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X-NUCLEO-IKS4A1

Data brief

Motion MEMS and environmental sensor expansion board for STM32 Nucleo



Product summary	
iNEMO inertial module: always-on 3-axis accelerometer and 3-axis gyroscope with ISPU - intelligent sensor processing unit	LSM6DSO16IS
Ultra-low power high performance 3-axis magnetometer	LIS2MDL
Ultralow-power 3-axis smart accelerometer with Qvar, AI, antialiasing filter, and advanced digital features	LIS2DUXS12
Low-power and high-precision MEMS nano pressure sensor	LPS22DF
Digital humidity and temperature sensor SHT40 replacing HST221 ST Humidity sensor component	SHT40-AD1B
6-axis IMU with embedded sensor fusion, AI, Qvar for high-end applications	LSM6DSV16X

Features

- LSM6DSO16IS: MEMS 3D accelerometer (±2/±4/±8/±16 g) + 3D gyroscope (±125/±250/±500/±1000/±2000 dps) with ISPU (Intelligent Processing Unit)
- LIS2MDL: MEMS 3D magnetometer (±50 gauss)
- LIS2DUXS12: Ultra low-power MEMS 3D accelerometer (±2/±4/±8/±16 g) with Qvar, AI, & anti-aliasing
- LPS22DF: Low-power and high-precision MEMS pressure sensor, 260-1260 hPa absolute digital output barometer
- SHT40AD1B: High-accuracy, ultra-low-power relative humidity and temperature sensor (by Sensirion)
- STTS22H: Low-voltage, ultralow-power, 0.5 °C accuracy temperature sensor (–40 °C to +125 °C)
- LSM6DSV16X: MEMS 3D accelerometer (±2/±4/±8/±16 g) + 3D gyroscope (±125/±250/±500/±1000/±2000/±4000 dps) with embedded sensor fusion, AI, Qvar
- DIL 24-pin socket available for additional MEMS adapters and other sensors
- Free comprehensive development firmware library and example for all sensors compatible with STM32Cube firmware
- Equipped with Qvar touch/swipe electrode
- I²C sensor hub features on LSM6DSO16IS and LSM6DSV16X available
- MIPI I3C® compatibility for communication with LIS2DUXS12, LSM6DSV16X and LPS22DF
- Compatible with STM32 Nucleo boards
- Equipped with Arduino UNO R3 connector
- Equipped with industrial connector for IR sensor (STHS34PF80) application development. It can be connected at the same time of external MEMS through DIL24 adapter
- Available interface for external camera module applications coupled with LSM6DSV16X through aux SPI (3/4 w)
- RoHS compliant
- WEEE compliant
- UKCA compliant

Description

The X-NUCLEO-IKS4A1 is a motion MEMS and environmental sensor evaluation board kit consisting of the main board X-NUCLEO-IQS4A1, which hosts the motion MEMS and environmental sensors, and the detachable add-on board STEVAL-MKE001A, which hosts the Qvar swipe electrodes.

