real product appearance).

Do not connect the shuttle board directly to the application board, as this can lead to severe damage of the shuttle board and its components.
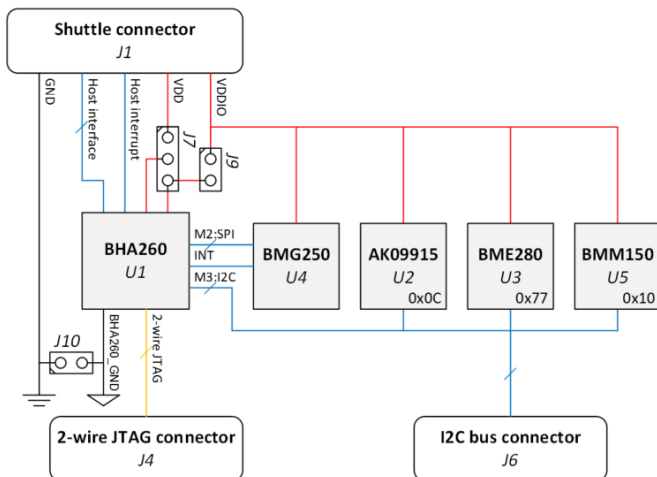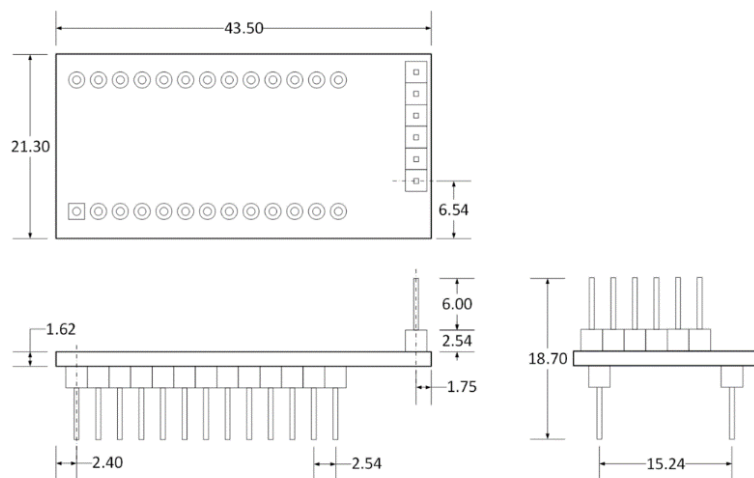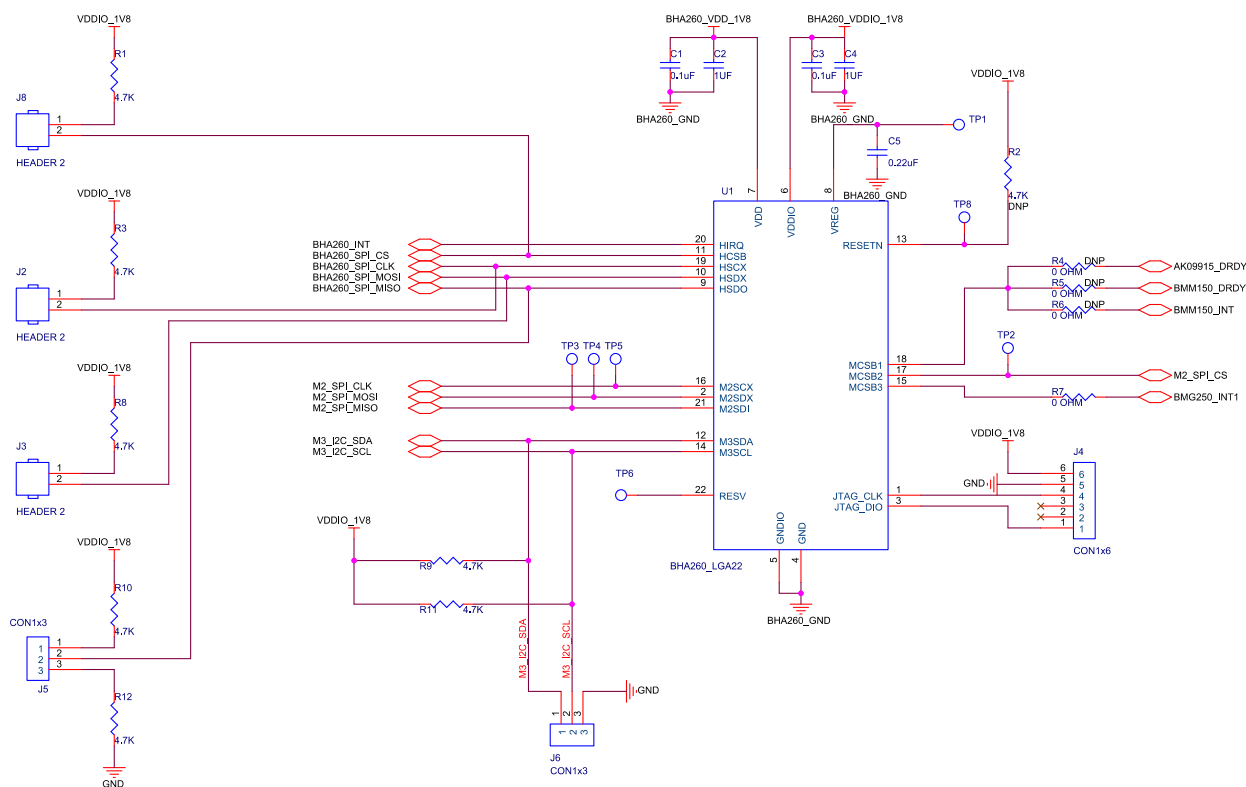

