Higher Institute of Engineering and
Technology in Kafr El-Sheikh
First year students in the
Department of Electrical Engineering

Telecommunications Trainer

(Royal team)

The project was submitted by first-year students in the electrical circuits subject in the Department of Electrical Engineering at the Higher Institute of Engineering and Technology in Kafr El-Sheikh

Supervised by

Dr. Ibrahim Zewail

May 2024

شكروتقدير

نحمد الله ونشكره كما ينبغي لجلال وجهه وعظيم سلطانه نستغفر الله عدد خلقه ورضا نفسه وزنه عرشه ومداد كلماته ونساله ان يتقبل منا اعمالنا واجتهادنا ويرضي بها عنا

، وصلي الله علي محمد صلي الله عليه وسلم - وعلي اله وصحبه وسلم تسليما كبيرا

نتوجه بالشكر الي اداره المعهد العالي للهندسه التكنولوجيا بكفر الشيخ ....

عميد المعهد / أ.د مفرح حماده حامد

وكيل المعهد / أ.د مصطفي كامل عبد الرحمن

رئيس القسم / أ.د رقيه

استاذنا الفاضل الدكتور/ ابراهيم زويل

كما يعود كل الفضل والشكر الي استاذي الدكتور المسئول عن المشروع الذي كان ولازال الداعم الاول لنا بعد الله -عز وجل – د/ ابراهيم زويل ،فلولاه لما كان لدينا هذا القدر من العلم والوعي

نود ايضا ان نتوجه لخالص الشكر لكل الاساتذه الذين ساهموا من الدعم النفسي لنا

وبخاصه د/هيثم فريج

المشروع مقدم من **royal team**

ROYAL TEAM
Electrical Engineering

Submitted by

Team Leader	Khaled Jalal Elramikh

Samy Samyr Alrakhawy	Basmala Galal Mohamed
Khaled wasef helil	Basmala Taha Mohamed
Kamal Mohamed Abdo	Fadia Mohamed Elbery
Mostafa Alsayed Mahmoud	Doaa khaled mohamed
Ziad Aymen Rehan	Doaa abdehhamid Amere
Haitham Hesham Apdo	sohila elsayed elhagen
Mostafa Kandil Khattab	Omima Fekry Kandil
zaki Hamdy Arab	Romisaa Reda Tolba
Mohamed Ibrahim Shawar	Asmaa Taher Mohamed
Rahma Abdelwahed Edress	Jana Jamal Eldin

Supervised by

Dr. Ibrahim Zewail

Telecommunications Trainer Kit

<<<Contents>>>

Introduction<<Abstract>>

As its name implies, the Emona Telecoms-Trainer 101 is used to help students learn about communications and telecommunications principles. It lets you bring to life the block diagrams that fill communications textbooks.

A “block diagram” is a simplified representation of a more complex circuit.

An example is shown in Figure 1 below.

Block diagrams are used to explain the principle of operation of electronic systems (like a radio transmitter for example) without worrying about how the circuit works.

Each block represents a part of the circuit th ıte task and is named according to what it does.

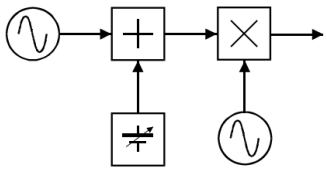


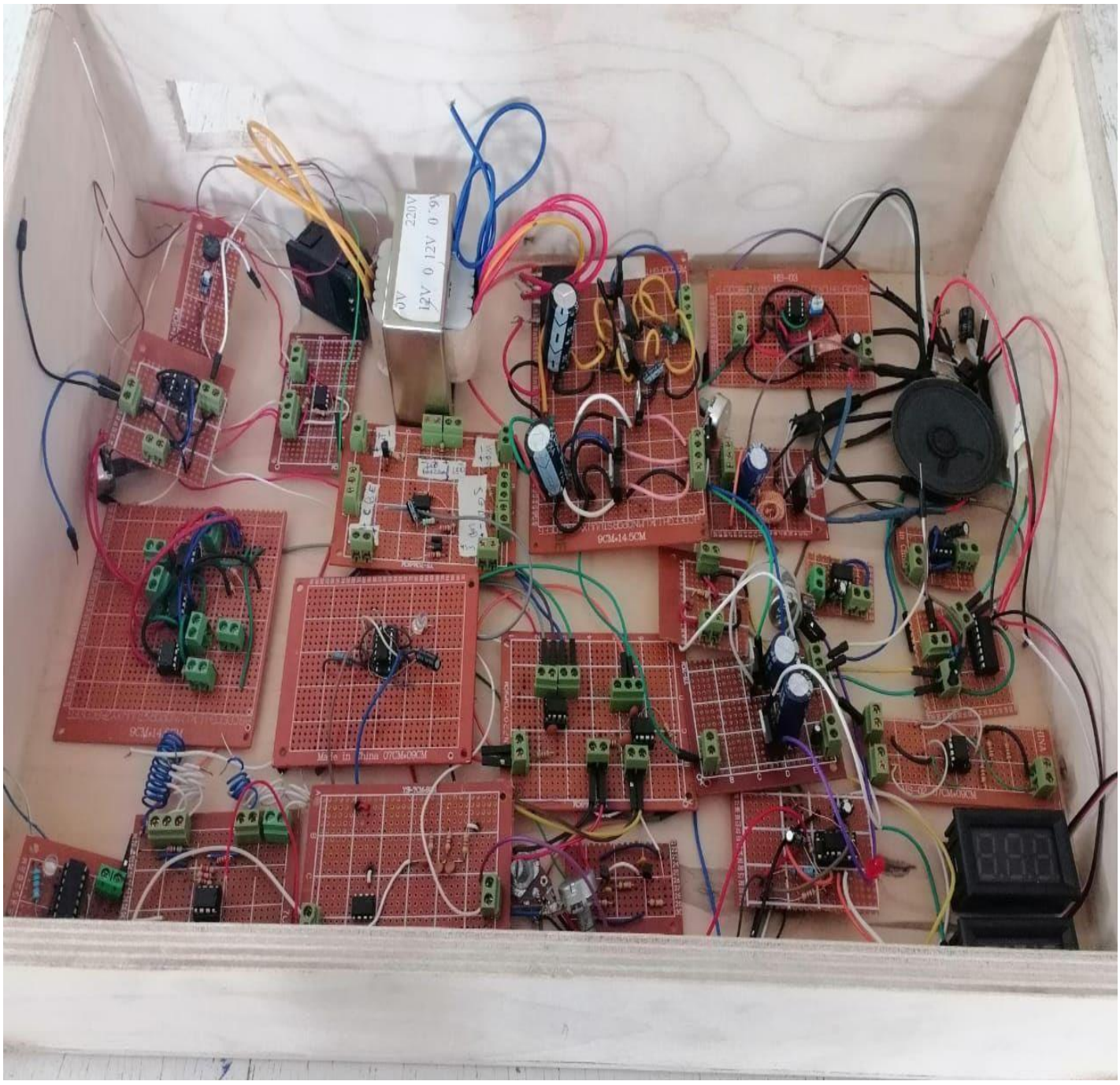
Figure 1

Examples of common blocks in communications equipment include the adder, multiplier, oscillator, and so on.

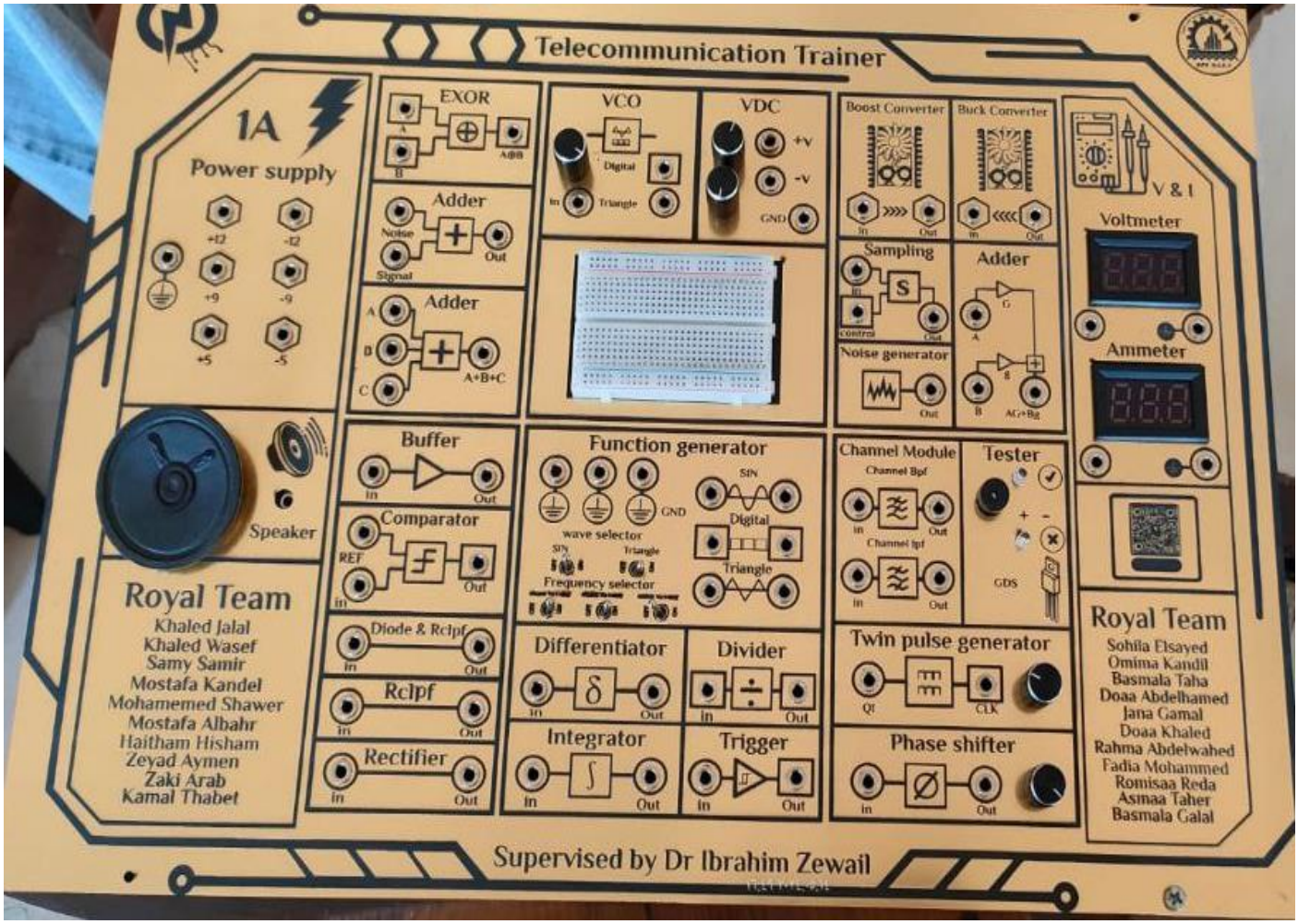
The Emona Telecoms-Trainer 101, illustrated below, has a collection of blocks (called modules) that you can put together to implement dozens of communications and telecommunications block diagrams.

