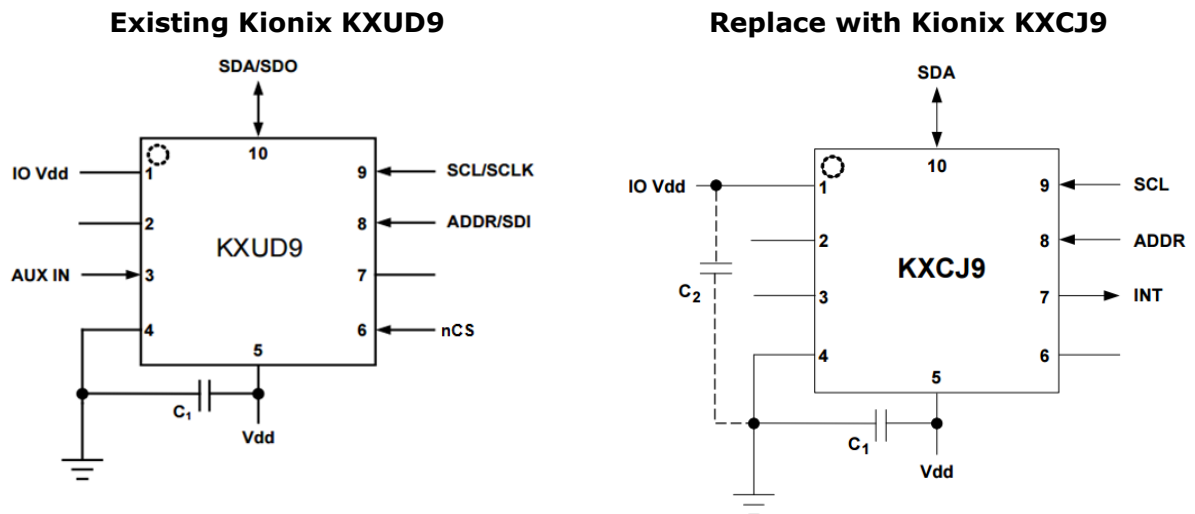


Introduction

The purpose of this application note is to illustrate how the Kionix KXCJ9 accelerometer can replace an existing Kionix KXUD9 accelerometer.

Pin Compatibility

The Kionix KXUD9 can be replaced by a Kionix KXCJ9 accelerometer for an I²C interface application only. The Kionix KXCJ9 only supports I²C and does not support SPI.



Pin	Name	Function
1	IO_VDD	The power supply input for the digital communication bus
2	DNC	Reserved – Do Not Connect
3	AUX IN	Auxiliary input for analog/digital conversion
4	GND	Ground
5	VDD	The power supply input. Decouple this pin to ground with a 0.1uF ceramic capacitor
6	nCS	nCS (SPI). Connect to IO_VDD for I ² C only mode.
7	DNC	Reserved – Do Not Connect
8	ADDR/SDI	I ² C programmable address bit/SPI Serial Data Input
9	SCL/SCLK	I ² C Serial Clock/SPI Serial Clock
10	SDA/SD0	I ² C Serial Data/SPI Serial Data Output

Pin	Name	Description
1	IO_VDD	The power supply input for the digital communication bus. Optionally decouple this pin to ground with a 0.1uF ceramic capacitor.
2	DNC	Reserved – Do Not Connect
3	DNC	Reserved – Do Not Connect
4	GND	GND
5	VDD	The power supply input. Decouple this pin to ground with a 0.1uF ceramic capacitor
6	RSVD	Reserved – Connect to VDD, IO_VDD, or GND
7	INT	Physical Interrupt
8	ADDR	I ² C programmable address bit – Connect to IO_VDD or GND
9	SCL	I ² C Serial Clock
10	SDA	I ² C Serial Data

Figure 1: Pinout of KXUD9 vs KXCJ9

The following are key differences in hardware and software between the Kionix KXUD9 and the Kionix KXCJ9 tri-axis accelerometers:

- The KXCJ9 ADDR pin (9) must be tied to IO_VDD or GND
- The KXCJ9 internal register definitions do not align with the KXUD9. Software changes are required in the user's application.
- The 7-bit I2C Slave Address associated with the KXCJ9 is 000111X, where the programmable bit, X, is determined by the assignment of ADDR (pin 8) to GND or IO_VDD.
- The KXCJ9 provides synchronous read back of acceleration data.
- The KXCJ9 includes a hardware interrupt INT (pin 7) that can be configured to indicate that new acceleration data is available and/or a motion has activated the interrupt.
- The KXCJ9 accelerometer output registers are least significant byte first.
- The KXCJ9 accelerometer output registers begin with XOUT_L at address 0x06 (not address 0x00).
- The KXCJ9 does not have a filter bypass option.
- The KXCJ9 includes an embedded wake up function that can be configured by the user to report when qualified changes in acceleration occur. The user has the option to enable or disable specific axes and specific directions, as well as to specify the delay time.
- The KXCJ9 Reserved registers should not be written.
- Device functions and performance differences may exist, see product specifications for details.
- The KXCJ9 does not have auxiliary ADC functions.

The Kionix Advantage

Kionix technology provides for X, Y, and Z-axis sensing on a single, silicon chip. One accelerometer can be used to enable a variety of simultaneous features including, but not limited to:

- Hard Disk Drive protection
- Vibration analysis
- Tilt screen navigation
- Sports modeling
- Theft, man-down, accident alarm
- Image stability, screen orientation & scrolling
- Computer pointer
- Navigation, mapping
- Game playing
- Automatic sleep mode

Theory of Operation

Kionix MEMS linear tri-axis accelerometers function on the principle of differential capacitance. Acceleration causes displacement of a silicon structure resulting in a change in capacitance. A signal-conditioning CMOS technology ASIC detects and transforms changes in capacitance into an analog output voltage, which is proportional to acceleration. These outputs can then be sent to a micro-controller for integration into various applications. For product summaries, specifications, and schematics, please refer to the Kionix MEMS accelerometer product sheets at <http://www.kionix.com/parametric/Accelerometers>.