Block diagram of BHA260AB shuttle board

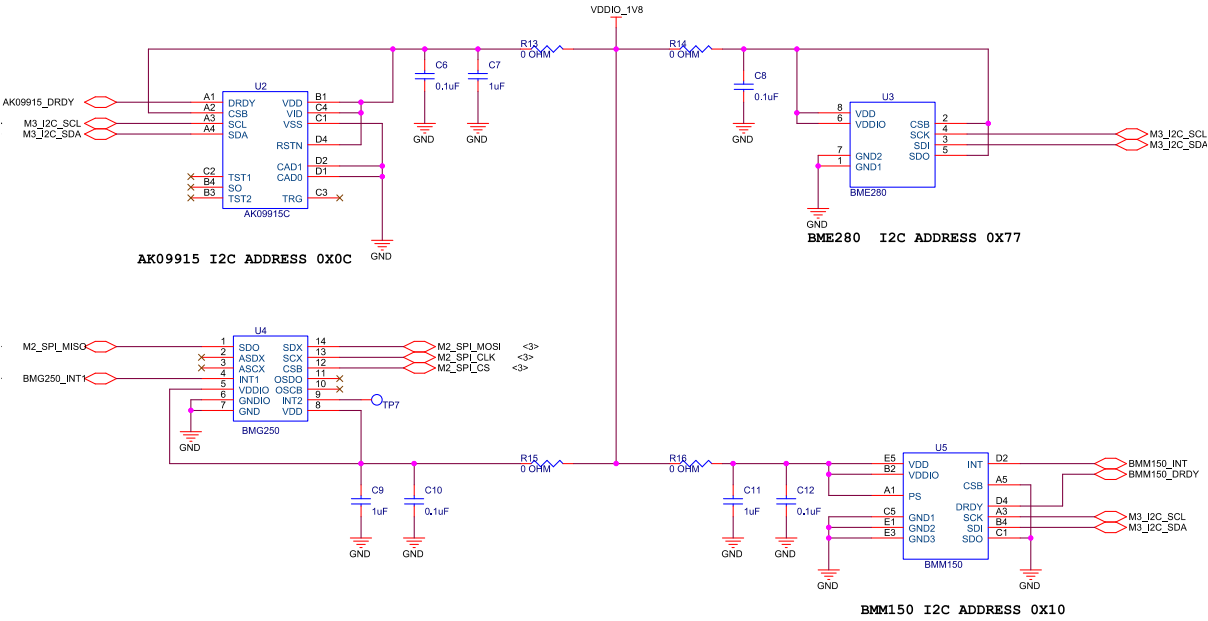Connection of shuttle board, level shifter board and application board

Designator	Function	Description		
J1	Shuttle board connector	Pin number	Pin name	Description
		1	VDD	Power supply (1.8V only!)
		2	VDDIO	Power supply (1.8V only!)
		3,23	GND	Ground
		4,15	MISO	Master-input-slave-output data pin of SPI bus (connected to BHA260AB host interface)
		5,17	MOSI	Master-output-slave-input data pin of SPI bus, or SDA of I2C bus (connected to BHA260AB host interface)
		6,18	SCK	Clock pin of both SPI and I2C bus (connected to BHA260AB host interface)
		7	CS	Chip selection pin of SPI bus (connected to BHA260AB host interface)
		21	INT	Host interrupt pin (connected to BHA260AB host interrupt)
		13,12,11, 10,28,27, 26,25,24	COD[x]	Device code for application board, COD of BHA260AB shuttle board is [100111001].
		8,9,14, 15,16,19, 20,22,	NC	Not used.
J2, J3, J8	Pull-up resistors for host interface running in I2C mode	J2: BHA260AB HSCX pad(SCK) J3: BHA260AB HSDX pad(SDA) J8: BHA260AB HCSB pad(SPI Chip select)		
J4	2-wire JTAG connector	Pin number	Pin name	Description
		1	TMS	TMS pin of 2-wire JTAG
		2,3	NC	Not used
		4	CLK	CLK pin of 2-wire JTAG
		5	GND	Ground on board
		6	VDDIO	1.8V power supply on board
J5	SPI/I2C mode & IC2 address selection	Setting	Mode	I2C address
		Open	SPI	-
		Left (towards R12)	I2C	0x28
		Right (towards R10)	I2C	0x29
J6	M3 I2C interface for bus extensions	Pin number	Pin name	Description
		1	M3_SDA	SDA pin of M3, with a 4.7kohm pull-up to 1.8V VDDIO
		2	M3_SCL	SCL pin of M3, with a 4.7kohm pull-up to 1.8V VDDIO
		3	GND	Ground pin.
J7, J9, J10	Access points to BHA260AB supply (e.g. for power measurement)	J7: BHA260AB VDD pad J9: BHA260AB VDDIO pad J10: BHA260AB_GND (GND+GNDIO) line		

