

TDK-InvenSense EV_ICM-42370-P Evaluation Board (EVB) User Guide

1 PURPOSE

This document describes the hardware and circuitry on the TDK-InvenSense EV_ICM-42370-P evaluation board for TDK motion sensor ICM-42370-P.

This user guide also covers the key signals, circuit functions, hardware jumper settings, and interface connections.

1.1 USAGE

The ICM-42370-P is a high-performance MEMS MotionTracking device that has a 3-axis accelerometer. It has a configurable host interface that supports I3CSM, I²C, and SPI serial communication, features up to 2.25 Kbytes FIFO and 2 programmable interrupts with ultra-low-power wake-on-motion support to minimize system power consumption.

The ICM-42370-P supports the lowest accel sensor noise in this IMU class, and has the highest stability against temperature, shock (up to 20,000g) or SMT/bend induced offset as well as immunity against out-of-band vibration induced noise.

Other industry-leading features include on-chip APEX Motion Processing engine for gesture recognition, and pedometer, along with programmable digital filters, and an embedded temperature sensor.

The EV_ICM-42370-P evaluation board is lead-free and RoHS compliant.

1.2 RELATED DOCUMENTS

Please refer to the product specification of the ICM-42370-P for mechanic, electrical characteristics, pinout, sensor configuration registers, and applications details. The datasheet can be found at invensense.tdk.com.

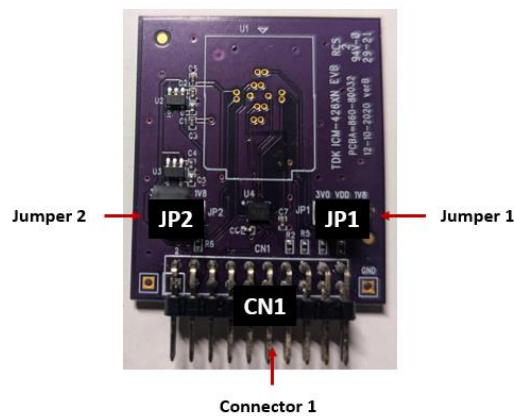


Figure 1. ICM-42370-P EVB

TABLE OF CONTENTS

1	Purpose	2
1.1	Usage	2
1.2	Related Documents	2
2	EV_ICM-42370-P Evaluation Board Overview	4
3	EV_ICM-42370-P Evaluation Board Schematics.....	5
4	Bill of Materials (BOM).....	6
5	Connector and Jumpers	6
6	Host interface options	7
7	Electrostatic Discharge Sensitivity	8
8	Revision History	9

2 EV_ICM-42370-P EVALUATION BOARD OVERVIEW

The EV_ICM-42370-P evaluation board hosts the ICM-42370-P TDK-InvenSense motion sensor which is in a small 2.5 x 3 mm 14-Pin LGA package.

In addition to LGA footprint for the ICM-42370-P, there is an ICM-42370-P socket footprint on the evaluation board as a load option.

The digital signal IO voltage (VDDIO) and chip operation voltage (VDD) can be selected between 1.8V and 3.0V.

