

# BHI260

## Ultra low-power high performance smart sensor hub with integrated accelerometer and gyroscope

### GENERAL DESCRIPTION

The BHI260 is a family of ultra-low power smart hubs consisting of Bosch Sensortec’s new, programmable 32-bit microcontroller (Fuser2), a state-of-the-art 6-axis IMU and a powerful software framework containing pre-installed sensor fusion and other sensor processing software within a small 44 pad LGA package.

The Fuser2 Core is configurable to operate at 20 MHz (Long Run mode) and 50 MHz (Turbo mode). It can boot from a wide variety of hosts, ranging from a small Cortex-M0™ MCU up to multicore application processors, while it has also the ability to run standalone, when booting from an attached flash memory. In combination with its wide connectivity and extendibility, the BHI260 becomes a versatile and ideal solution when it comes to always-on sensor processing at ultra-low power consumption.

### BHI260 TARGET APPLICATIONS

- ▶ 24/7 always-on sensor processing at ultra-low power consumption
- ▶ 3D orientation, step counting, position tracking, activity recognition, pose and head tracking, context awareness
- ▶ Wrist-mounted, wearables, eyewear and other wearable devices
- ▶ Smartphones and other mobile communication devices
- ▶ AR/VR/MR headset and controller devices

### FEATURES

The BHI260 provides an ideal all-in-one solution for always-on sensor applications such as fitness tracking, step counting, indoor navigation and gesture recognition.

#### Hardware features

##### CPU Core

- ▶ ARC EM4 CPU with ARCV2 16/32 bit instruction set (up to 3.6 CoreMark/MHz)
- ▶ Floating Point Unit (FPU) / Memory Protection Unit (MPU)
- ▶ 4-channel micro DMA Controller / 2-way associative Cache Controller

##### Memory

- ▶ 256 kByte on-chip SRAM
- ▶ 144 kByte on-chip ROM preloaded with software
- ▶ Up to 8 Mbyte external flash for XiP code execution

##### Connectivity

- ▶ Host interface configurable as SPI or I2C
- ▶ 3 master interfaces (selectable out of 2x SPI master and 2xI2C master)
- ▶ Up to 25 GPIOs
- ▶ Fast I/O operations:
  - ▶ SPI and GPIOs up to 50 MHz
  - ▶ I2C up to 3.4 MHz

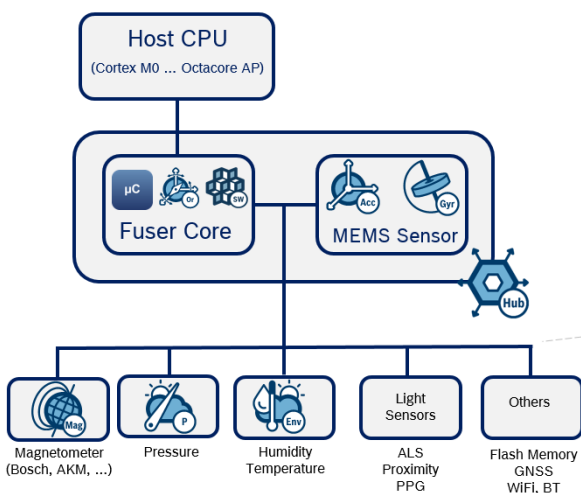
##### Integrated sensor (6-DoF IMU)

- ▶ 16-bit 3-axis accelerometer
- ▶ 16-bit 3-axis gyroscope

#### Software features

- ▶ Open sensor development platform
- ▶ Integrated Software Framework and OpenRTOS™ with full Android™ compliant sensor stack
- ▶ Integrated BSX sensor fusion software for reliable 3D motion tracking, activity recognition, and more
- ▶ Powerful SDK for easy customization and support for
  - ▶ Metaware C Compiler for ARC
  - ▶ GNU C Compiler for ARC

