Contents

Experiments

Experiment (1)

Phase Shift Oscillator

Objective:

This experiment is demonstrated the operation of RC sine wave phase shift oscillator.

The required components and Equipment:

1- Three resistance 10 K ohm
2- Three Capacitors of 2.2 nF
3- LM 741
4- Power Supply of 12 and -12 volt
5- Wight Board
6- Oscilloscope

Procedures:

- Connect the circuit as shown in Fig.1.1 by using the 741 datasheet in Fig. 1.2.
- Connect channel 1 of the oscilloscope with the output of the op-amp.
- Measure the frequency of oscillations.

Circuit Diagram:

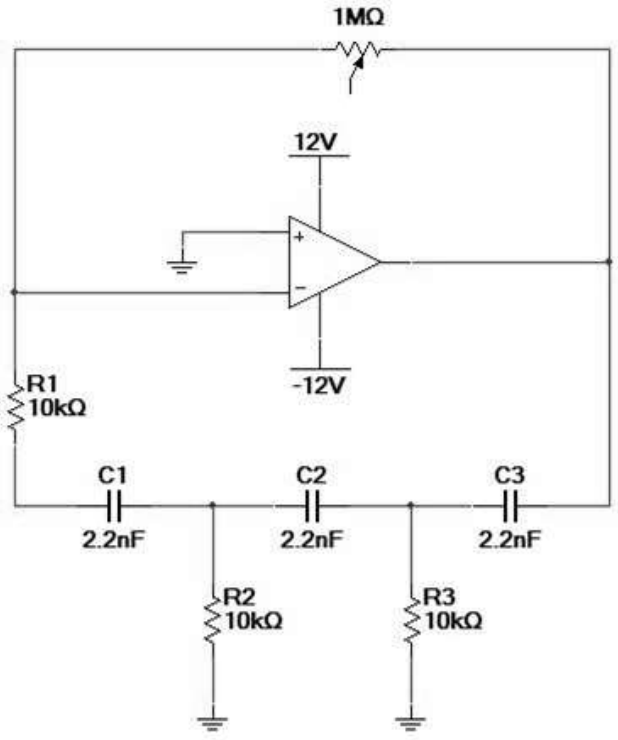

Figure 1.1: Phase Shift Oscillator Circuit

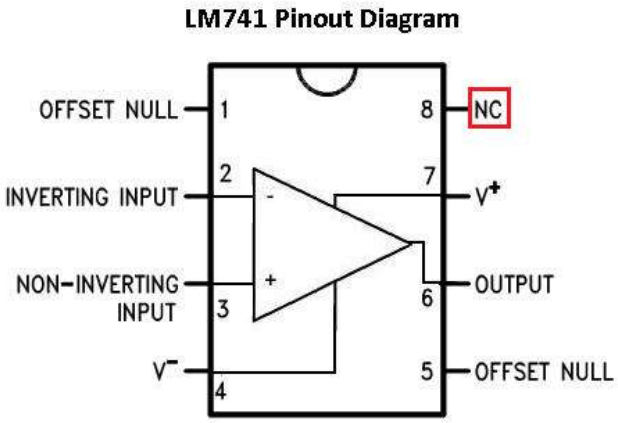

Figure 1.2: 741 Op-Amp Datasheet

Results:

-Sketch the output wave form and record the measured frequency.
- Compare between the calculated and measured frequency.

Experiment (2)

Wien Bridge Oscillator

Objective:

The experiment is intended to familiarize the student with the operation of RC sine wave Wien bridge oscillator.

The required components and Equipment:

1- Variable resistor 1 M ohm
2- Two Capacitors 16 nF
3- Two resistor of 10 Kohm
4- One 47 K ohm
5- Power Supply of 12 and -12 volt
6- Oscilloscope
7- LM741
8- Wight Board

Procedures:

- Connect the circuit as shown in Fig.2.1 by using the 741 datasheet in Fig. 2.2.
- Adjust the variable resistance 1 M ohm to 106Kohm.
- Connect the output voltage to the oscilloscope channel.
- Compare the measurement with calculation and the results from oscilloscope.