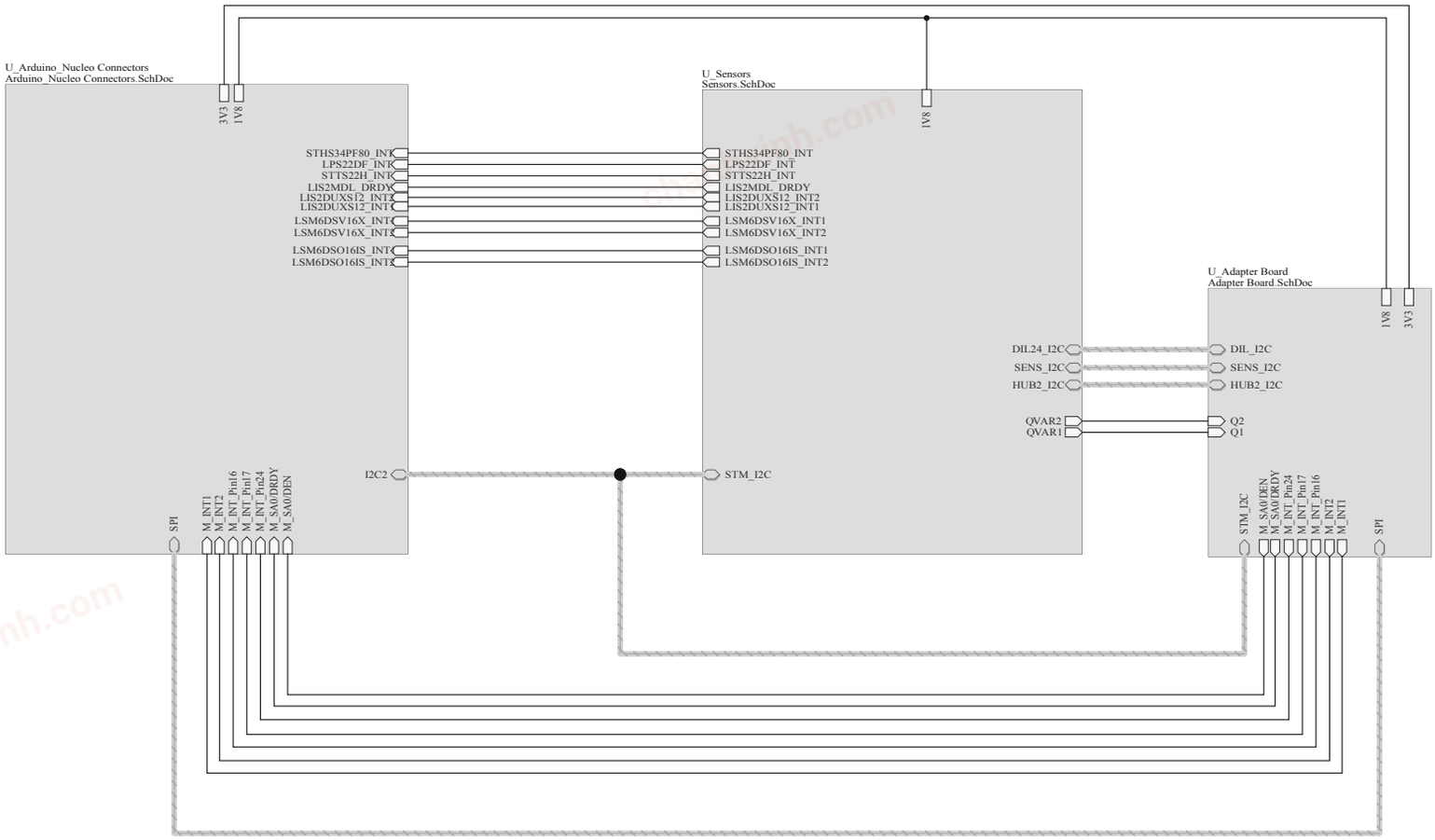
This expansion board allows application development with features like sensor HUB (LSM6DSO16IS and LSM6DSV16X), electronic image stabilization (EIS) and optical image stabilization (OIS) for camera applications through LSM6DSV16X SPI interface and Qvar touch/swipe gestures (thanks to the equipped electrode).

There is also the possibility to integrate presence and motion detection with an IR sensor as well as combining the features of multiple sensors through the DIL24 adapter.

