

# libfreespace and the BeagleBoard

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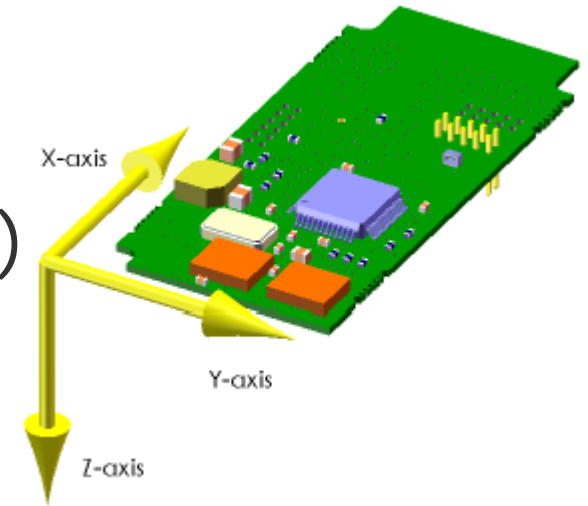
# Freespace® Motion Sensing

- Technology inside many in-air pointing remote controls
- Uses inexpensive MEMS accelerometers and rotational sensors to compute mouse pointer events
- Sensor assembly designed to be small and embeddable
- Communication via USB HID over RF link
- Lots of additional functionality by using the open-source libfreespace library



# libfreespace

- Userspace library with C API
- Device discovery (up to 49 devices)
- Calibrated sensor data
  - Acceleration in  $x, y, z$
  - Rotational velocities for pitch, roll, yaw
- Computed device orientation as a quaternion
- Language bindings for Python, Java, and C#



# BeagleBoard Integration

- Orientation quaternion used to control orientation of a 3D OpenGL ES model
- Building natively on Beagle just worked!
- Quaternion to Euler angle conversion code included in libfreespace-examples (sadly, 3D code not distributable)
- Other ideas
  - Pointing-based remote control for XBMC and Neuros would rock
  - Head-mounted display orientation (check out <http://www.kopin.com/golden-i/technology/>)
  - Inertial navigation on the cheap

# Links

- Project page: <http://libfreespace.hillcrestlabs.com>
- Video: <http://www.youtube.com/watch?v=UHQdUS0i-nw>
- Contacts
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