BT Keyboard

Operation Principle

1. Controller Side Radio

The BT keyboard system is mainly composed of three parts: radio modem, frequency synthesizer and baseband microprocessor. The antenna is an embedded PCB antenna matching is done by using lumped inductors and capacitors.

The microcontroller scans keystrokes on the BT keyboard, then packs the data by adding preambles, frame information, and error checking bytes. The radio system uses one of 79 channels (the frequency range is 2.402-2.480GHz) to send signal in random.

The BT keyboard is powered by 2*1.5V AAA batteries and regulated to 2.8V. The power consumption of RF module is about 1.8mA, the total power consumption of the BT keyboard is about 2mA in normal working mode. It will enter sleep mode if no key be pressed after 8 minutes, in this mode the total power consumption of BT keyboard is only about 35uA*.

This Bluetooth module is regulated to Bluetooth V3.0. and set from 2402.00MHz to 2480.00MHz.The separation is 1.0MHz and there are 79 channels in total. The working procedures are:

a. When power on, this device will loop scan the whole frequency until a connection command from the partner is received.

b. This device transmits a response signal.

c. The partner receives the response signal and recognizes it, then send a connection command to establish the connection.

d. each frequency is used equally on the average by each transmitter that each new transmission event begins on the next channel in the hopping sequence after the final channel used in the previous transmission event.

e. After the connection establish successfully, the data transmission is beginning. At the

same time, the partner and this device will shift frequencies in synchronization per a same pseudo randomly ordered list of hopping frequencies, the hopping rate is 1600 times per second. This device conform to the criteria in FCC Public NoticeDA00-705.

f. The bandwidth of the this device, which is set to a fixed width by the software, match the hopping channel bandwidth of their corresponding partner. This device is a true frequency hopping system and does not have the capability to be coordinated with other FHSS systems in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

There are 79 channels in total. The channels hopping from one channel to another channel during the pseudorandom selection process. The hopping interval is 12 millisecond. This system frequency hops between 79 channels. If it is determined that one of the 79 hopping channels is found to be noisy or poor due to other RF interference, then a new channel is selected from the 78 unused channels and the one noisy channel is released to the unused group. This repeats whenever a noisy or poor channel is detected. For example, for the hop pattern of 2414MHz,2434MHz,2444MHz,2434MHz,2451MHz,2441MHz,2454MHz,2434MHz,2427MHz,2461MHz,2461MHz,2444MHz,2414MHz,2448MHz,2451MHz,2417MHz,2478MHz,2469MHz,2473MHz,2403MHz,etc. The sequential hops can not follow any order, is completely random.