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BHA260AB shuttle board layout – placement (top, bottom)

BHA260AB shuttle board outline dimensions (in mm)

BHA260AB shuttle board schematics (1)

VDDIO_1V8

U2

AK09915_DRDY

M3_I2C_SCL
M3_I2C_SDA

A1	DRDY	VDD	B1
A2	CSB	VID	C4
A3	SCL	VSS	C1
A4	SDA		
	RSTN	D4
C2	TST1	CAD1	D2
B4	SO	CAD0	D1
B3	TST2	TRG	C3

AK09915C

R13
0 OHM

C6
0.1uF

C7
1uF

GND GND

R14
0 OHM

C8
0.1uF

GND

U3

8	VDD	CSB	2
6	VDDIO	SCK	4
		SDI	3
7	GND2	SDO	5
1	GND1	

BME280

M3_I2C_SCL
M3_I2C_SDA

GND

AK09915 I2C ADDRESS 0X0C

GND

BME280 I2C ADDRESS 0X77

U4

M2_SPI_MISO

BMG250_INT1

1	SDO	SDX	14
2	ASDX	SCX	13
3	ASCX	CSB	12
4	INT1	OSDO	11
5	VDDIO	OSCB	10
6	GNDIO	INT2	9
7	GND	VDD	8

BMG250

M2_SPI_MOSI   <3>
M2_SPI_CLK   <3>
M2_SPI_CS   <3>

TP7

GND

R15
0 OHM

R16
0 OHM

U5

E5	VDD	INT	D2
B2	VDDIO		
A1	PS	CSB	A5
C5	GND1	DRDY	D4
E1	GND2	SCK	A3
E3	GND3	SDI	B4
		SDO	C1

BMM150

BMM150_INT
BMM150_DRDY

M3_I2C_SCL
M3_I2C_SDA

C9
1uF

C10
0.1uF

GND GND

C11
1uF

C12
0.1uF

GND GND

GND GND

BMM150 I2C ADDRESS 0X10

Host interface

SPI	I2C	
	0x28	0x29
J3 J2 J8 / J5	J3 J2 J8 / J5	J3 J2 J8 / J5

VDDIO_1V8 VDD_1V8

J1

BHA260_SPI_MISO
BHA260_SPI_MOSI
BHA260_SPI_CLK
BHA260_SPI_CS

1	VDD	COD4	28
2	VDDIO	COD3	27
3	GND	COD2	26
4	MISO	COD1	25
5	MOSI	COD0	24
6	SCK	COD_GND	23
7	CS	IO4	22
8	IO5/INTA	INTC/IO7	21
9	IO0	INTB/IO6	20
10	AX	IO8	19
11	AY	SCL	18
12	AZ	SDA	17
13	AMUX	IO3	16
14	IO1	IO2	15

SHUTTLE_CON

BHA260_INT

BHA260_SPI_CLK
BHA260_SPI_MOSI

BHA260_SPI_MISO

GND GND

COD[8..0]= 1001 11001

power rail

seperately	VDDIO for all
J7 / J9 / J10	J7 / J9 / J10

VDD_1V8 BHA260_VDD_1V8

J7
1	
2	
3	

CON1x3

VDDIO_1V8 BHA260_VDDIO_1V8

J9
1	
2	

HEADER 2

J10
1	
2	

HEADER 2

BHA260_GND GND

BHA260AB shuttle board schematics (2)
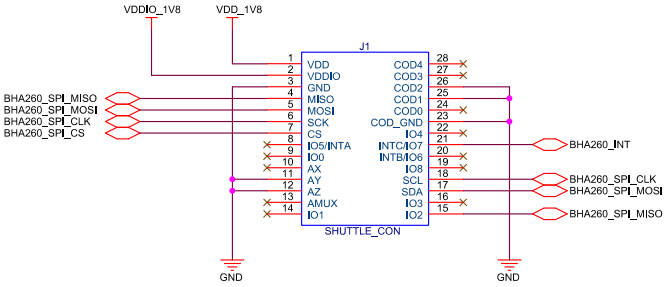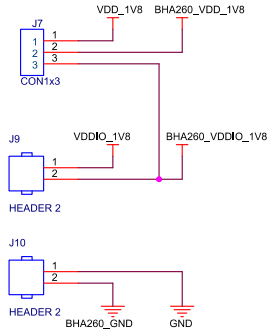
Caution