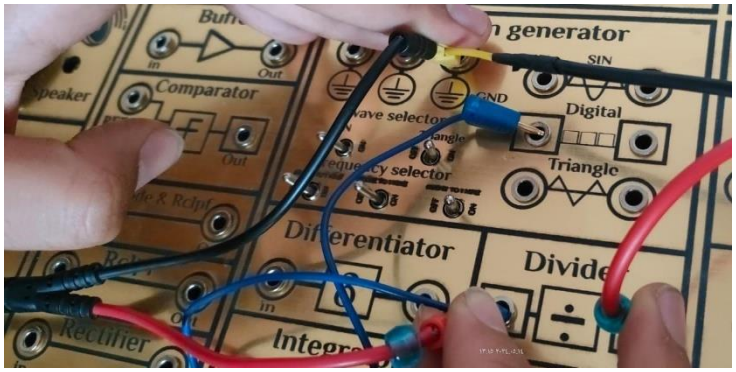
All details of the project will be mentioned in this report

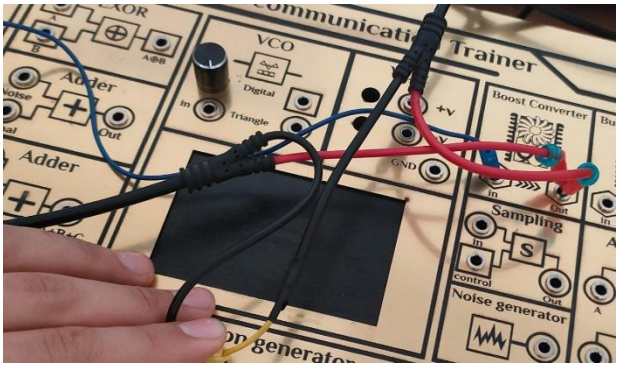
Project model on PCP



Final image of the project







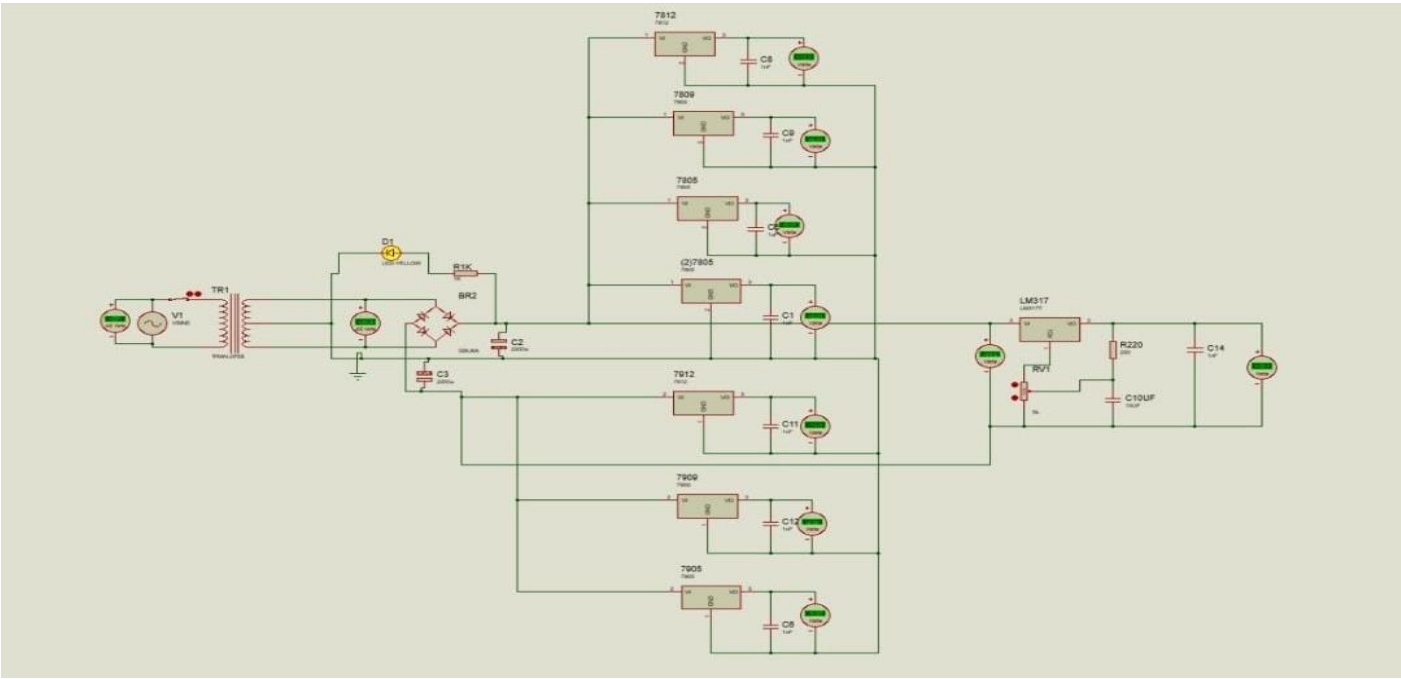
1) Power Supply

- Importance……

The basic electrical power supply for the project. It is used to Power most of the electronic circuits in the project. It can be used As an external source and **contains**……

- Fixed Positive Voltage (+5V, +9V, +12V)
- Fixed Negative Voltage (-5V, -9V, -12V)

- Electronic circuit drawing…….



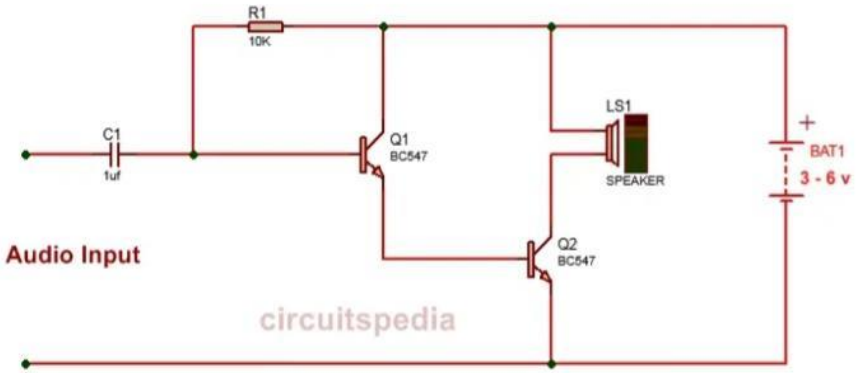
- The output form => by us.....

2) Speaker

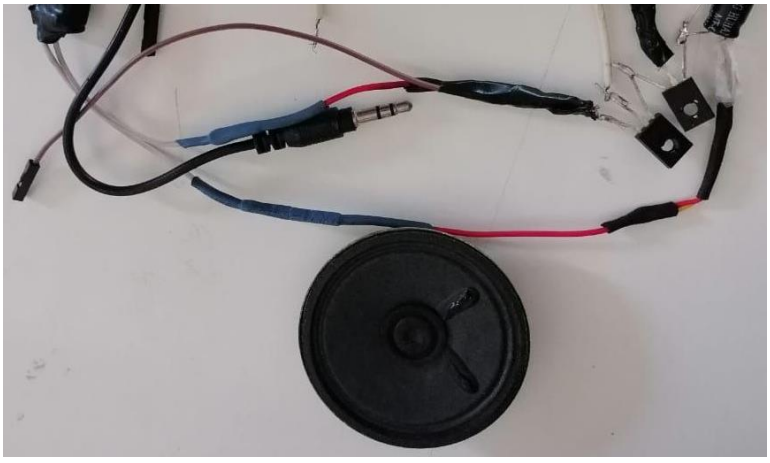
- Importance……

The speaker circuit, or what is known as the audio speaker circuit, is a combination of electronic parts used to operate the speakers and convert electrical signals into sound. These circuits vary depending on the type of speaker and the intended use. But in general, the speaker circuit consists of several main parts: Signal source (audio source), Amplifier, Crossover, Speakers, Wires and connections.

- Electronic circuit drawing…….



- The final picture…….



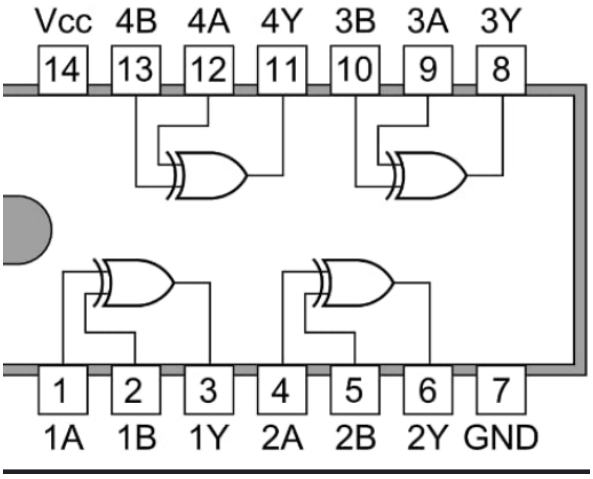
3) Exor

- Importance……

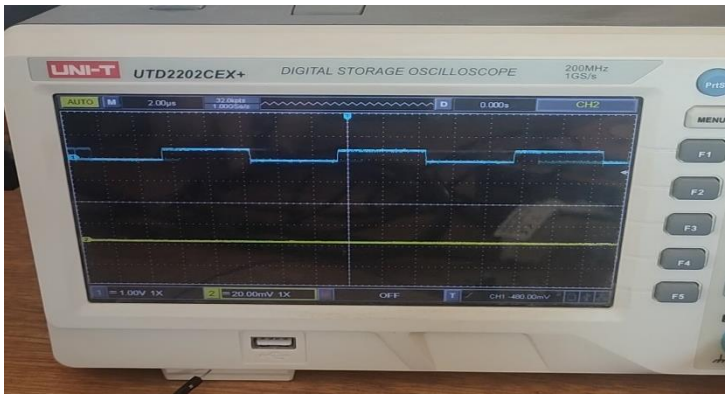
XOR gate. The XOR logic gate is widely used in digital circuits to process signals that represent binary numbers. It is called EOR and EXOR. It is a logic gate with multiple inputs and one output. It is widely used in the encryption process. It is represented by

---

- Electronic circuit drawing…….



- The final picture…….

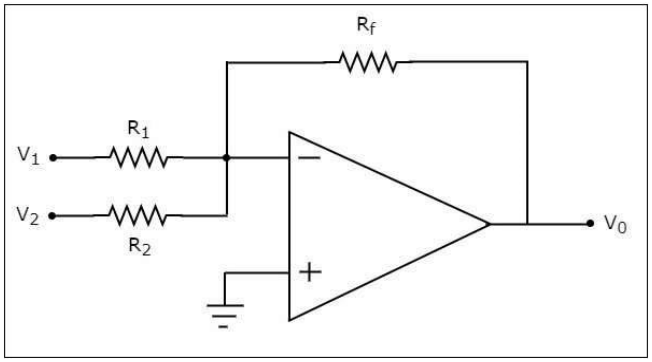


4) Adder

- Importance……

The objective for a two-input adder using an op amp is to design a circuit that can accurately sum two input voltages and produce a single output voltage equal to the sum of the two inputs. This involves configuring the op amp in a suitable amplifier configuration, such as an inverting or non-inverting adder, while ensuring that the circuit maintains linearity, stability, and proper signal amplification.

- Electronic circuit drawing…….



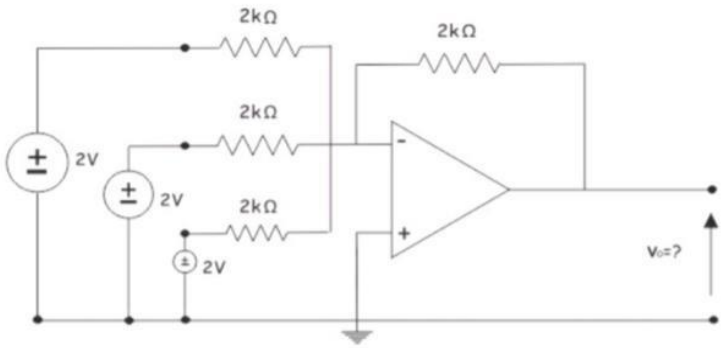
- The output form => by us……

5) Adder (OP-AMP)

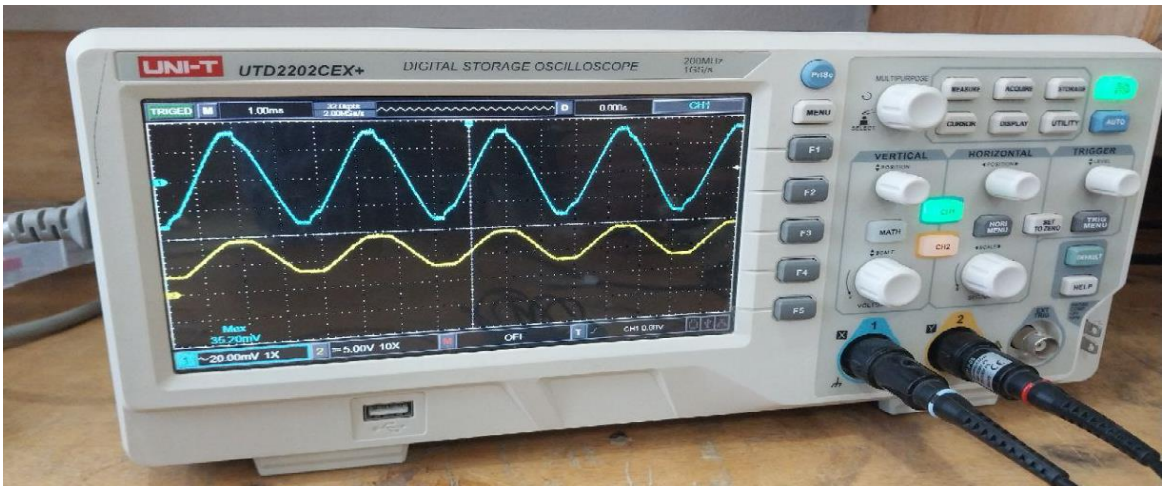
- Importance……

An op-amp is an integrated circuit (IC) that amplifies the difference in voltage between 3 inputs. An operational amplifier is an integrated circuit that can amplify weak electrical signals. The operational amplifier has 3 input pins and 1 output pin. Its primary role is to amplify and output the voltage difference between the two input terminals.