Circuit Diagram:

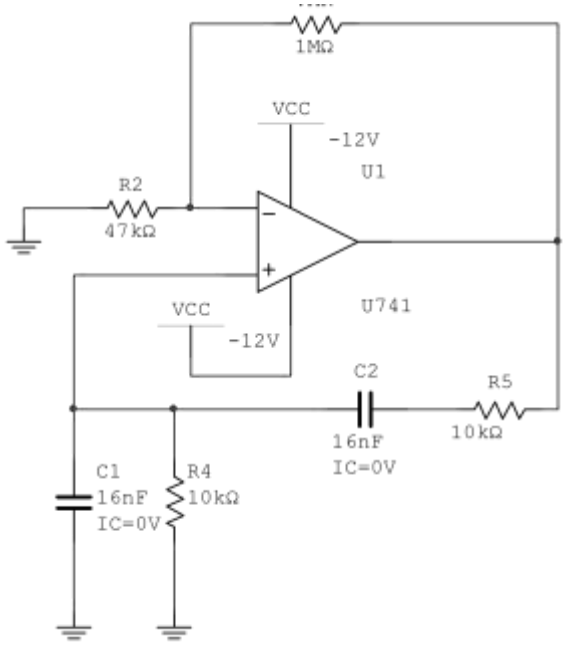

Figure 2.1: Wien Bridge Oscillator Circuit

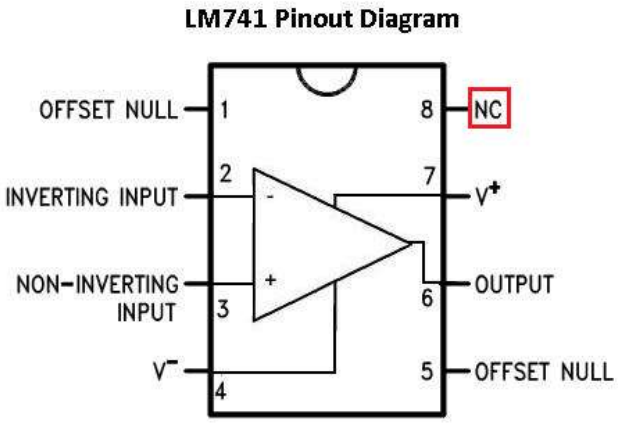

Figure 2.2: 741 Op-Amp Datasheet

Results:

- Sketch the output waveform and record the measured frequency.
- Compare your frequency measured with the calculated frequency and $f = \frac{1}{2\pi RC}$

Experiment (3)

Astable Multivibrators

Objective:

The experiment is intended to design and implement Astable Multivibrator with IC 555 as shown in figure.

The required components and Equipment:

1- Function Generator
2- One chip LM555
3- One capacitor 1 uF
4- Two resistances 1 K ohm
5- Oscilloscope
6- Multimeter
7- Supply 15V

Procedures:

- Study the operation of the circuit shown in Fig.3.1.
- Connect the component.
- Connect this circuit with oscilloscope and measure and draw the output wave shaping.

Circuit Diagram:

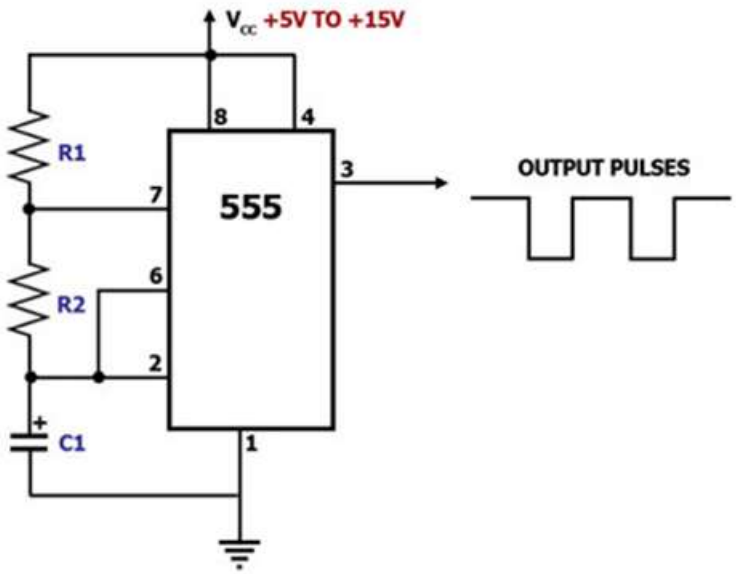

Figure 3.1: 555 Astable Multivibrator Circuit

Results:

- Calculate the output frequency and state the design equations .

Experiment (4)

Colpitts Oscillator

Objective:

This experiment is demonstrated the operation of Colpitts sine wave phase shift oscillator.

The required components and Equipment:

1- Variable Resistance 1M ohm
2- Resistance 1Kohm
3- Two Capacitors of 2.2 nF
4- LM741
5- Power Supply of 12V and -12V
6- Inductor 105 mH
7- Wight Board
8- Oscilloscope

Procedures:

- Connect the circuit as shown in Fig.4.1 by using the 741 datasheet in Fig. 4.2.
- Connect channel 1 of the oscilloscope with the output of the op-amp.
- Measure the frequency of oscillations.

Circuit Diagram:

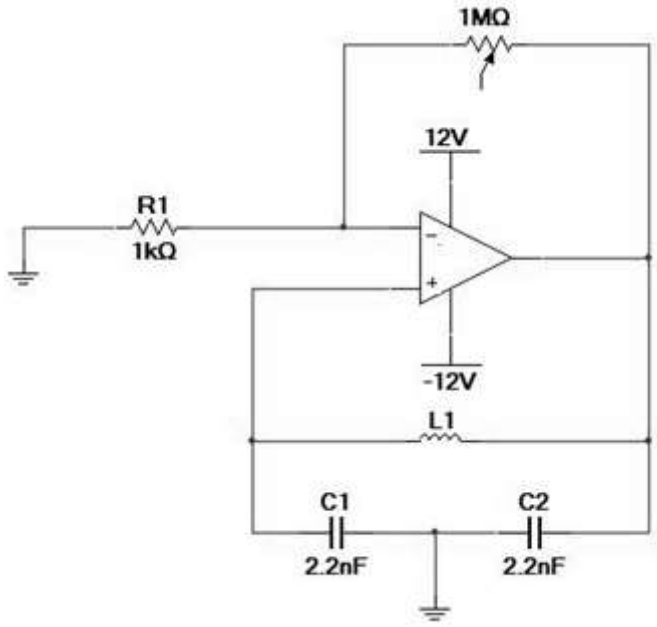

Figure 4.1: Colpitts Oscillator Circuit

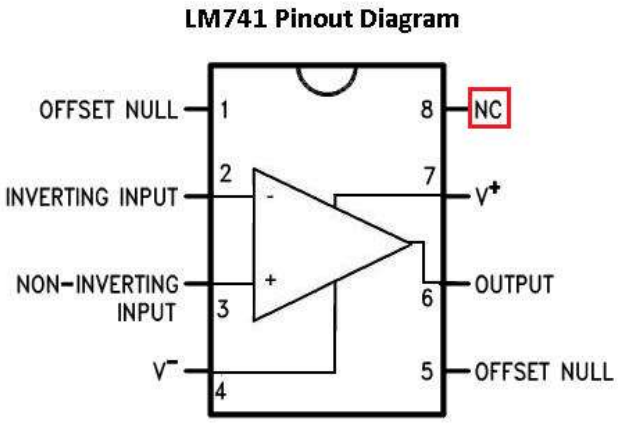

Figure 4.2: 741 Op-Amp Datasheet

Results:

- Sketch the output wave form and record the measured frequency.
- Compare between the calculated and measured frequency.