Real Time Packet Reception Using Software Defined Radio's
Project Progress Report

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1. Introduction

In this project, we are using a 433MHz RF transmitter and a RTL software defined radio to detect incoming wireless signals and decode the message contained in them in real time. We are using the Arduino micro controller to generate and encode the message and send it via the RF transmitter. At the receiver end we are using GNU radio SDR tool set to demodulate, decode and reconstruct the data transferred.

2. Progress

1. Understanding the code example for RFID decoding given by you

2. Started with the get acquainted with the SDR and SDR# using POSCAG decoding example given on the RTL SDR website

3. Experimenting with the use of GNU radio software and SDR

4. Study about the modulation type of the transmitter we have

5. Study about the messaging format and the encoding used

3. Challenges/Problem

1. Too much noise on the receiver and therefore reconstructing the signal a little more challenging

2. Analog to Digital Conversion in the GNU Radio to sample the incoming data and to verify the message format and details with the previously identified data

3. Weak Power of the transmitter.

4. Results

The message format used for transmission is defined in the Arduino library $RH_ASK.h$. It is as follows:

1. 36 bit training preamble

2. 4 bit header (To, From, ID, Flag)

3. 12 bit start symbol ($0xb38$)

4. 8 bit message length count including frame count sequence

5. N message bytes – The maximum n is defined in the header file also

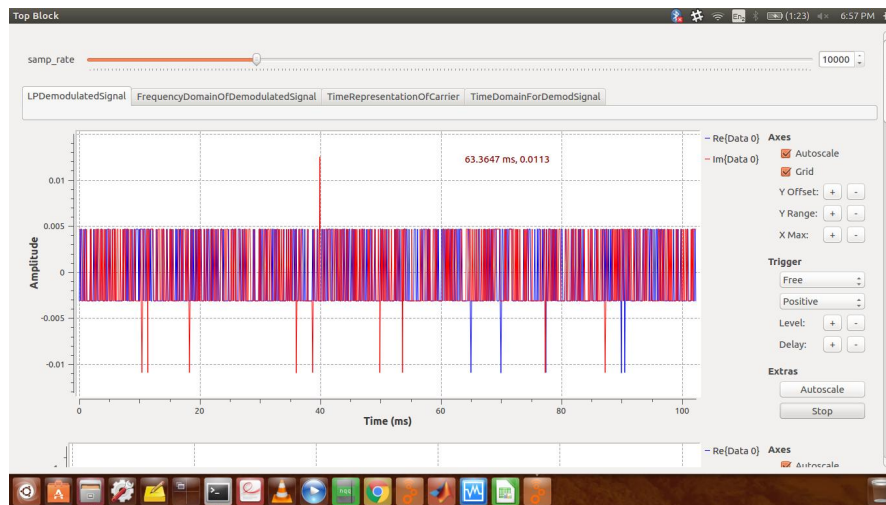The speed of data transfer is selected at 200 bits per second

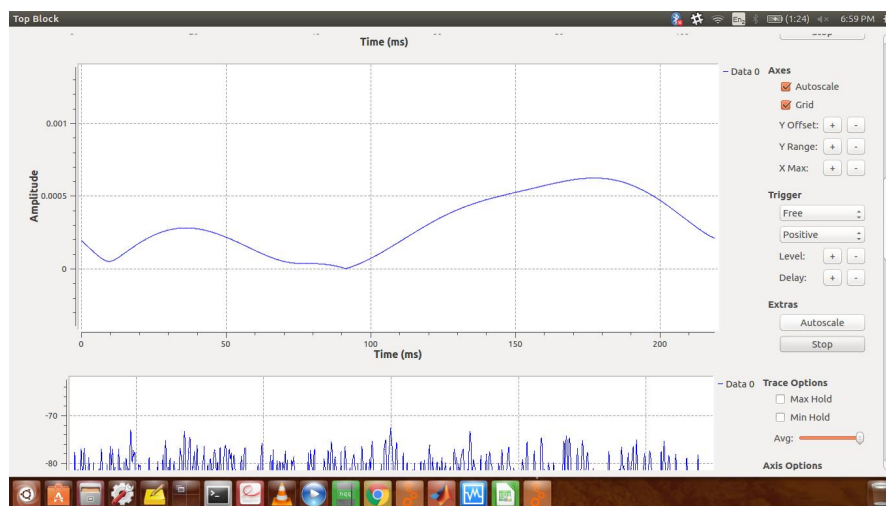Figure 1: Time Domain Representation of Signal Captured by RTL-SDR