- Electronic circuit drawing…….



- The output form => by us……

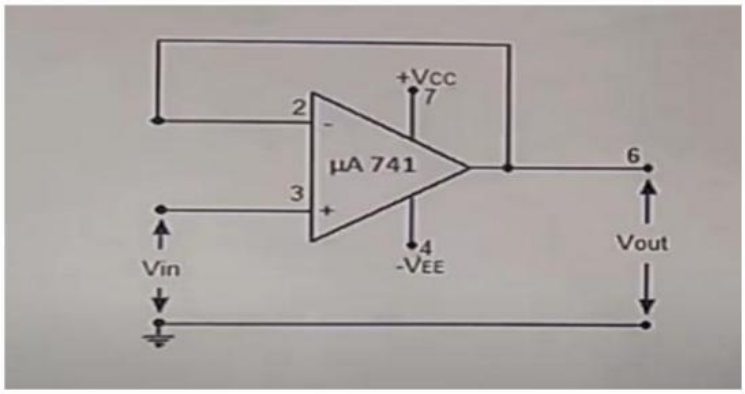


6) Buffer

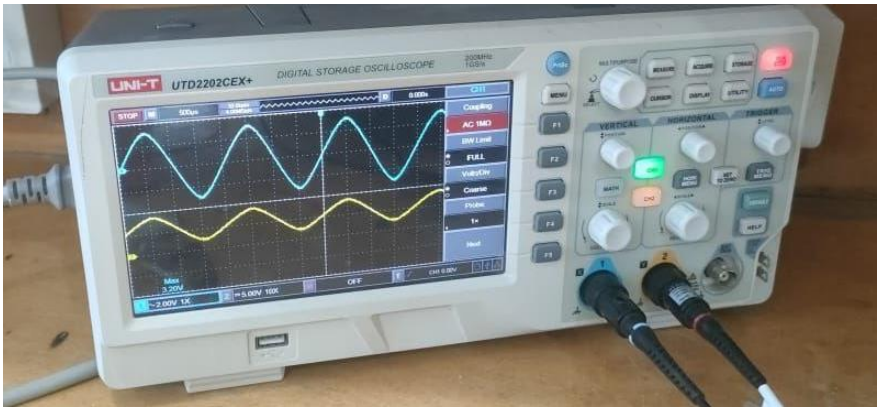
- Importance……

An electronic circuit used to amplify or amplify the input signal received. This circuit amplifies the incoming signal without changing its shape or distorting it. The circle buffer is typically used in electronic control and distribution applications, where it provides sufficient current to feed other electronic circuits without affecting signal quality.

- Electronic circuit drawing…….



- The output form => by us……

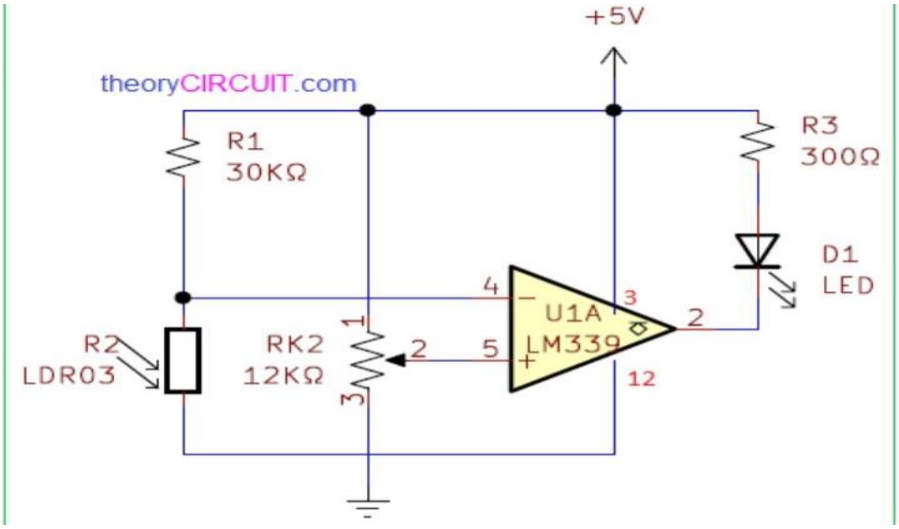


7) Utilities Comparator

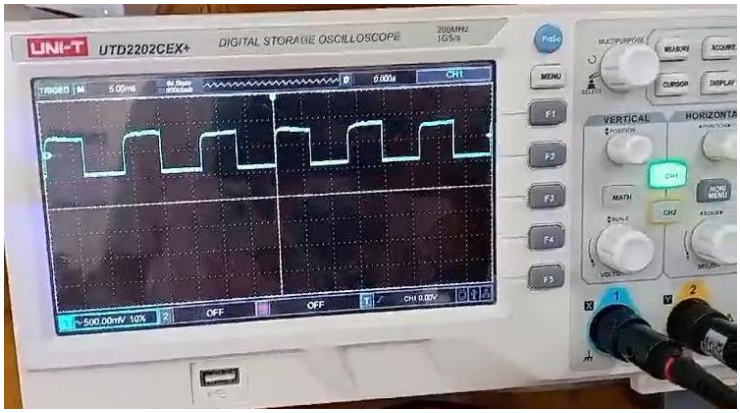
- Importance……

This circuit Compares between two voltages (the positive voltage and the negative voltage), which are the input to the op-amp, and the input is Signal and its output is digital. The value of VCC, whether positive or negative, depends on the difference between the two voltages.

- Electronic circuit drawing…….



- The output form => by us……



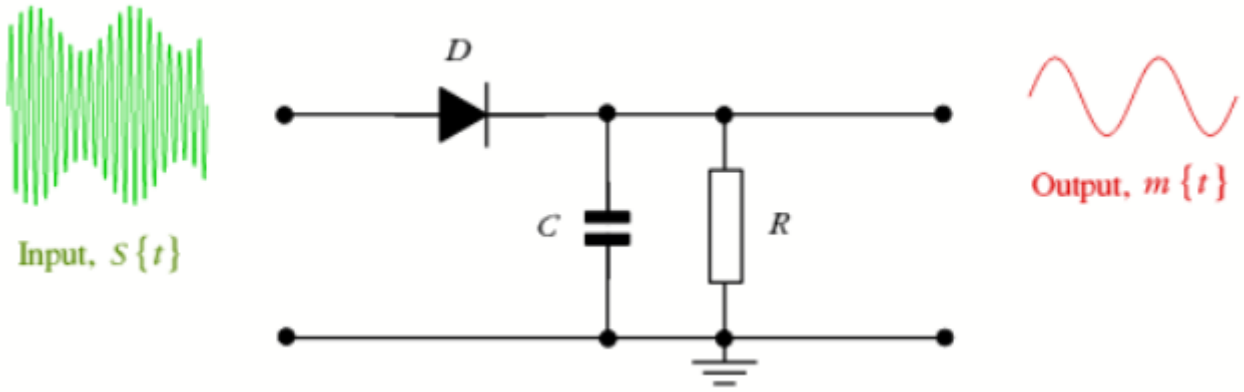
8) RC & Doide

- Importance……

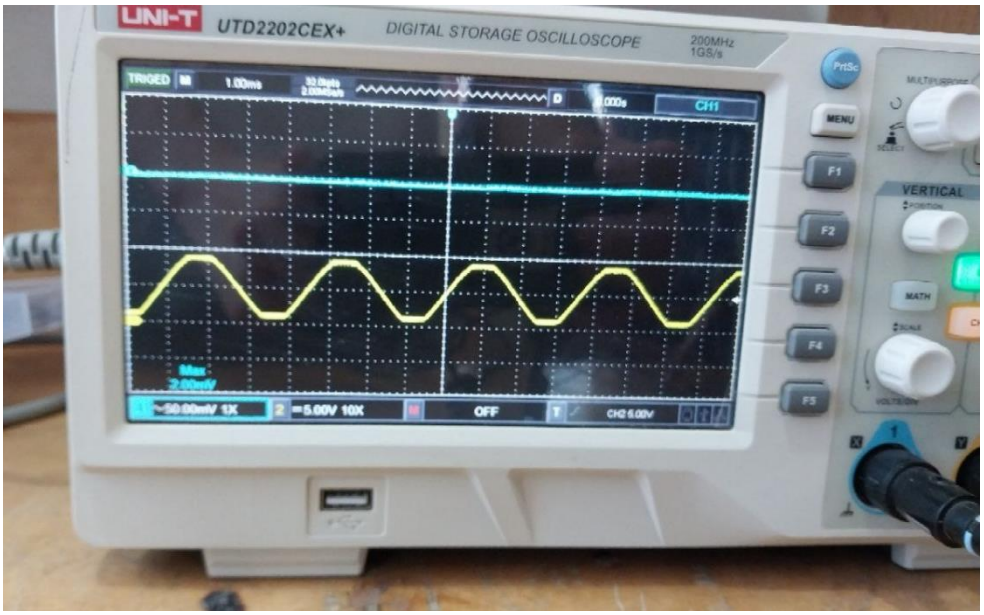
It purifies the wave from noise and unifies the direction of the wave

---

- Electronic circuit drawing…….



- The output form => by us……



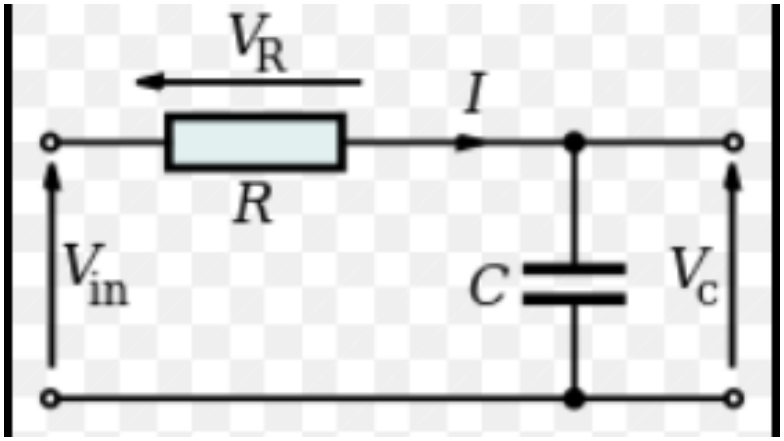
9) RC LPF

- Importance……

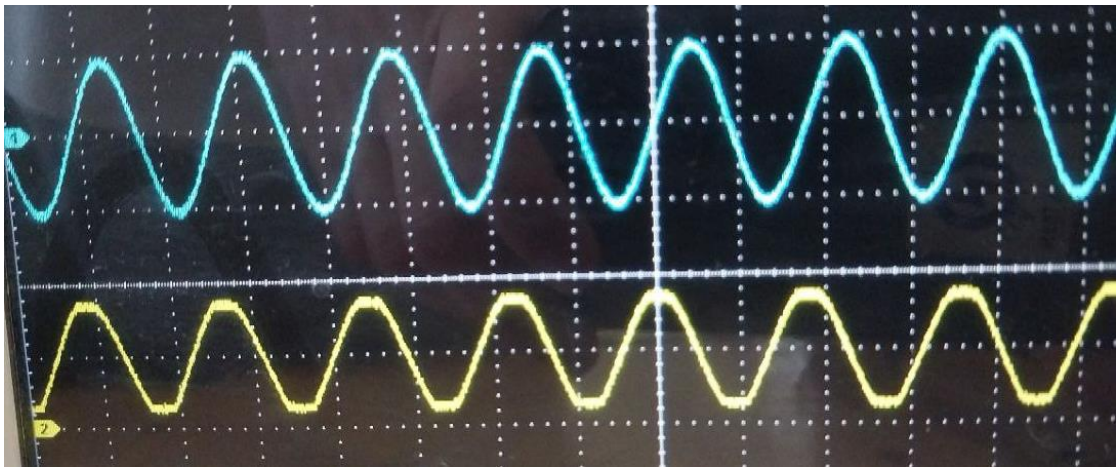
It filters the wave from noise, that is, it does not allow high-frequency waves to pass through it

---

- Electronic circuit drawing…….



