

MEMS Gyroscope

The micro electro-mechanical systems (MEMS) gyroscope on your phone adds an **additional dimension** to the information supplied by the accelerometer by **tracking rotation or twist** which also helps the accelerometer out with understanding which way your phone is **oriented**.

MEMS gyroscopes generally use a **vibrating mechanical element** as a sensing element for detecting the **angular velocity**. They do not have rotating parts that require bearings which allows an easy **miniaturization** and the use of the manufacturing techniques typical of MEMS devices.

The MEMS gyroscope measures **angular rate using the Coriolis Effect**. When a mass is moving in a particular direction with a particular velocity and when an external angular rate is applied, a force occurs, which causes **perpendicular displacement of the mass**. So similar to the accelerometer, this displacement will cause **change in capacitance** which will be measured, processed and it will correspond to a particular angular rate.

While the gyroscope takes care of the **rotational orientation**, it is the accelerometer that senses the **linear changes** relative to the frame of reference of the device. That is, the data coming from the accelerometer needs to be paired with the data coming from the gyroscope to get precise information about how your phone is moving through a **3-dimensional** space

The gyroscope accordingly plays an important part in the **gesture controls** of your media, **direction control in gaming**, the **muting** of your ringing phone by simply turning it **upside down**.

However, gyroscopes are not exclusive to phones. They are also used to determine **altitude and position** in **aircrafts altimeters**, to keep cameras **steady on the move**, to prevent **automotive roll-over**, to trigger **airbag systems**, and in many other potential applications.