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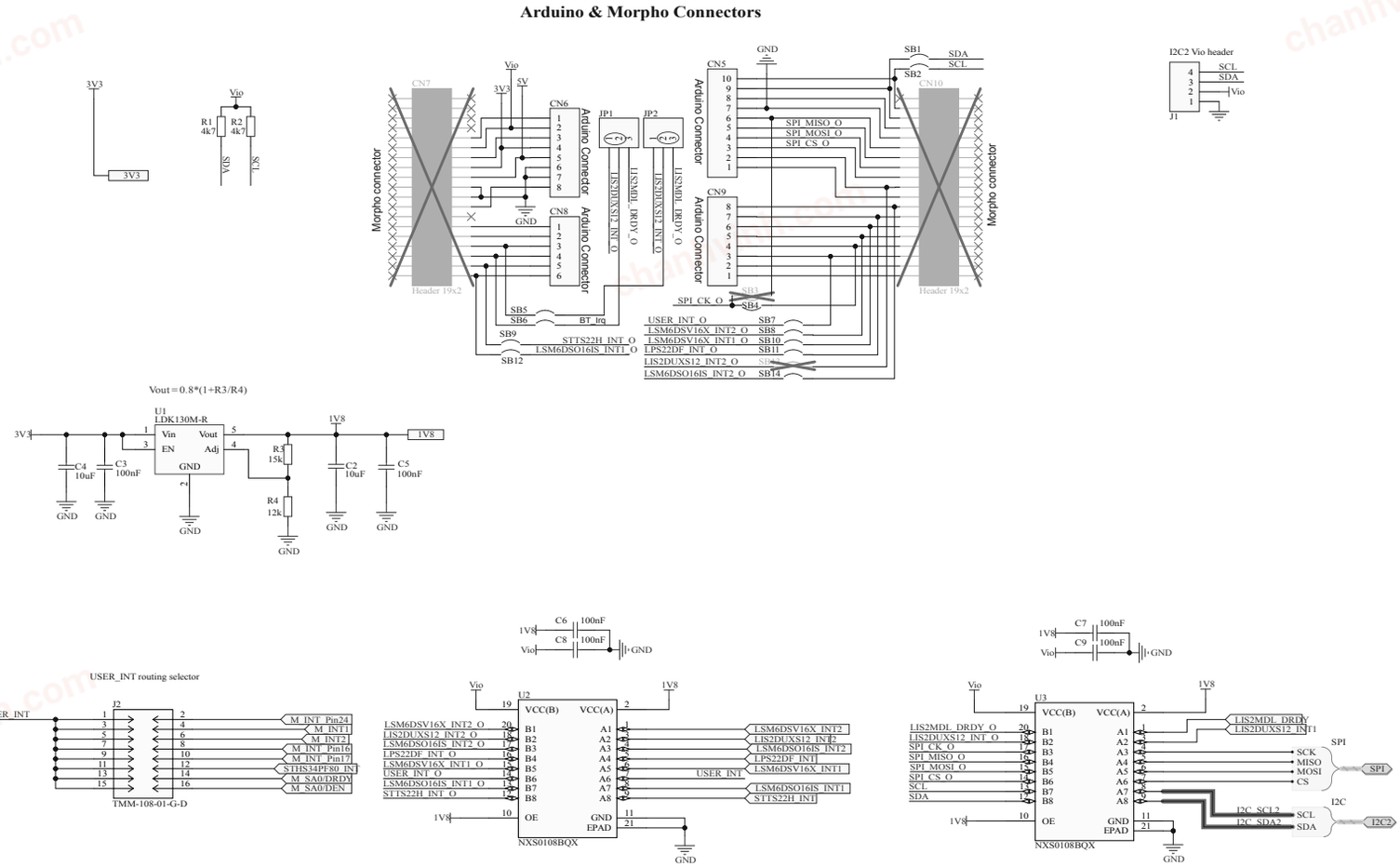
1 Schematic diagrams

Figure 1. X-NUCLEO-IKS4A1 circuit schematic (1 of 4)



