Interfacing Accelerometer MMA7361with ATmega2560 in Firebird V Robot

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Agenda for Discussion

1. Accelerometer
   - Introduction
   - Working Principle
2. Interfacing of Accelerometer with FireBird V
   - Pin Diagram
   - Pin Connections of MMA7361 Accelerometer
   - Connection Details
3. C Code
4. Applications using Accelerometer

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- For example, an accelerometer at rest on the surface of the earth will measure an acceleration g= 9.81 m/s2 straight upwards, due to its weight. By contrast, accelerometers in free fall or at rest in outer space will measure zero.
- This type of acceleration that accelerometers can measure is g-force acceleration.

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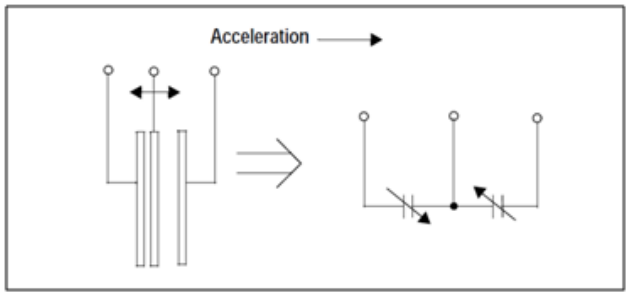

Figure : Structure of a g-cell

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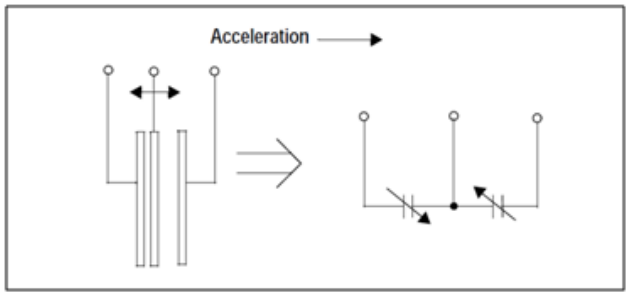

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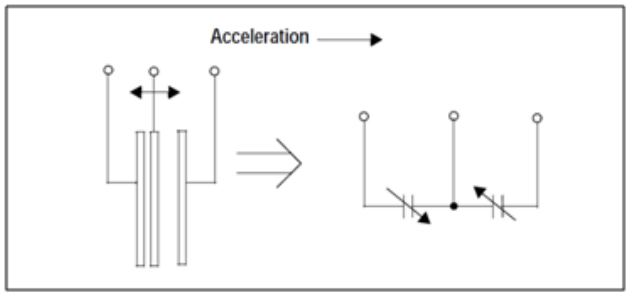
- As the center beam moves with acceleration, the distance between the beams changes and each capacitor's value will change, ($C = A\epsilon/D$). Where A is the area of the beam, ϵ is the dielectric constant, and D is the distance between the beams.