- The output form => by us….

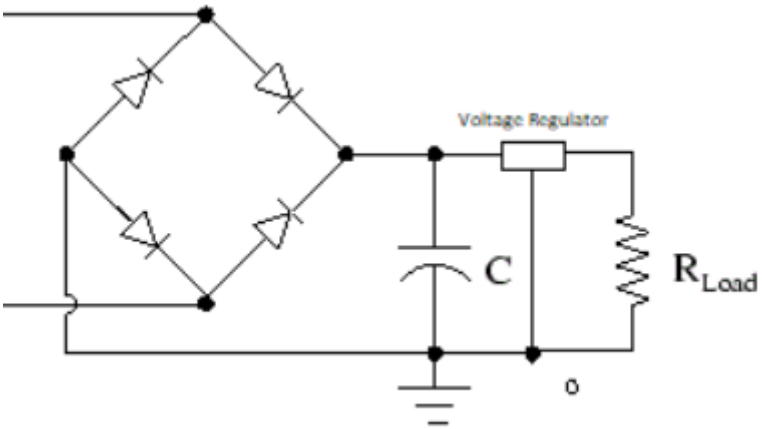


10) Rectifier

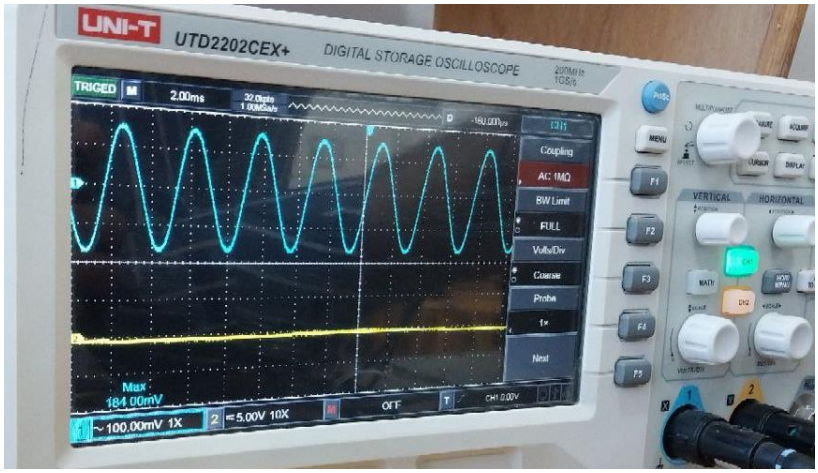
- Importance……

The uniform directional circuit works to unify the direction of the wave, meaning it converts the alternating current into a direct current. The capacitor in the circuit works to smooth the signal to the wave, and the resultant is a constant voltage.

- Electronic circuit drawing…….



- The output form => by us……

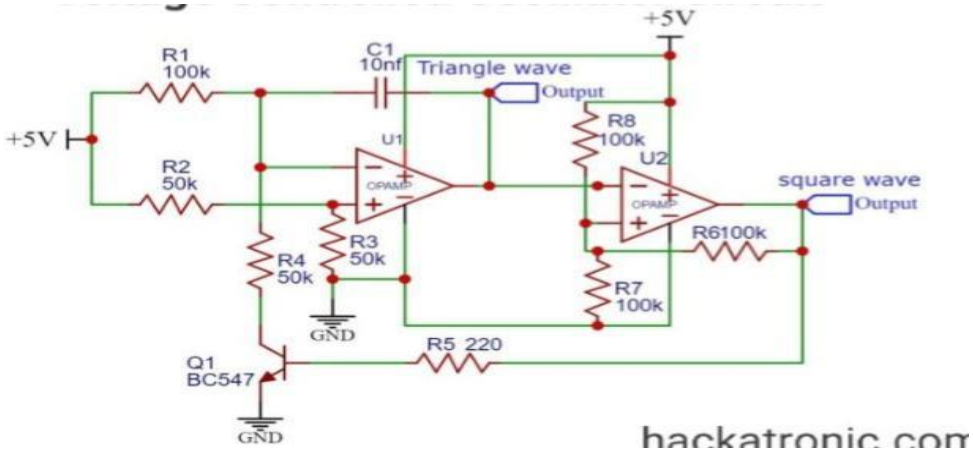


11) VCO

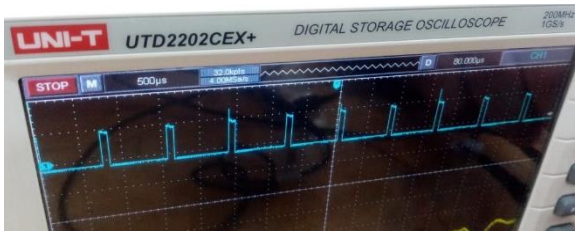
- Importance……

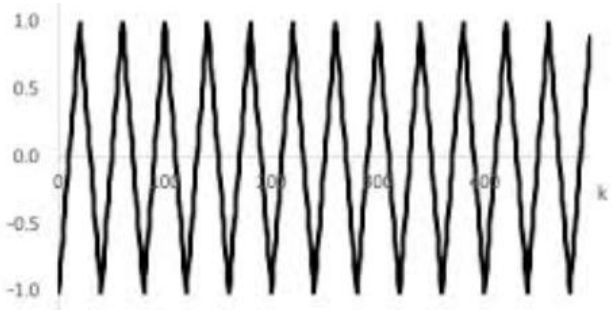
It is a group of oscillators that control voltage and are classified based on In the form of the resulting wave (harmonic oscillators (linear) – oscillators Relaxation (sawtooth).

- Electronic circuit drawing…….



- The output form => by us……





12) VDC

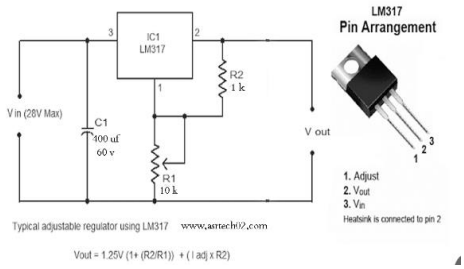
- Importance……

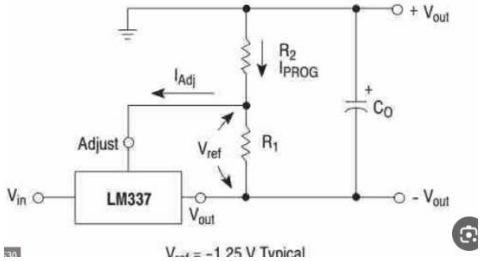
It can be used as an external source

Variable positive voltages (from +1.5 to +15)

Variable negative voltages (from - 1.5 to - 15)

- Electronic circuit drawing……





- The output form => by us……

13) function generator

- Importance……

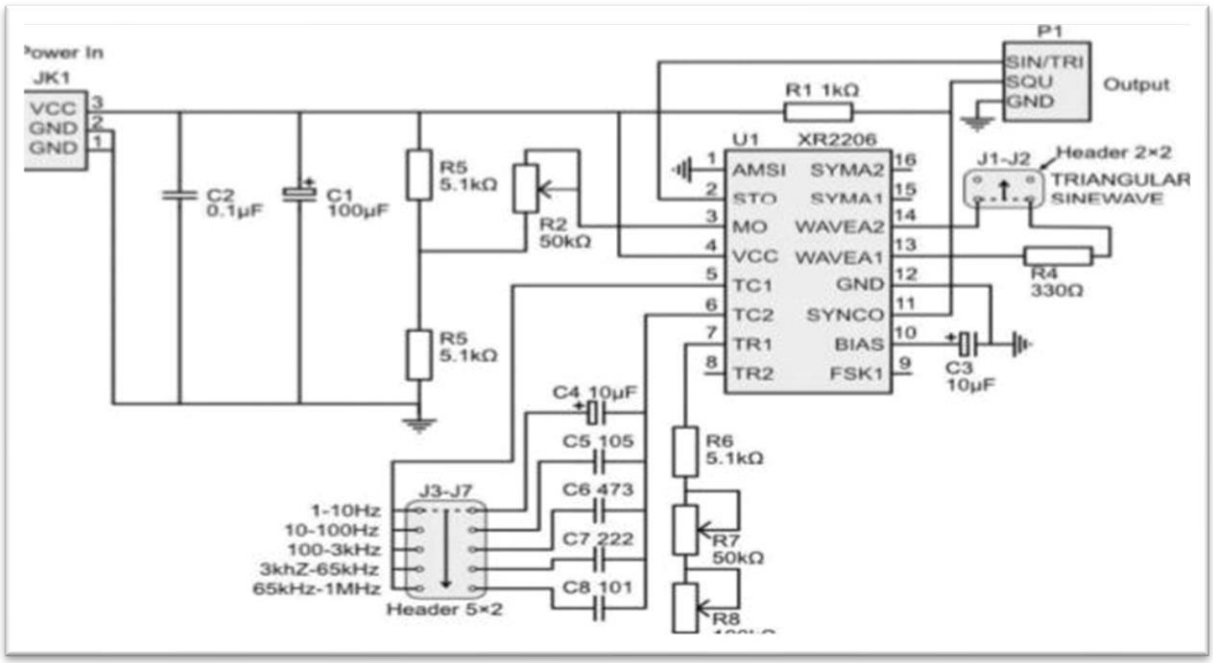
Function generator is the part of the **Kit** that is responsbale for producing different types of waves, we used the **XR2206 IC**.

for making (sine & Triangle & Square).