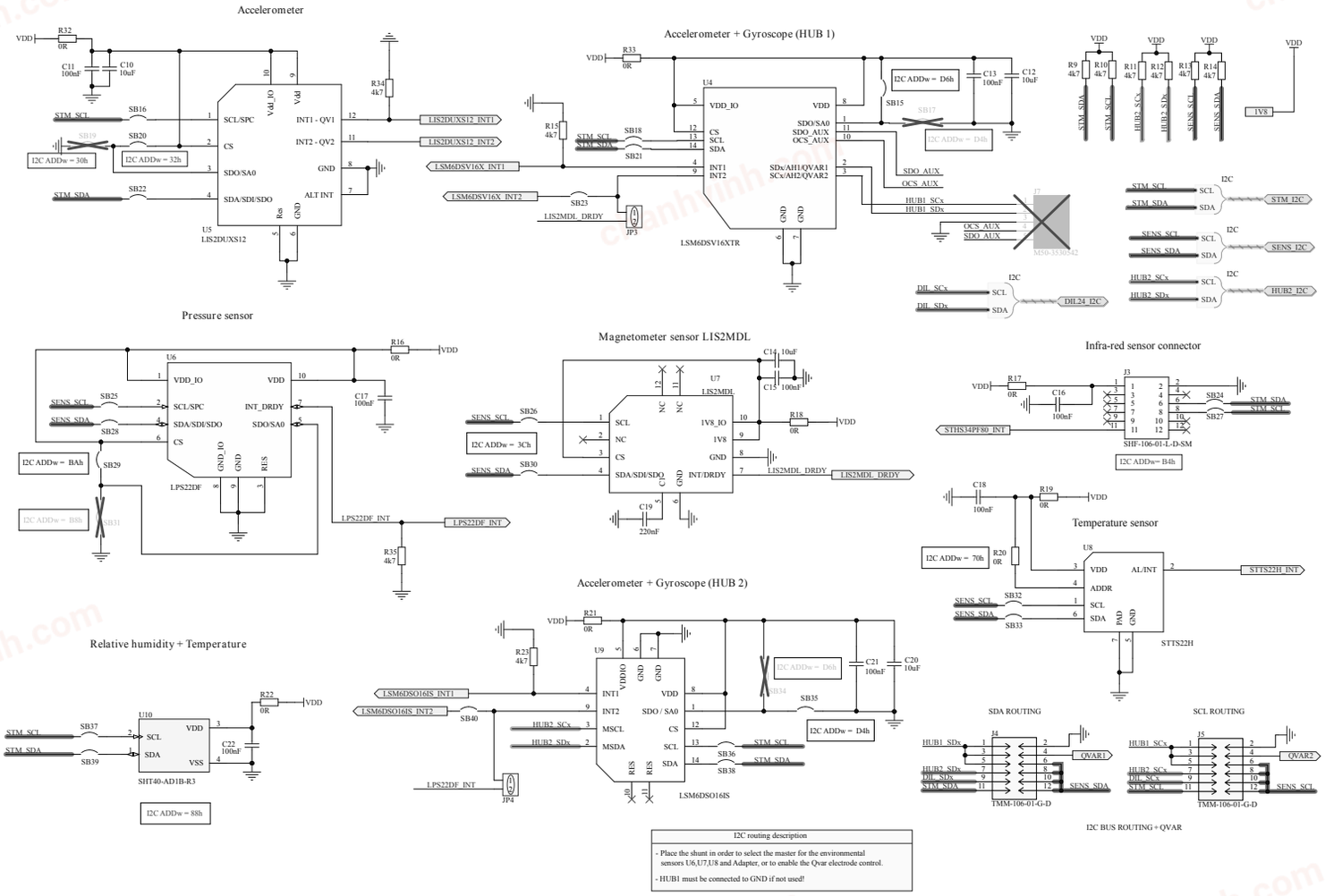
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Figure 2. X-NUCLEO-IKS4A1 circuit schematic (2 of 4)



