12. Experiments with UST 40 kHz Ultrasonic Speaker and Mics
UFO Doctor, Dec 12th, 2011

1. Introduction

The sensitivity of standard Electret Mic and the efficiency of High Woofer Speaker are not optimal for our ambitious duck project.

Miru told me to make experiment with the well known UST-40T and UST-40R, which I have but did not want to use since they are specified for 40 kHz +/-1% only and since the dimensions are about D16x12, weight 3 grams.

For our Duck project we need an FSK with a frequency shift > +/-1 %, since the frequency temperature stability of the PLL within the temperature range 0 to 50 degree Celsius is about +/- 0.2% only.
(see fig. 9 of Datasheet XR2211, Ro = 10kOhm, with higher Ro values the other PLL resistors get higher values, which is not good by personal experience)

The frequency temperature stability of the Ardunio Nano is much better, since the clock frequency is given by stable quartz.

2. Material and Method

Ultrasonic Speaker UST-40T; Ultrasonic Microphone UST-40R
Sinus Generator 2Vpp
Storage Scope with an Input Impedance of 1Meg/30pF
Measuring distance 500mm:
A: Speaker and Mic face to face
B: Speaker and Mic both upwards (in laboratory indoor conditions)

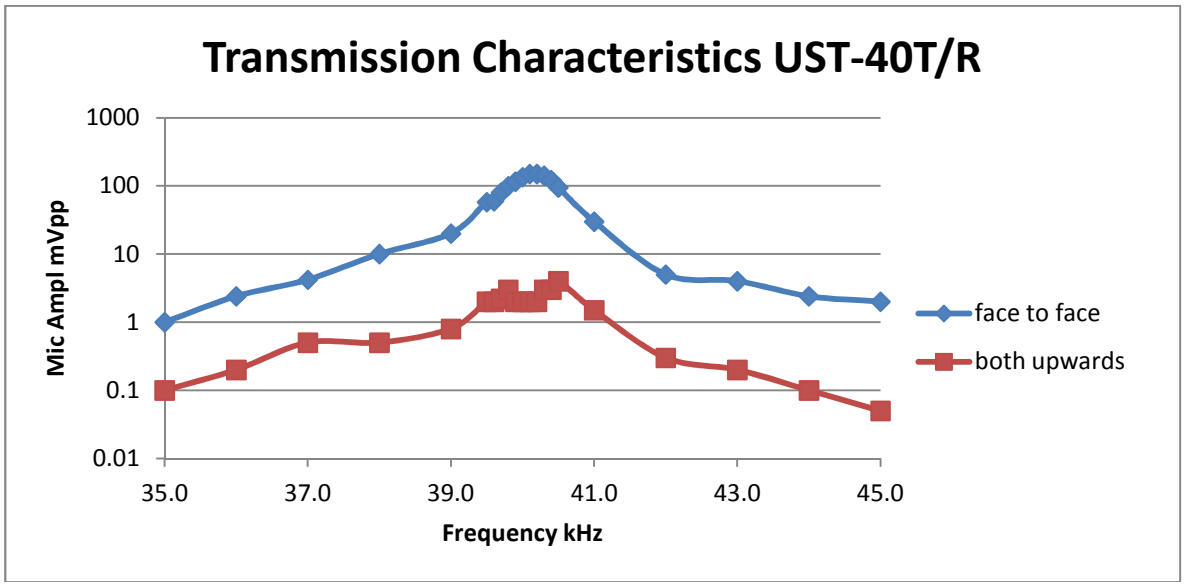

Fig. 1. Acoustic transmission test with UST-Material, distance 0.5 meter

3. Discussion

The performance of the UST material is much better compared with High Woofer Speaker and Electret Mic.
FSK with center frequency 40 kHz and +/- frequency shift +/- 1 kHz looks good for our next experiments!