Map-Fi Tag Receiver part

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Outline

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- My Task
- Envelope-demodulation Method
- Self-adaptive Envelop-demodulation Circuit
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- IC Design
- Q&A

System Introduction

Tags backscatter the provided RF signal to achieve low energy consumption communication

RF Transmitter : providing RF signal

Tag: backscattering to move the spectrum and imitate the 48 sub-channel of the OFDM system

Receiver : any device obeying 802.11g protocol

My Task

Design a PCB to receive the command sending to the Tag.

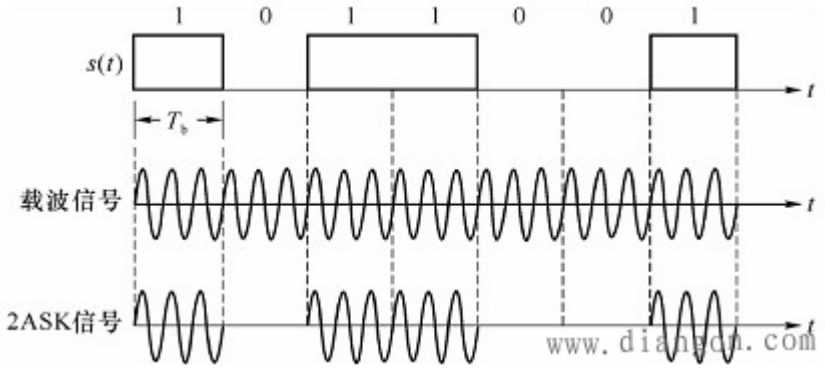
Command is used to synchronize and trigger.

Command signal:

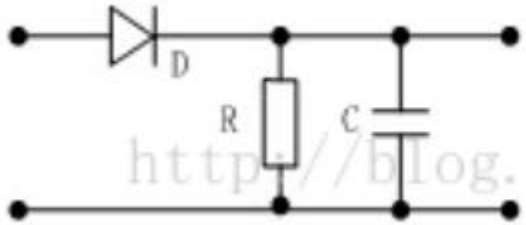
2ASK modulation method

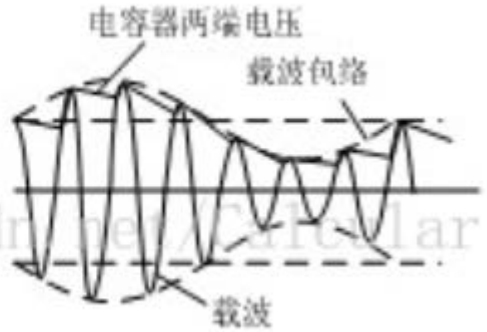
Carrier wave 2.4GHz

Data rate 250kbps



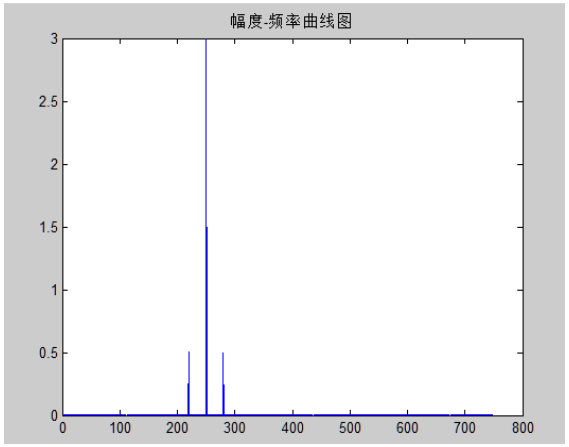
Envelope-demodulation Method

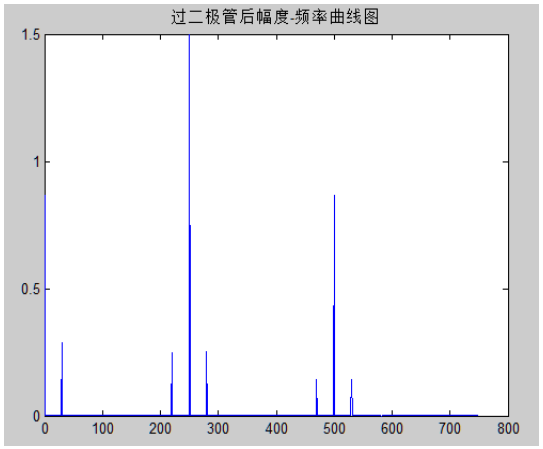




Typical Circuit

Using matlab

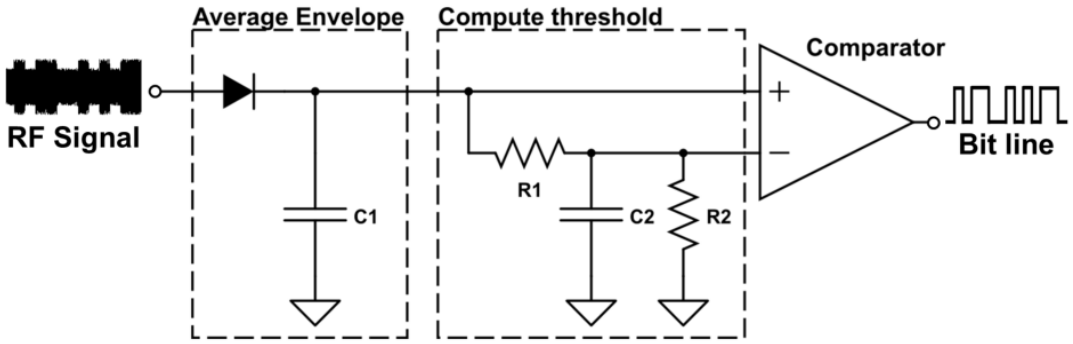




Diode Spectrum Analysis

Self-adaptive Envelop-demodulation Circuit

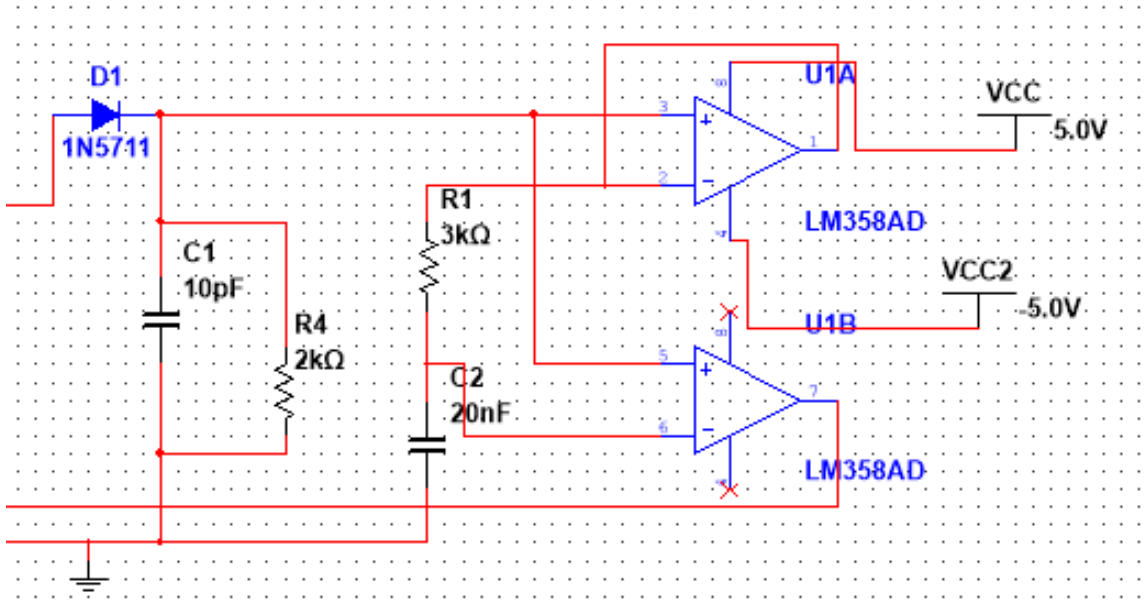
Problem: different transmission distance require different threshold



Solve the transmission distance problem

Threshold decided by the signal itself

My Design



Part1: envelope-demodulation circuit
Part2: voltage follower
Part3: low pass fliter
Part4: comparator

