Summary Description: Testing NRF24L01 Radio Module Communications

Tags: electronics; software; Arduino nano; NRF24L01 radio module

Why I did this: I love the ‘magic’ of remote communications (i.e. being able to control items from long wireless distances). I wanted to test out some widely popular radio communication modules known as the NRF24L01 (I specifically have the longer-range PA/LNA ones, but the wiring and coding techniques are the same as the original). NRF24L01 modules operate under the widely popular 2.4GHz unlicensed radio band.

(summary pic of system)

Design Walkthrough:

Parts: 2x Arduino microcontrollers (nano); 2x NRF24L01 (PA/LNA) modules; 1602 LCD display; RGB led; 2x 9V batteries; potentiometer

Following the directions of some Arduino script examples, I setup a code script to allow a potentiometer to change the colour of an RGB led and display the state on a 1602 LCD display. The idea was that I could put the potentiometer on one setup of nano and radio, the RBG led and display on the other setup of nano and radio, then tune the led colour from a distance.

It worked well enough; I was able to control the color easily from 60 feet (18 meters) away, but I wanted to see how far I could get before losing control. I changed the programming of the sender setup to be from using a manual potentiometer to instead having an automatic incrementor that will change the led state every second.

(pics of system)

Lessons Learned and Future Changes:

But what’s its real potential? I was able to stay connected up to about 250 feet (76 meters) away in a congested neighbour of houses and garages, but I read that it could potentially stay connected at about 3600 feet (1100 meters), so I would love to take it to a long open field or mountain and test the range; maybe use it on drone/plane project.

References:

NRF24L01 tutorial: <https://www.instructables.com/NRF24L01-Tutorial-Arduino-Wireless-Communication/>