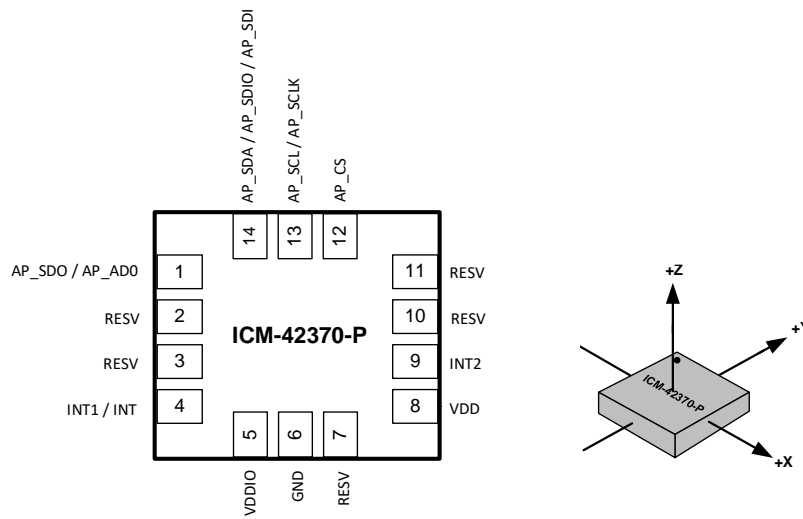


Figure 2. Pin Out Diagram for ICM-42370-P 2.5x3.0x0.76 mm LGA

The EV_ICM-42370-P evaluation board is populated with components only on its top side to achieve ease of jumper setting access. Board name, code, and date are printed on the top side too. There is no component and silkscreen print on the bottom side.

Please note, the same PCB fab may be used for TDK-InvenSense other motion sensors.