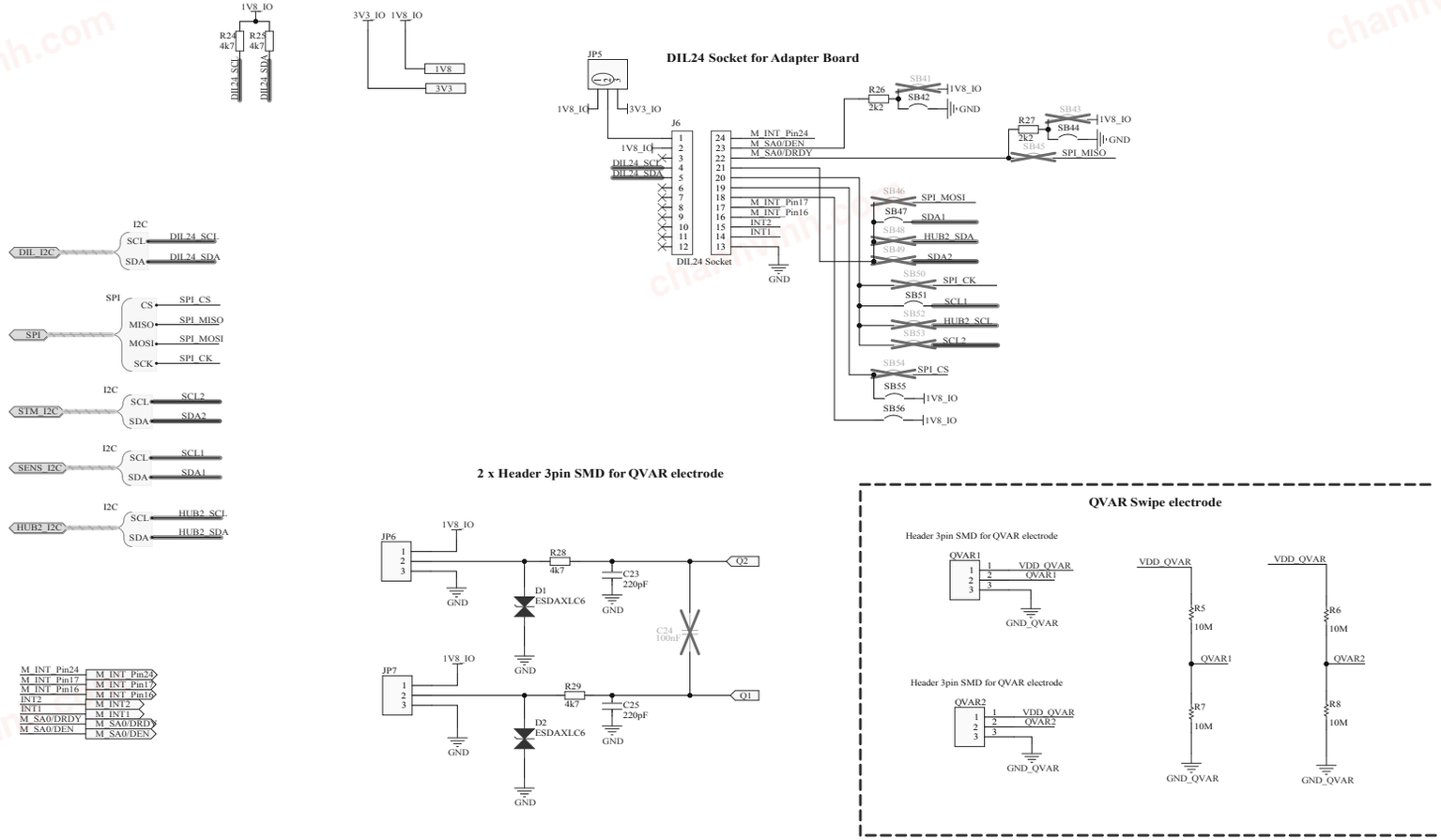
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Figure 3. X-NUCLEO-IKS4A1 circuit schematic (3 of 4)



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Figure 4. X-NUCLEO-IKS4A1 circuit schematic (4 of 4)



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2 Kit versions

Table 1. **X-NUCLEO-IKS4A1 versions**

Finished good	Schematic diagrams	Bill of materials
X$NUCLEO-IKS4A1A (1)	X$NUCLEO-IKS4A1A schematic diagrams	X$NUCLEOIKS4A1A bill of materials

1. *This code identifies the X-NUCLEO-IKS4A1 evaluation kit first version. The kit consists of the main board X-NUCLEO-IQS4A1 whose version is identified by the code X$NUCLEO-IQS4A1A and the detachable board STEVAL-MKE001A whose version is identified by the code STEVAL$MKE001AA.*

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Revision history

Table 2. **Document revision history**

Date	Version	Changes
11-Oct-2023	1	Initial release.
05-Dec-2023	2	Updated Features, Description and Product summary.
19-Mar-2024	3	Updated Section Features, Section Description, Product summary table and Figure 3. X-NUCLEO-IKS4A1 circuit schematic (3 of 4).

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