Problems

1. Amplitude

-30dBm signal voltage 220mV

Germanium diode turn on voltage 0.2~0.4V

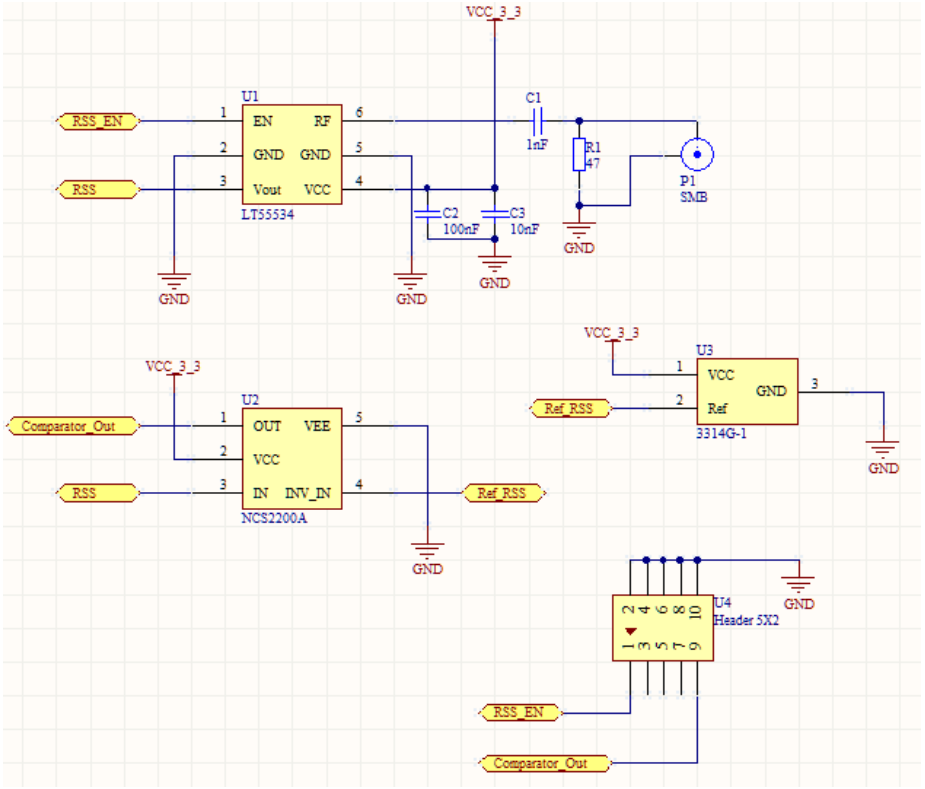
(now this is not a problem……)

2. Frequency

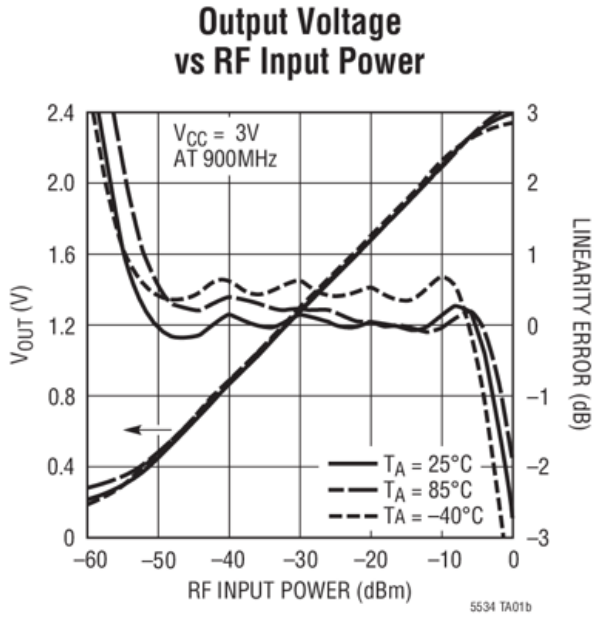
Losing unilateral conduction characteristic

Special diode

IC Design



U1 LT5534 power detect component



A bit high energy consumption

Q&A

Thank you!