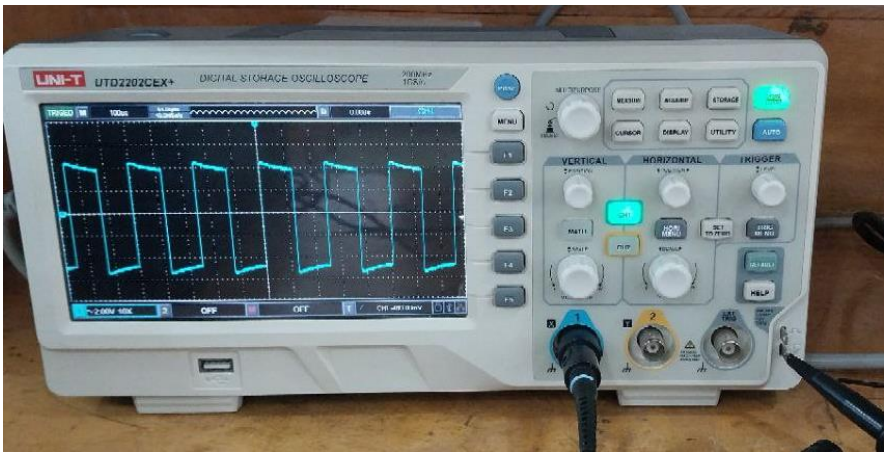
The circuit has the following specification:

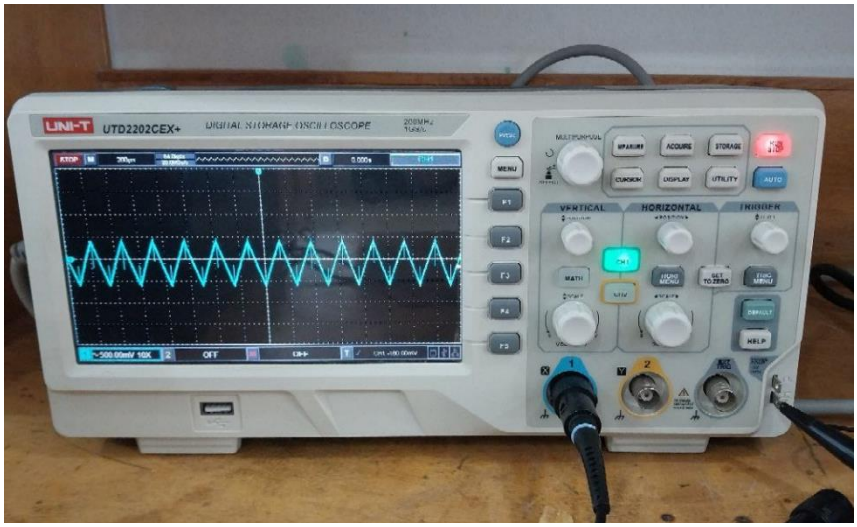
- ❖100 Hz => 3K Hz
- ❖3K Hz => 65K Hz
- ❖65K Hz => 1M Hz

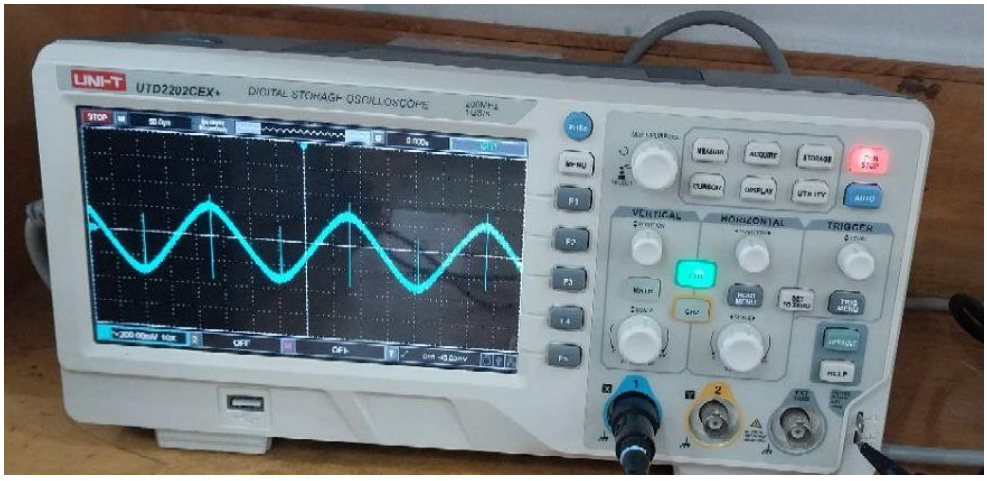
- Electronic circuit drawing……



- The output form => by us.....





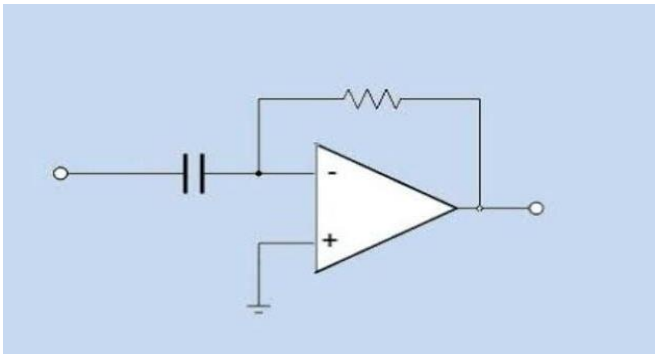


14) Differentiator

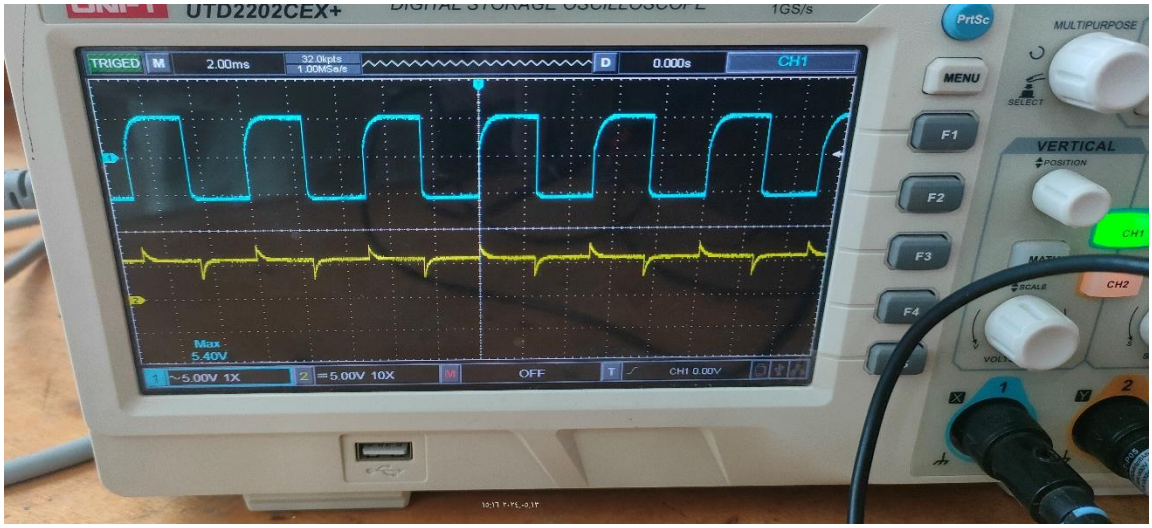
- Importance……

The result is the time differential of the analog signal

- Electronic circuit drawing……



- The output form => by us……

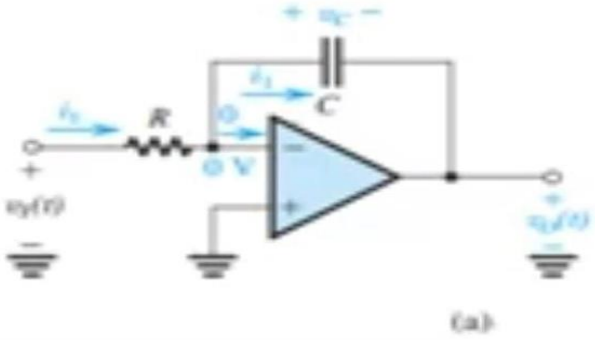


15) Integrator

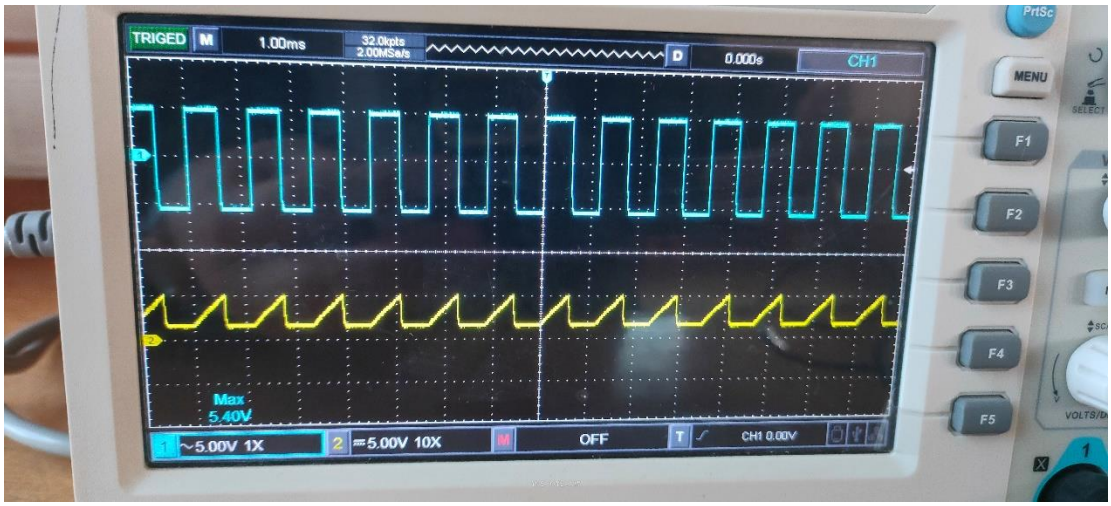
- Importance……

The result is the time integral of the analog signal

- Electronic circuit drawing……



- The output form => by us……

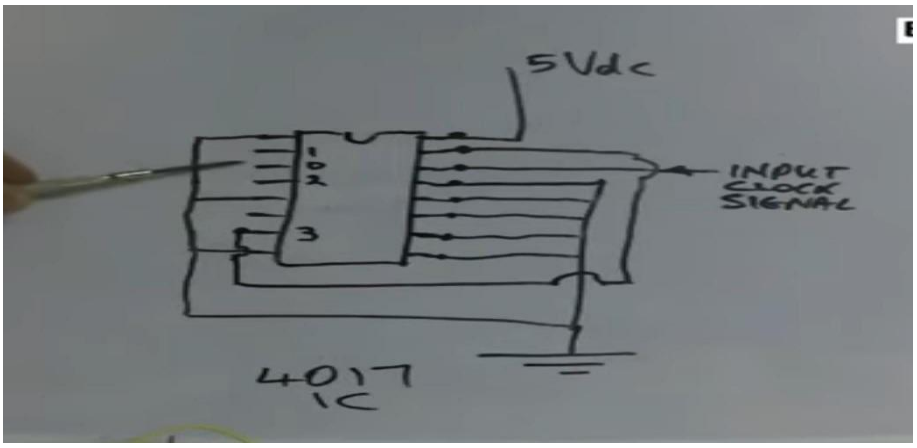


16) Divider

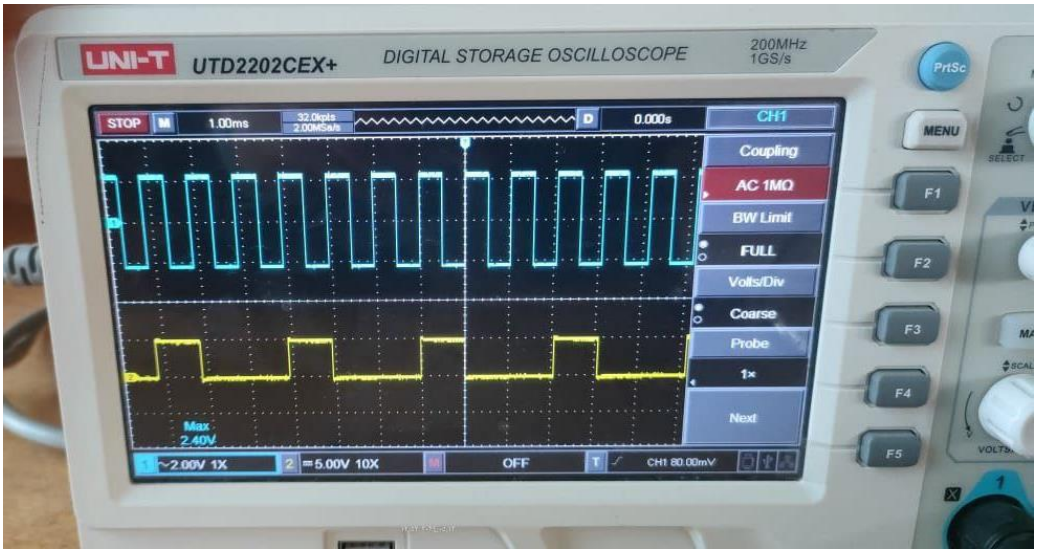
- Importance……

It is used to reduce the frequency by a certain percentage (integer)