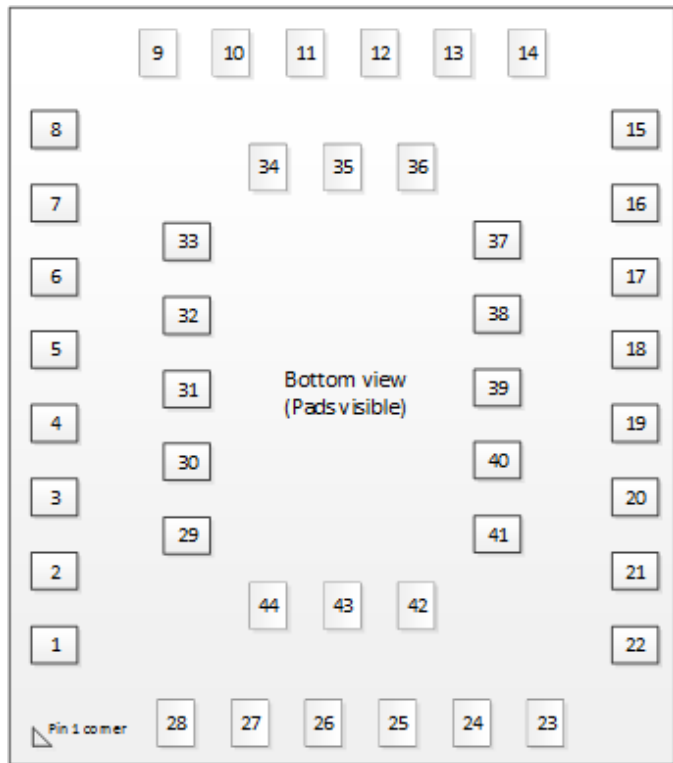
### OVERVIEW



**TECHNICAL SPECIFICATIONS**

BHI260 technical data	
Operating voltage	1.8 V
Current consumption	
Fuser2 (running CoreMark)	
– Long Run mode (20 MHz)	950 µA
– Turbo mode (50 MHz)	2.8 mA
Sensor Fusion (Hub+IMU) operation (calculating Game Rotation Vector)	
– 800 Hz ODR	1.2 mA
– 100 Hz ODR	1.0 mA
Standby current	8 µA
Sensor Fusion Performance	
– Static accuracy (Head., Pitch, Roll)	2, 2, 2, degrees
– Dynamic accuracy (Head., Pitch, Roll)	7, 2, 2 degrees
– Calibration time	<1 second
– Orientation stabilization time	0.2 seconds

**PIN CONFIGURATION**



Pin	Name	Description
1	M3SDA	M3 I2C SDA
2	M3SCL	M3 I2C SCL
3	HOSTBOOT	Boot select
4	QSPI_D0	External Flash Data 0
5	QSPI_CLK	External Flash Clock
6	VREG	Voltage regulator output

7	VDDIO	Digital IO and Fuser Supply
8	QSPI_D3	External Flash Data 3
9	RESETN	Reset input, active low
10	HIRQ	Host Interrupt Output
11	HSDX	Host Interface SPI MOSI, I2C SDA
12	VDDIO	Digital IO and Fuser Supply
13	M2SCX	M2: SPI SCK / I2C SCL
14	QSPI_CSN	External Flash Chip Select
15	QSPI_D1	External Flash Data 1
16	MCSB3	SPI Chip Select 3
17	GNDIO	Digital IO and Fuser Ground
18	MCSB2	SPI Chip Select 2
19	MCSB4	SPI Chip Select 4
20	QSPI_D2	External Flash Data 2
21	OCSB	OIS Chip Select Input
22	ASCX	OIS Clock / Aux I2C SCL
23	JTAG_CLK	Fuser Debug Clock
24	JTAG_DIO	Fuser Debug Data
25	GND	Analog Sensor Ground
26	GND	Analog Sensor Ground
27	GND	Analog Sensor Ground
28	VDD	Analog Sensor Supply
29	M1SCX	M1: SPI SCK / I2C SCL
30	ASDX	OIS MOSI / Aux I2C SDA
31	RESV3	Reserved: do not connect (internal IMU chip select)
32	HSDO	Host Interface SPI MISO / I2C address select
33	HSCX	Host Interface SPI SCK / I2C SCL
34	HCSB	Host Interface SPI CSN / Protocol Select
35	M2SDX	M2: SPI MOSI / I2C SDA
36	GNDIO	Digital IO and Fuser Ground
37	M2SDI	M2: SPI MISO / I2C unused
38	MCSB1	SPI Chip Select 1
39	OSDO	OIS MISO
40	RESV2	Reserved: do not connect (internal IMU interrupt)
41	RESV1	Reserved: do not connect (internal IMU interrupt)
42	VDDIO	Digital IO and Fuser Supply
43	M1SDI	M1: SPI MISO
44	M1SDX	M1: SPI MOSI / I2C SDA

**Headquarters**

**Bosch Sensortec GmbH**  
 Gerhard-Kindler-Strasse 9  
 72770 Reutlingen · Germany  
 Telephone +49 7121 3535 900  
 Fax +49 7121 3535 909

[www.bosch-sensortec.com](http://www.bosch-sensortec.com)