

# **Wireless Joypad for PS2**

## **Theory of Operation**

11/30/04

### **1. Station Side Radio**

The radio system is mainly composed of three parts: radio modem, frequency synthesizer and baseband microprocessor. The radio is interfaced with PS2 via a 9-pin connector. PS2 sends a command to the radio every 16.666 milliseconds (NTSC, 20 milliseconds on PAL). The radio takes the data from PS2, packetizes the data by adding preambles, frame information, and error checking bytes. The packetized frame is transmitted to the wireless joystick. When joystick replies, this radio receives the data, un-packetizes it, and sends to PS2. The radio modem is a FSK modem running at 250 kbps with GFSK encoding to avoid frequency drifting. Frequency is controlled by a frequency synthesizer which adjusts a voltage-controlled RF oscillator dynamically for accurate frequency management. A total of 79 channels can be selected covering the frequency range of 2.402 – 2.480 GHz. The antenna is an embedded PCB antenna; matching is done by using lumped inductors and capacitors. The radio is a half-duplex system and is powered by the host. The total average power consumption of the radio system is about 16 mA at 3.3V.

### **2. Joypad Side Radio**

Joypad side radio operates in similar way to Station Side Radio as described in previous section. A total of 79 channels can be selected covering the frequency range of 2.402 – 2.480 GHz. It scans keystrokes on the joypad. Similarly, the data is packetized in the same way as Station Side Radio. The joypad radio is powered by 4-AAA size batteries and down regulated to 3.0V. Another provides power for two vibration motors in the joypad.