

## **ELCN8005-21F-Sec1-Electronics Design Principles**

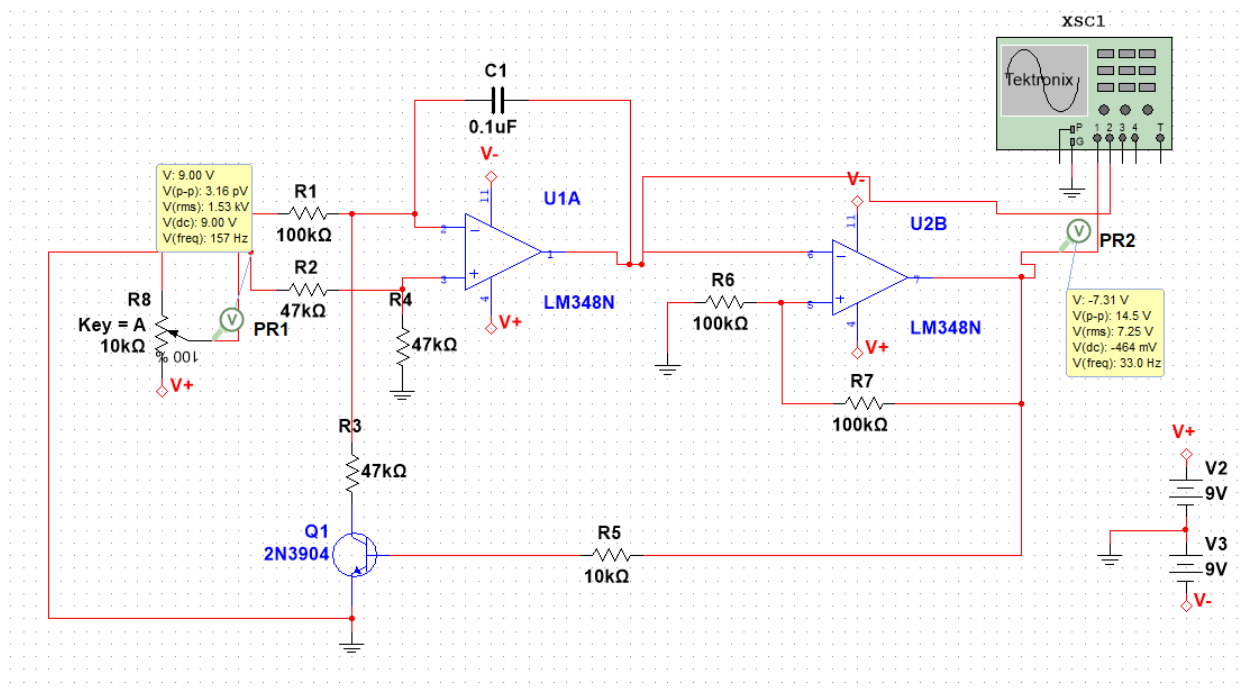
- **Experiment:** Voltage Controlled Oscillator (VCO)
- **Submitted by:**
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- **Date:** 9/11/2021

**OBJECTIVE:**

- Design and build a Voltage Controlled Oscillator (VCO)  
Basic Receiver and Phase-Locked Loop (PLL)

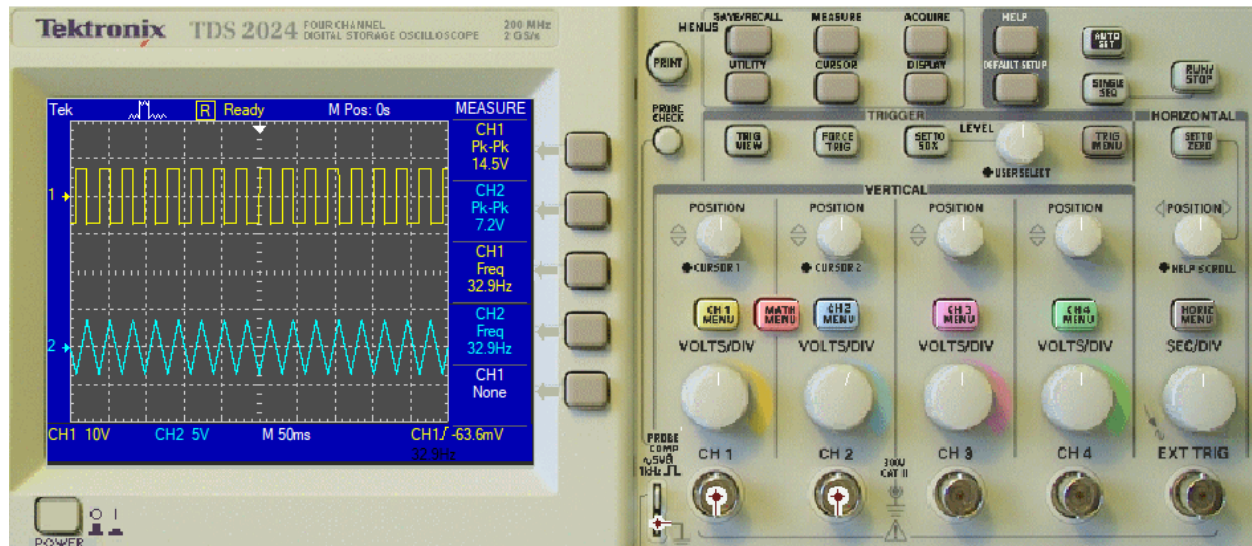
**EQUIPMENTS:**

Hardware	Software
LM348 – 1 Resistor – 47k,10k,100k Capacitor – 0.1uf Power supply – 9v Transistor - 1 Multimeter – 1 Breadboard – 1	Multisim

**SCHEMATIC IN MULTISIM:**

## OUTPUT:

Tektronix oscilloscope-XSC1



## CALCULATIONS:

Formula for Output frequency:

$$f = \frac{1}{(2\pi RC)}$$

**R** = 47k

**C** = 0.1uf

Output Frequency :-

$$f = \frac{1}{2\pi RC}$$

$$R = 47K \Rightarrow 47000 \Omega$$

$$C = 0.1\mu F \Rightarrow 1 \times 10^{-7} F$$

$$= \frac{1}{2\pi (47000) (1 \times 10^{-7})}$$

$$= 33.8 \text{ Hz} //$$

Frequency is 33.8Hz

#### THEORY VS PRACTICAL:

Theory Frequency	Practical Frequency	
	Multisim	Breadboard
33.8 hz	33 hz	30 hz

**CONCLUSION:**

The voltage control oscillator has 2 output one is triangle and other is square wave. The first op amp acts as an integrator. The second op amp acts as a schmitt trigger. The output of the voltage controlled oscillator is frequency which is accordance to the control voltage. In the bread board the output is shown in led blinking.

**DISCUSSION:**

From performing this experiment, I am able to build the voltage controlled oscillator circuit in multi sim and breadboard. Understood the working principle of the VCO.

**Reference:** <https://www.elprocus.com/voltage-controlled-oscillator-working-application/>