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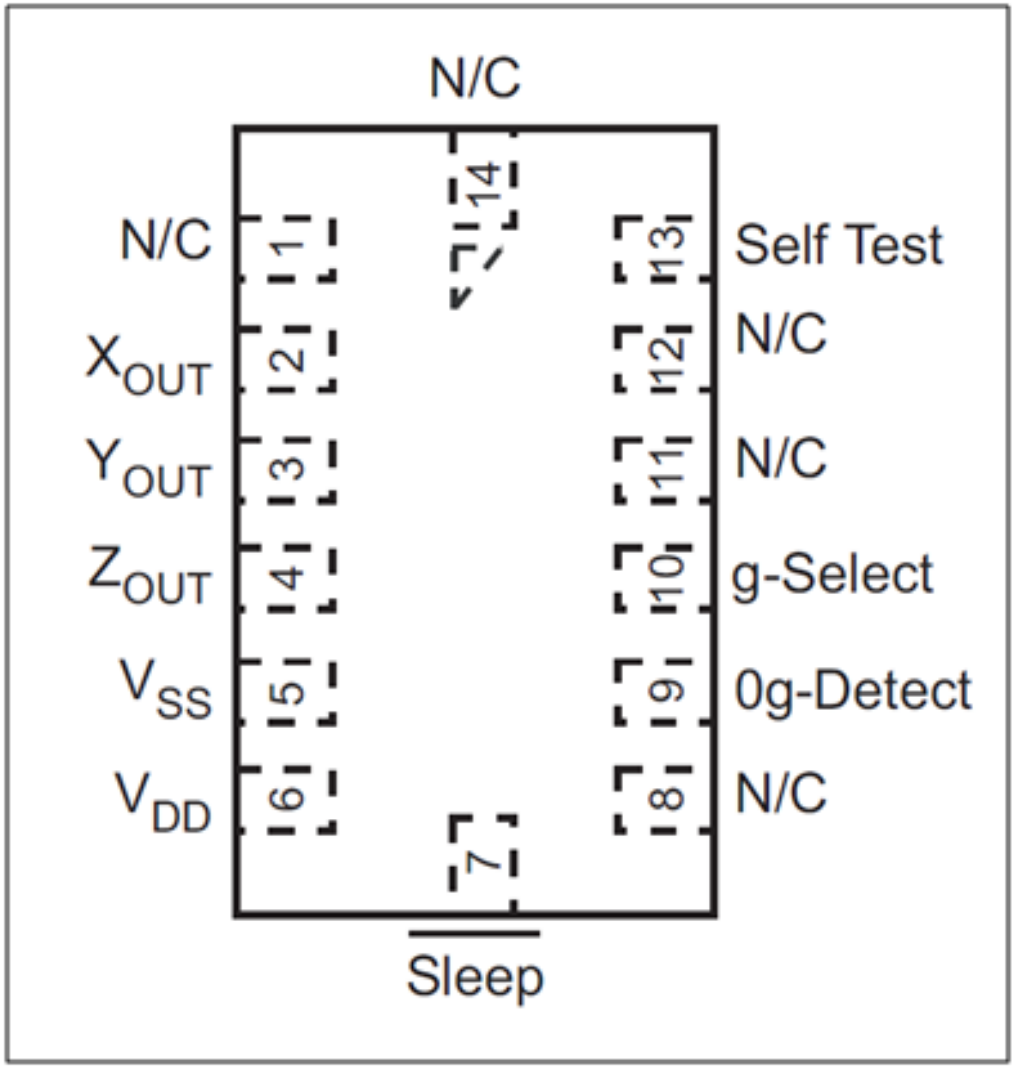

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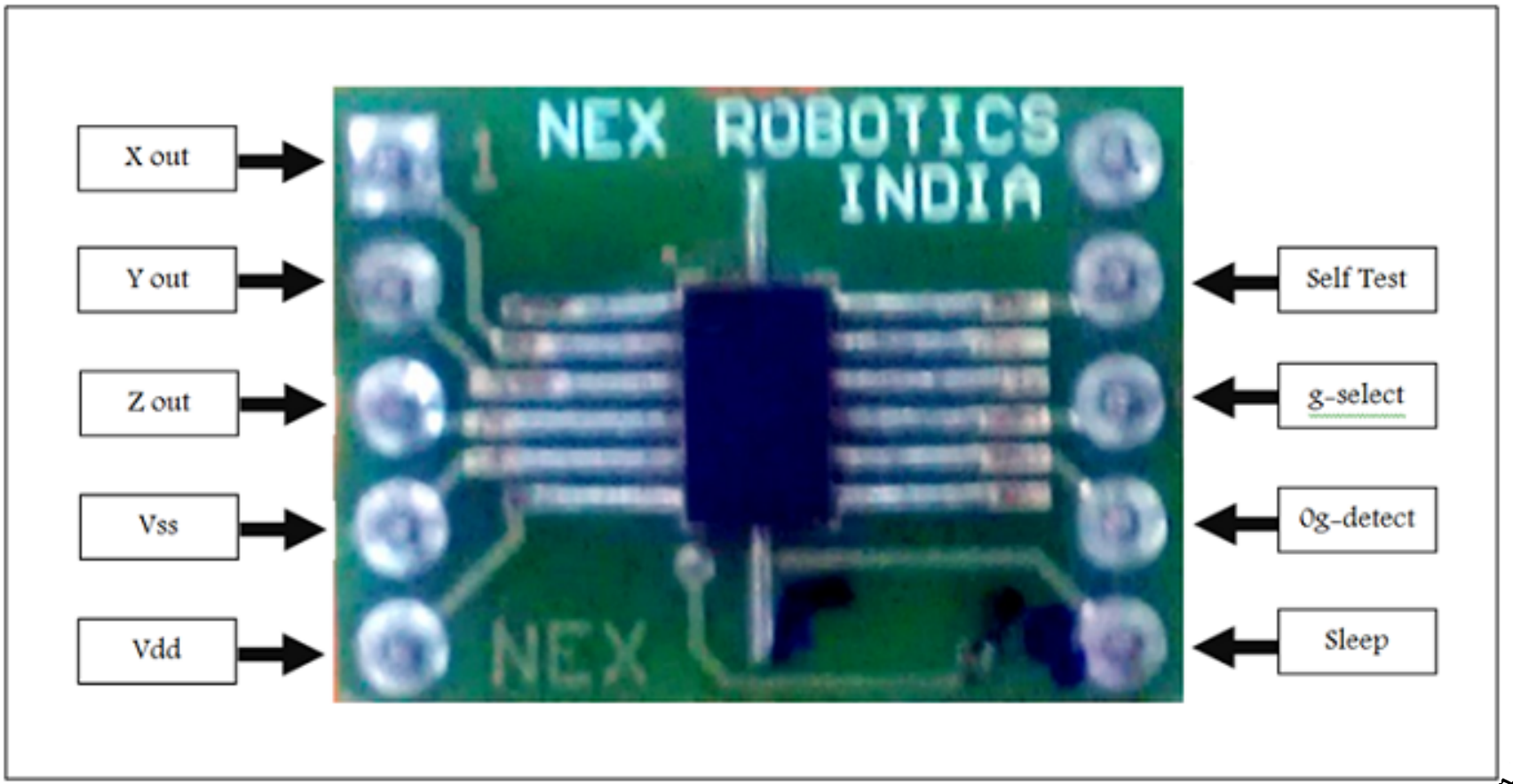

