PS3 "Tony Hawk: Ride" Skateboard Controller
Operation Principle
July 24, 2009

Controller Side Radio

The radio system is mainly composed of three parts: radio modem, frequency synthesizer and baseband microprocessor. The radio modem is a MSK modem running at 250 kbps. The antenna is an embedded PCB antenna matching is done by using lumped inductors and capacitors.

The skateboard controller consists of 4 distance measurement sensors and 2 accelerometers for motion detection. There are 2 microcontrollers on the skateboard. One is responsible for interpreting the distance information while the other microcontroller communicates with the accelerometers and scans keystrokes on the key panel. Then the data is packed by adding preambles, frame information, and error checking bytes. The radio system uses one of 92 channels (the frequency range is 2404.4 - 2478.9MHz) to send signal in random, and the channel changing frequency is 83Hz.

The skateboard controller radio is powered by 4-AA size batteries and regulated to 3.0V. The current consumption of the RF module is about 16mA, the total current consumption of the skateboard side radio system is about 35mA in normal working mode. It will enter sleep mode if no key is pressed or no motion is detected after 15 minutes, in this mode the total current consumption of the skateboard controller is less than 400uA.