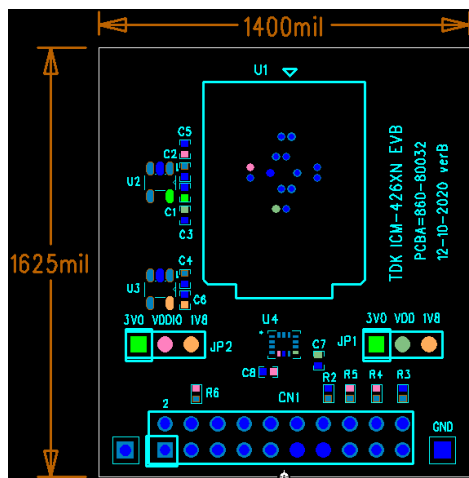


Figure 3. Evaluation board top sides

3 EV_ICM-42370-P EVALUATION BOARD SCHEMATICS

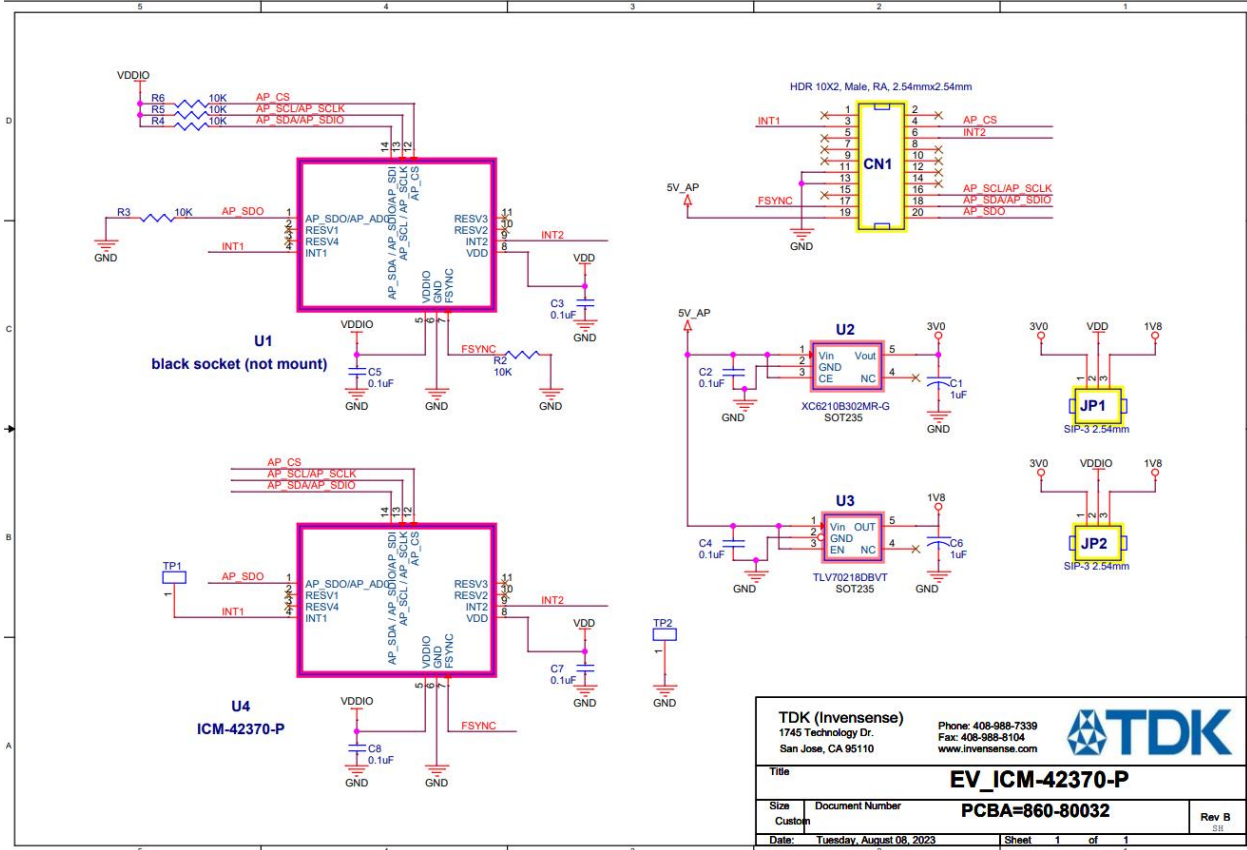


Figure 4. Evaluation Board Schematics

4 BILL OF MATERIALS (BOM)

The BOM the evaluation board is provided below for reference.

QUANTITY	REFERENCE	PART	MANUFACTURER	MANUFACTURER'S PART NUMBER
1	CN1	HDR 10X2, Male, RA, 2.54mmx2.54mm	Würth	61302021021
2	C1,C6	1µF	Murata	GRM155R61A105KE15D
6	C2,C3,C4,C5,C7,C8	0.1µF	Yageo	CC0402KRX5R6BB104
2	JP1,JP2	SIP-3 2.54mm	FCI	68000-103HLF
5	R2,R3,R4,R5,R6	10K	Yageo	RC0402JR-0710KL
1	U2	XC6210B302MR-G	Torex	XC6210B302MR-G
1	U3	TLV70218DBVT	TI	TLV70218DBVT
1	U4	ICM-42370-P	TDK	ICM-42370-P
1	U1	Socket – Not Mounted	N/A	N/A

Table 1. Bill of Materials

5 CONNECTOR AND JUMPERS

CN1 is used for I²C/I³C/SPI host communication, IRQ, and power supply connection.

CONNECTOR REF. NAME	PIN #	SIGNALS
CN1	3	INT1
	4	AP_CS
	6	INT2
	11	GND
	13	GND
	16	AP_SCL/AP_SCLK
	17	FSYNC
	18	AP_SDA/AP_SDIO
	19	5V
	20	AP_SDO
	1,2,5,7,8,9,10,12,14,15	NC

Table 2. CN1 Signals

JP1 and JP2 are jumpers to set VDD and VDDIO voltage level.

CONNECTOR REF. NAME	PIN #	SIGNALS
JP1	1	3.0V
	2	VDD
	3	1.8V
JP2	1	3.0V
	2	VDDIO
	3	1.8V

Table 3. JP1 and JP2 Signals

6 HOST INTERFACE OPTIONS

EV_ICM-42370-P sensor data can be read using the jump wires or by soldering the required pins from CN1 to the external host CPU.

The evaluation board can be directly plugged in via CN1 to a TDK InvenSense SmartMotion Host Interface board DK-UNIVERSAL-I, ordered separately.

7 ELECTROSTATIC DISCHARGE SENSITIVITY

The IMU sensor can be permanently damaged by electrostatic discharge (ESD). ESD precautions for handling and storage must be taken to avoid damage to the devices.

8 REVISION HISTORY

DATE	REVISION	DESCRIPTION
08/28/2024	1.0	Initial release

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