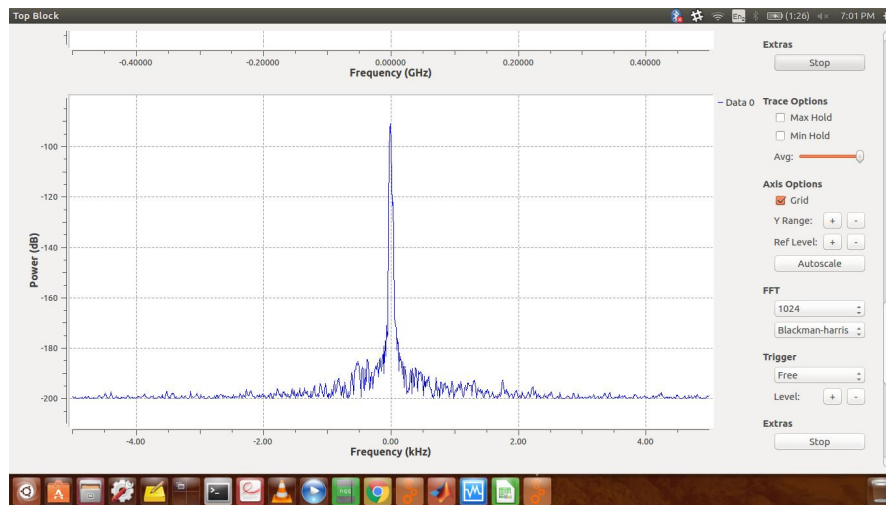Figure 2: LPF output in Time Domain Representation

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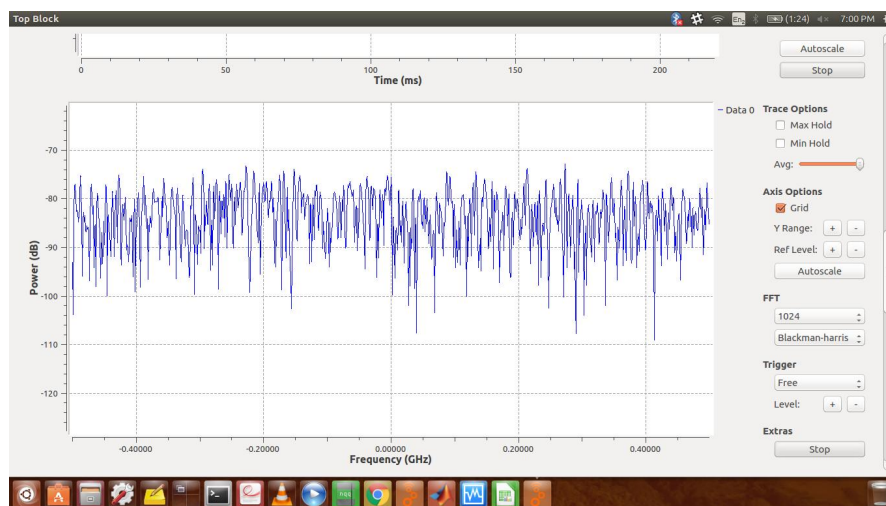Figure 3: LPF output in Frequency Domain Representation

Figure 4: Demodulated output in Frequency Domain Representation

5. Next Step

Reconstructing the digital signal from the A2D converter to the original text in real time and verifying that noise / interference has not caused error in transmission.