Indoor Ultra-wideband communication system

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Introduction

Ultra-wideband (UWB) is a wireless transmission standard that will revolutionize consumer electronics. The purpose of the project is to increase interest in UWB technology, and to explore its usefulness by building an indoor UWB communication system that can be applied to file and message transmission.

Motivation

UWB is interesting because of its inherent low power consumption, high data rates of up to 480 Mbps, and large spatial capacity. Further more, the power spectral density is low enough to prevent interference with other wireless services. And UWB signals are like background noises, it is immune to detection and interception by other narrowband receivers. This new standard has recently been approved by the FCC for unlicensed use and has been gaining interest throughout the consumer electronics industry.

Design

Firstly, we are using Matlab to simulate the process of modulation and demodulation of this UWB communication system. And then we conducted baseband pulse modulation and demodulation experiment by using TIMS (Telecommunication Instructional Modeling System) as the second step. From the TIMS baseband experiment, we could successful transform the message signal to the PWM signal, but the PPM generated by the TWIN PULSE GENERATOR couldn't reach 500MHz bandwidth, thus we design the pulse generator to reach the UWB standards.

Conclusion

The object to build the UWB system having bandwidth larger than 500 MHz. This project proves that the UWB signal have large bandwidth, low power consumption and high transmission speed. Thus, this system can be used to build many convenient indoor communication applications.