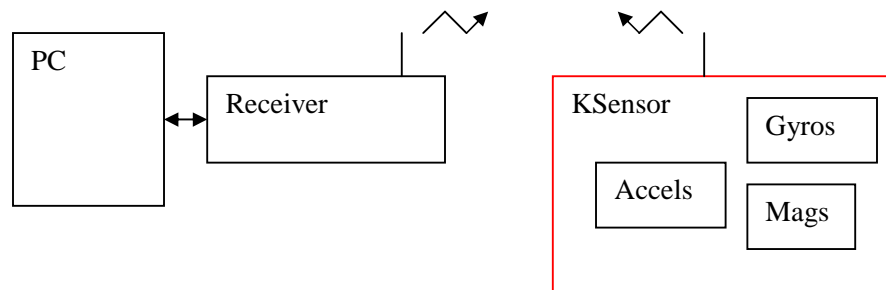# KSensor

Operational/ Technical Description

1. Overview:

The KSensor is a wireless inertial sensing device. The system is used to detect the orientation of an object that the inertial sensor is attached to. The sensor uses gyros, accelerometers and magnetometers to detect its yaw, pitch and roll. Typical uses are for sports training, virtual reality applications and simulation and training.

2. Technical Description

The KSensor uses a transceiver based on a Chipcon Zigbee chipset but it does not implement the higher level Zigbee software protocol stack. There are three boards in the receiver package. The first is the radio board that has the Chipcon radio chip, a Pic microprocessor to handle the communication protocol between the IMU and the Chipcon chip and a PCB antenna. The second board is the IMU board with a processor and the gyros, accels and magnetometers along with necessary support chips. The final board has the power switch and charger circuit for the battery.

The Chipcon 2420 radio used is a single chip Direct Sequence Spread Spectrum (DSSS) transceiver. Its supports data rates up to 250kbps with a 2 MChip/s chip rate. It uses O-QPSK with half sine pulse shaping modulation. The 2420 uses an input reference oscillator of 16MHz.

The integrated PCB antenna is a so-called Inverted-F type. The Inverted F antenna is a wire monopole where the top section is folded down to be parallel with the ground plane. The peak antenna gain is 5 dBi, the corresponding peak field strength is 90dBuV/m.

There is a balum to convert output of the chip to the single ended input of the PCB antenna.

The system does not do frequency hopping. It supports up to 16 channels spaced at 5Mhz intervals between 2.4 and 2.4835 MHz.