- Electronic circuit drawing……



- The output form => by us……



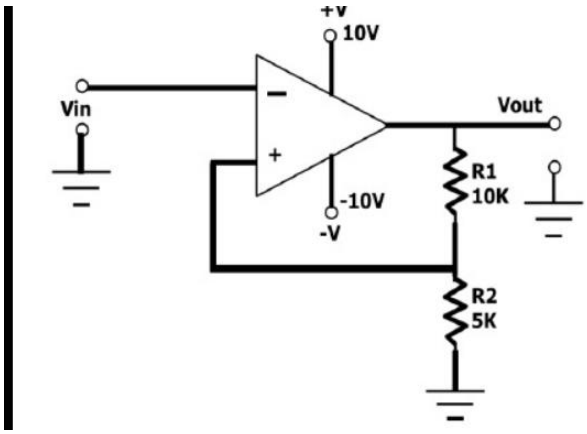
17) trigger

- Importance……

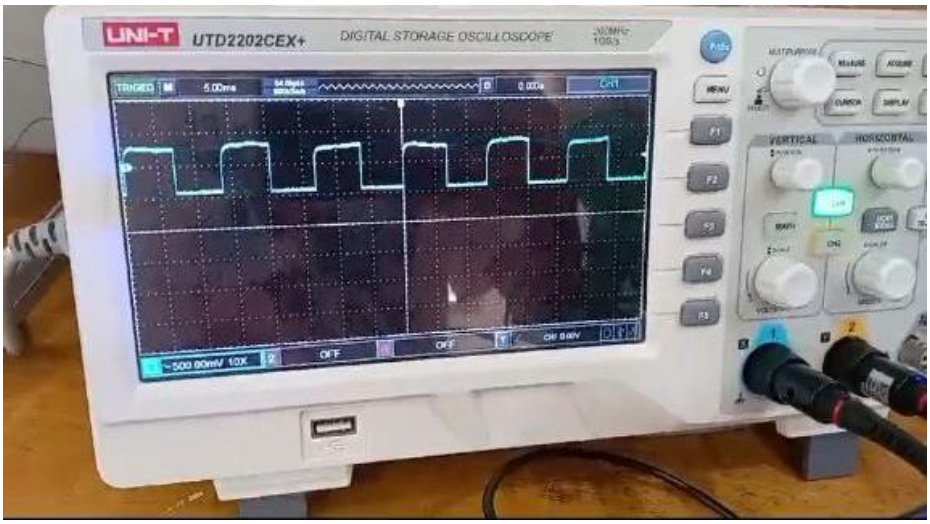
It converts any signal

In income to square

- Electronic circuit drawing……



- The output form => by us……

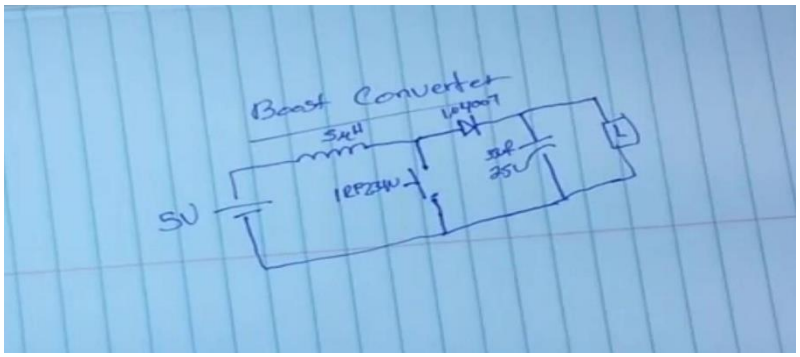


18) Boost Convertor

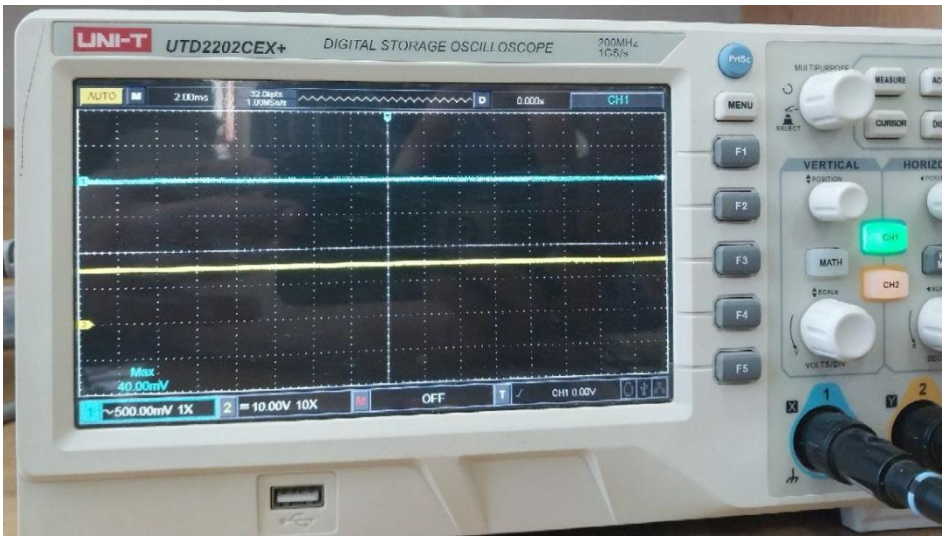
- Importance……

High Voltage, but DC

- Electronic circuit drawing……



- The output form => by us……

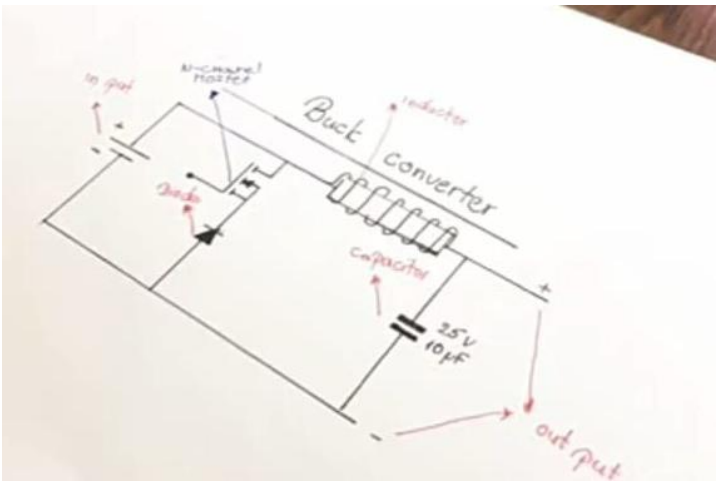


19) Buck Convertor

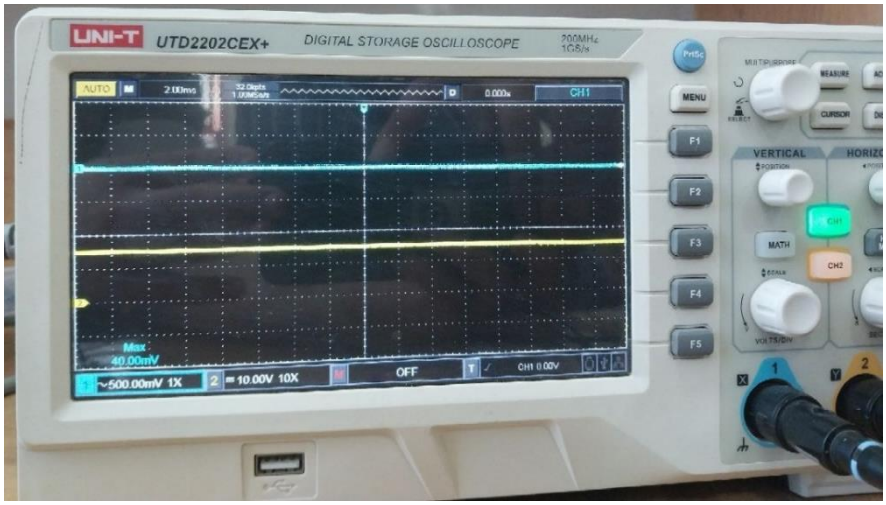
- Importance……

The voltage decreases, but the DC

- Electronic circuit drawing……



- The output form => by us……

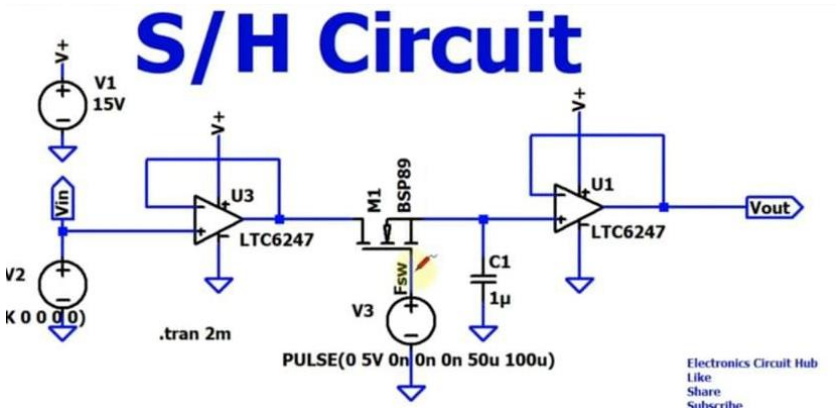


20) Sampling

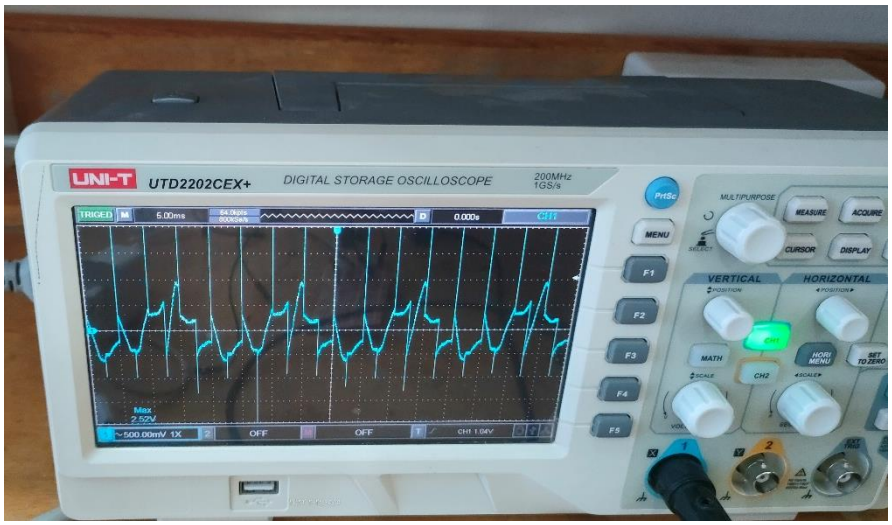
- Importance……

A stage in the conversion from analog to digital

- Electronic circuit drawing……



- The output form => by us……

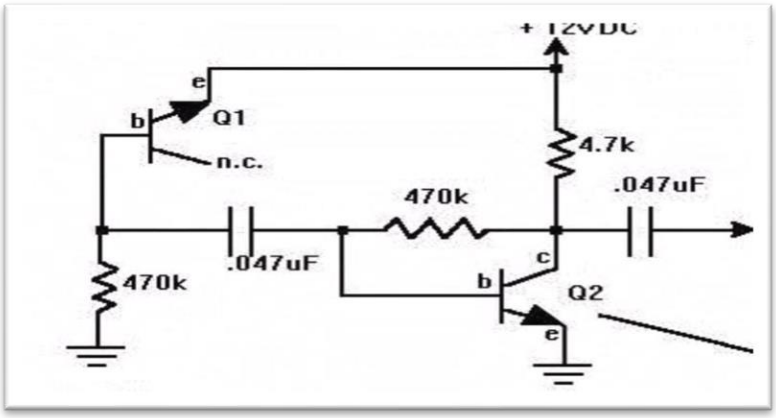


21) Noise Generator

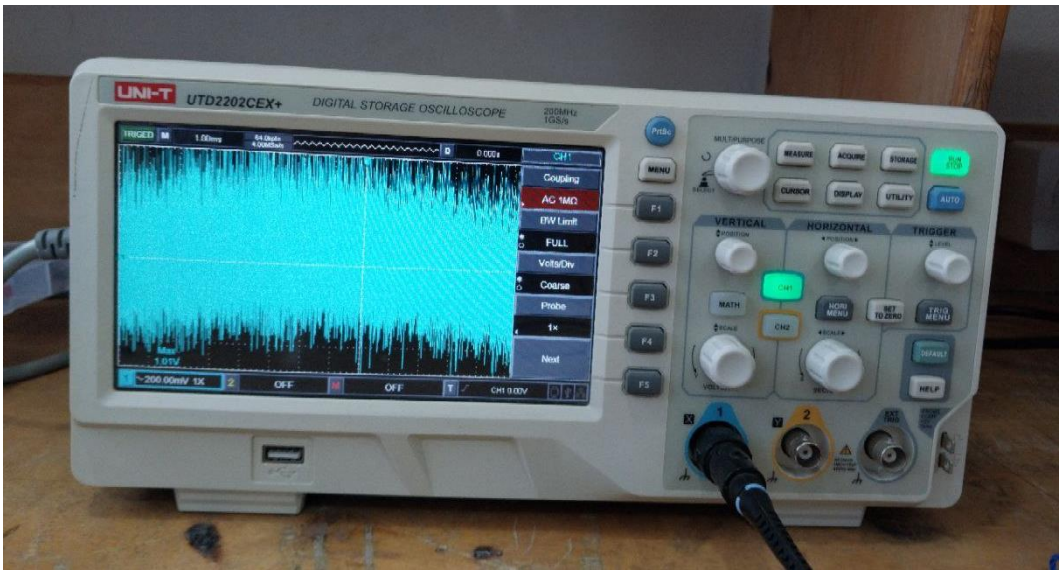
- Importance……

It is an electronic device used to produce a random signal containing signals of various frequencies.