Connection Details

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Pins of MMA7361 Accelerometer	Pins of FireBird V Expansion slot	Description
X out	ADC Channel 14	Connected to Servo Pod 1 slot of FireBird V(Port K)
Y out	ADC Channel 15	Connected to Servo Pod 1 slot of FireBird V(Port K)
Z out	ADC Channel 11	Connected to FireBird V (Port K) inplace of sharp IR Sensor
Vss	GND	Common ground pin
Vdd	3.3V	Power supply and reference voltage for ADC
Sleep	3.3V	Connected to Vdd
g-select	NC	Input Pin to change the sensitivity of the sensor
0g-detect	NC	Output Pin
Self Test	NC	Input Pin

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Applications using Accelerometer

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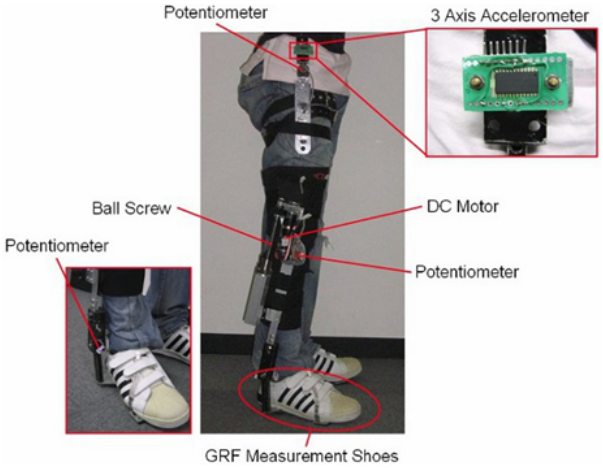

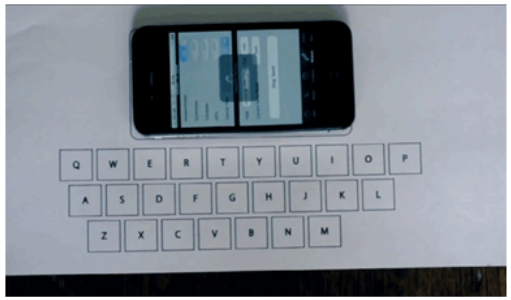

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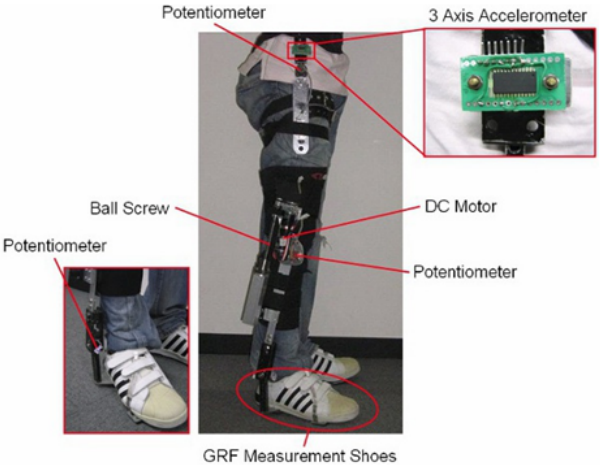
- For Robot Movement similar to the walking support system as shown in the picture to the right.



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- For Robot Movement similar to the walking support system as shown in the picture to the right.
- Accelerometers measuring dynamic forces such as vibrations can be used for designing Virtual Keyboards