*All switches(SW1,SW2) should be set to '1'
when plugging in Shuttle board.*

Jumper	Notes
J3	JTAG pin
J4	1-2 IF is I2C; 2-3 IF is SPI
J15/J16	Current Measurement for VDD/VDDIO
J8/J9	Auto/Manu Voltage-Adjust for VDD/VDDIO

Board ID Switch for FF board

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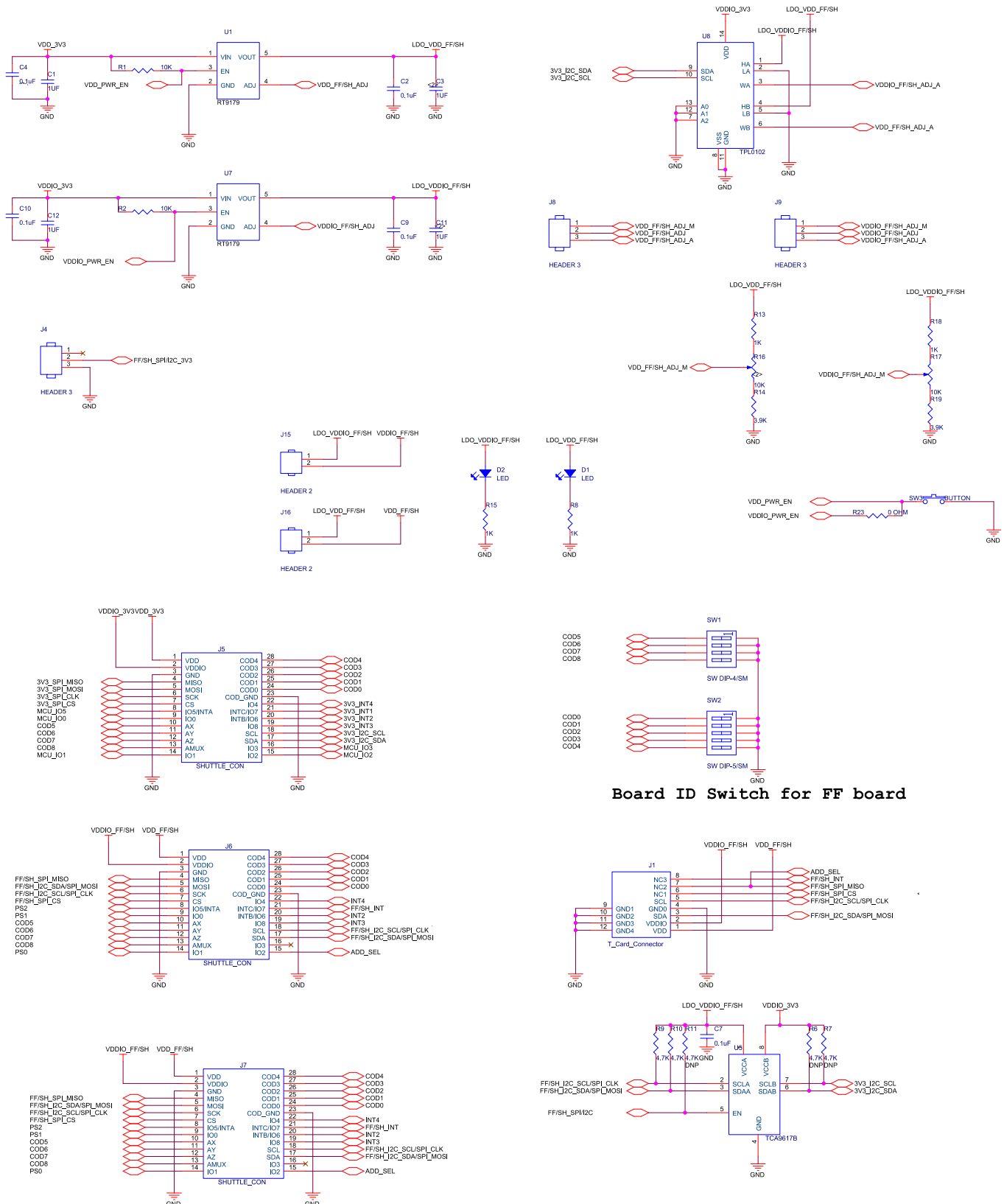
Level-shifter board schematics (2)

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