- Electronic circuit drawing……



- The output form => by us……



22) Channel Module

- Importance……

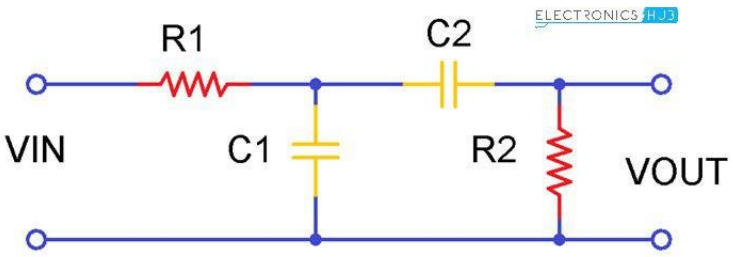
LPF

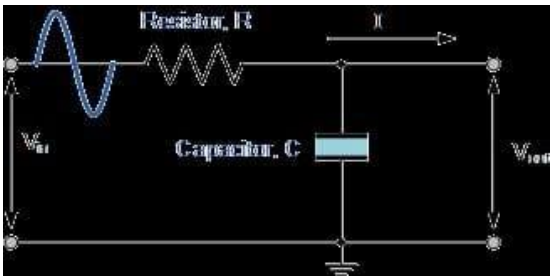
This circuit filters signal to low frequencies. We enter signal to pin (in) and we will obtain signal with low frequencies from pin (out).

BPF

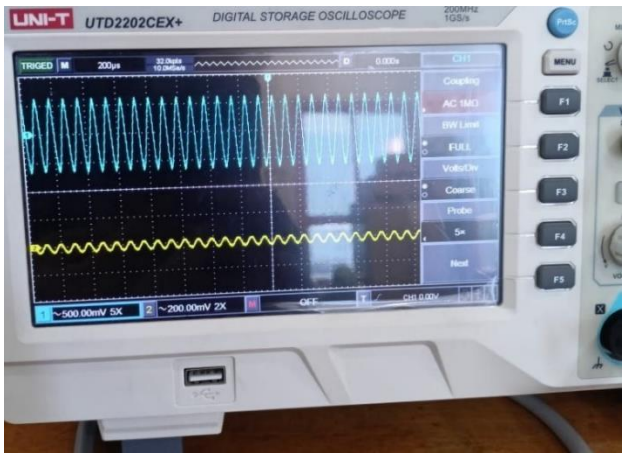
This circuit filters signal to medium frequencies. We enter signal to pin (in) and we will obtain signal with medium frequencies from pin (out).

- Electronic circuit drawing……





- The output form => by us……



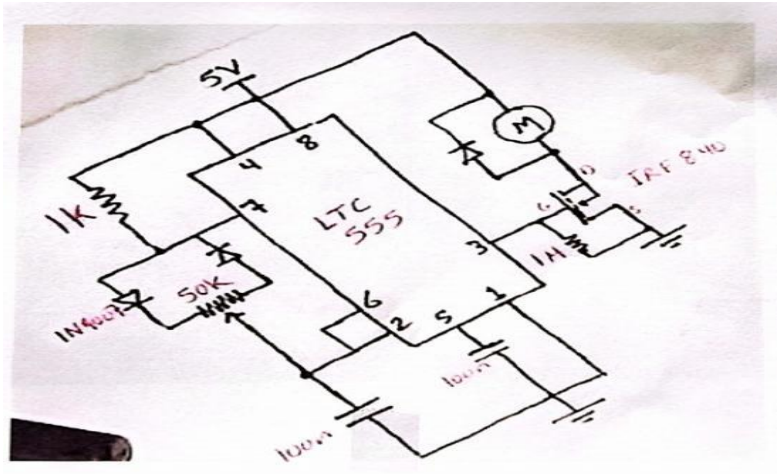
23) Twin Pulse Generator

- Importance……

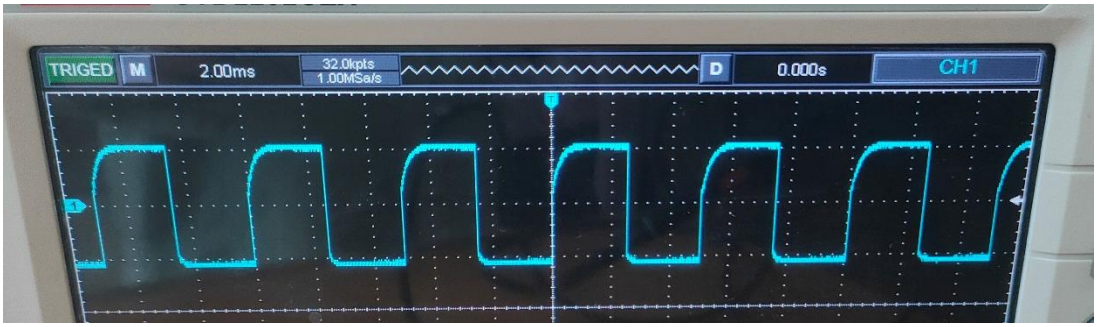
Twin pulse generator is a circuit that controls the width and breadth of the wave

---

- Electronic circuit drawing……



- The output form => by us……

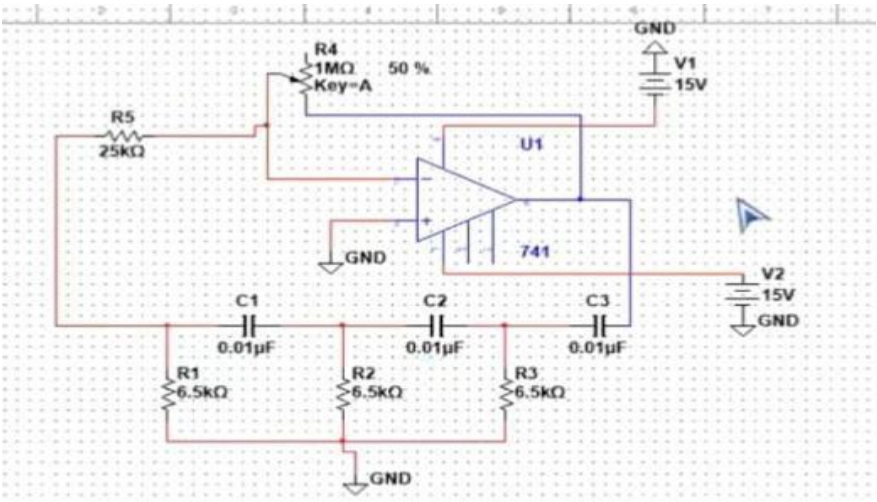


24) Phase Shifter

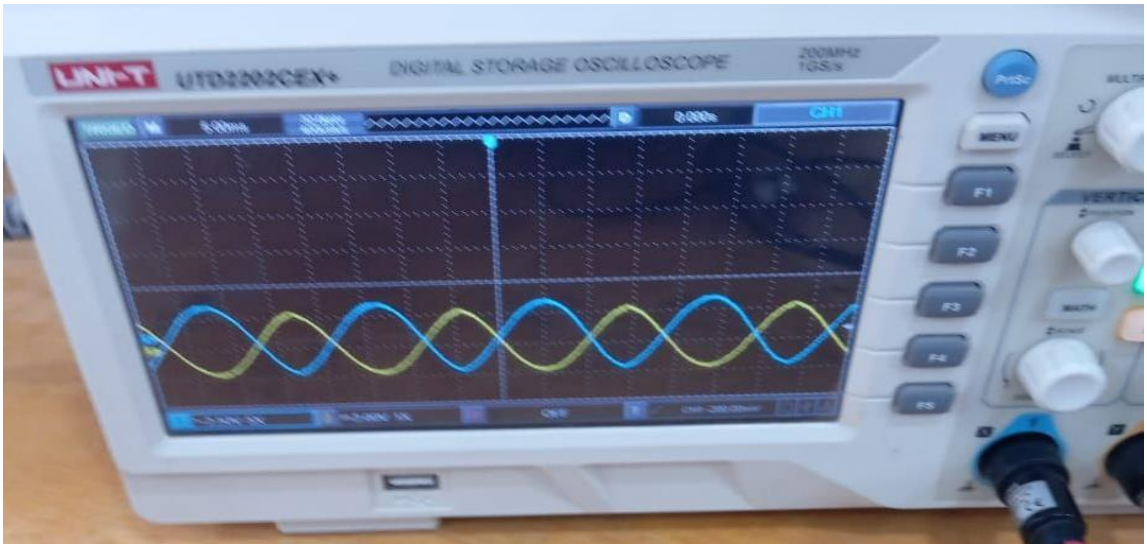
- Importance……

Changes the phase of the wave The wave turns by 180 degrees

- Electronic circuit drawing……



- The output form => by us……



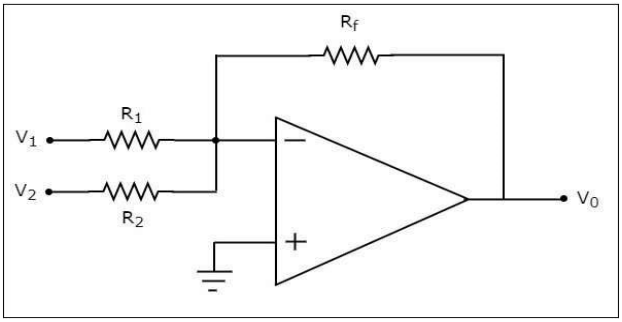
25) Adder

- Importance……

The objective for a two-input adder using an op amp is to design a circuit that can accurately sum two input voltages and produce a single output voltage equal to the sum of the two inputs. This involves configuring the op amp in a suitable amplifier configuration, such as an inverting or non-inverting adder, while ensuring that the circuit maintains linearity, stability, and proper signal amplification

---

- Electronic circuit drawing……



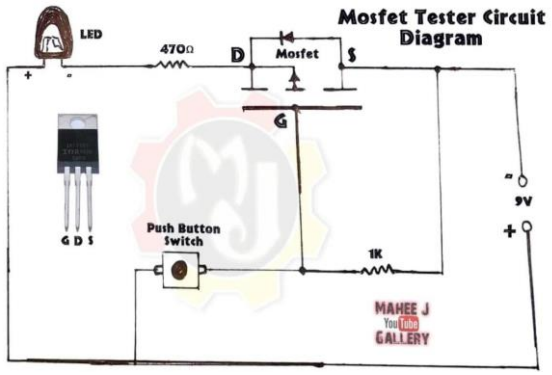
- The output form => by us……

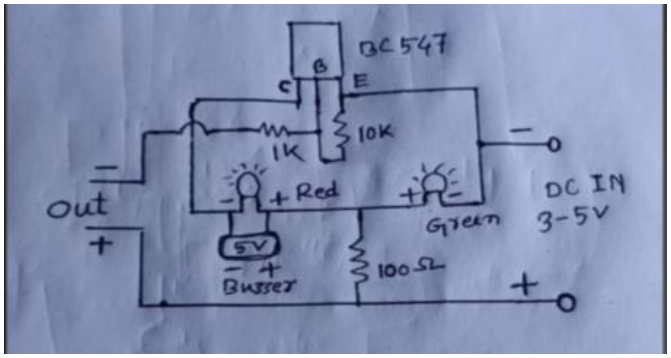
26) Tester

- Importance……

  - This circuit test => **Resistor – Inductor – Capacitor – Led**
  - This circuit test => ***Mosfet Transistor***

- Electronic circuit drawing……





- The output form => by us……

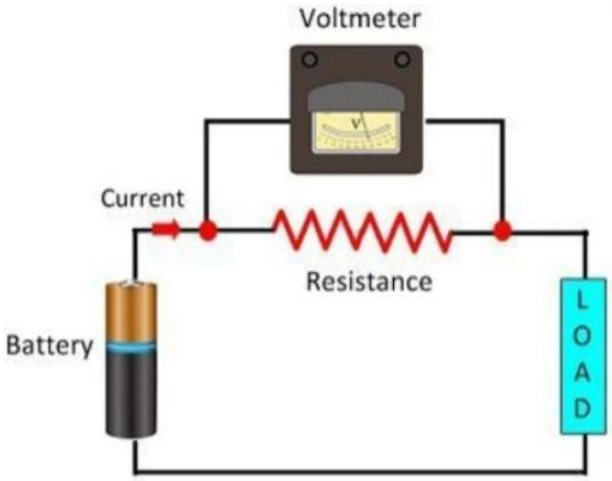
The output will be on LEDs or buzzers

27) Voltmeter

- Importance……

t measures electrical voltage

- Electronic circuit drawing……



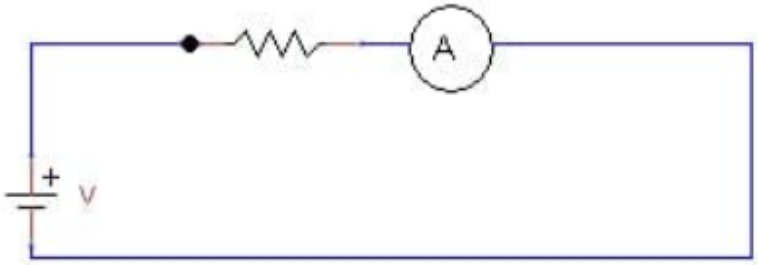
- The output form => by us……

28) Ammeter

- Importance……

It measures electric current

- Electronic circuit drawing……



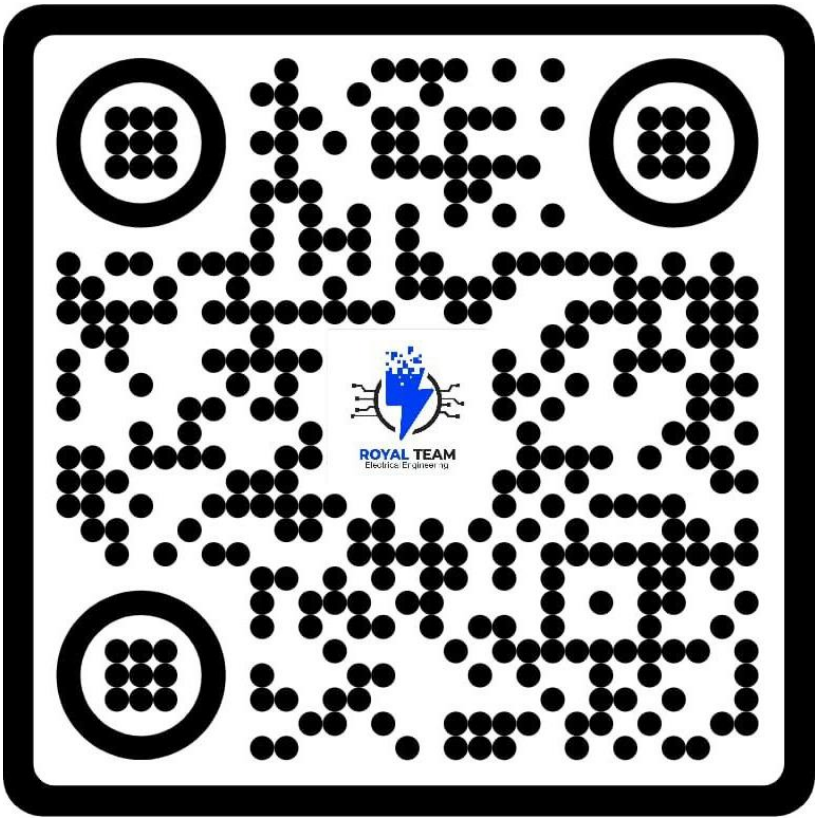
- The output form => by us……

29) QR

When opened, the QR helps you know a brief overview of the project, the function of each circuit, and how to use it.

Help us make the QR

Engineer / *Haitham Hisham*

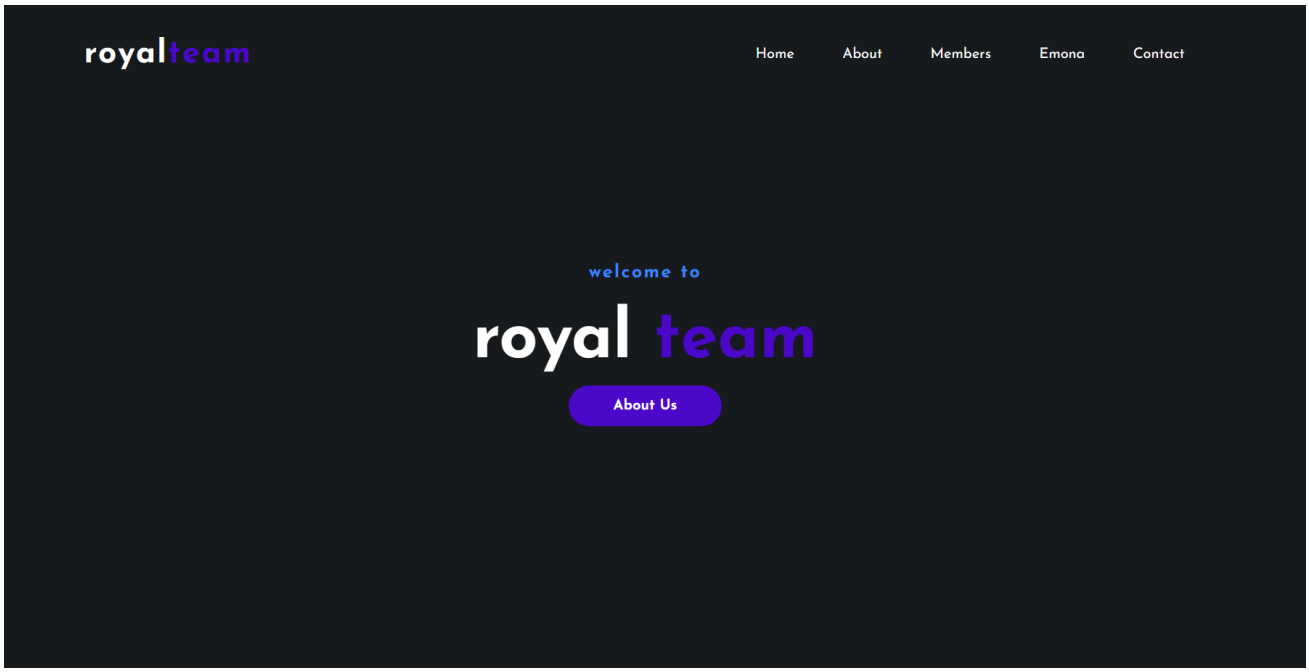


30) Website

When you open the QR, a website appears with an overview of the project and an introductory overview of the team members. It contains an explanation of the use of each circuit and an overview of the virtual output of the electronic circuits.

Help us make Website

Engineer / *Khaled Wassef*



31) Catalog

The catalog helps explain the operation of each circuit, how to use it, measure it, and what the result looks like after measurement

Help us Catalog

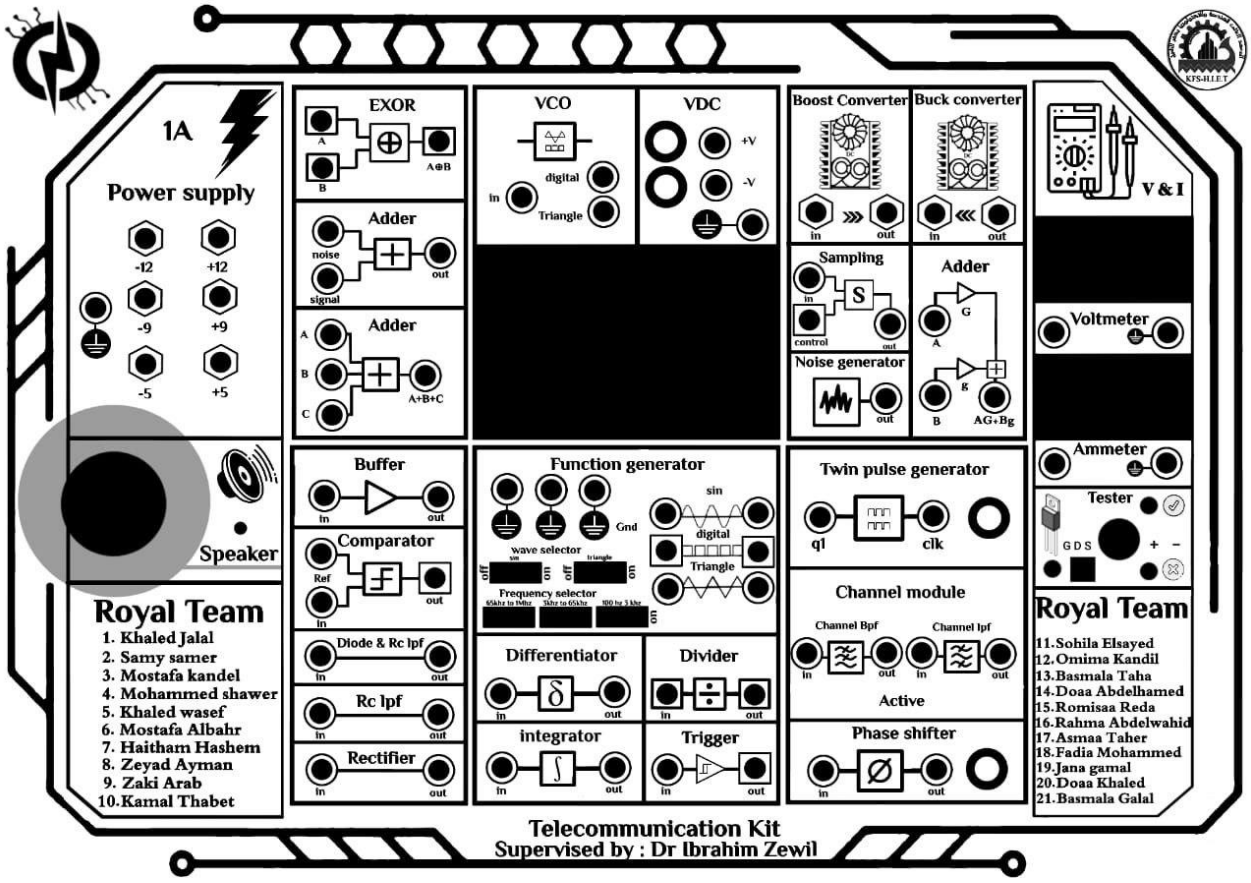
Engineer / *Khaled Wassef*

32) Project design

The project was worked on in more than one stage, including designing the external appearance of the project

Help us make design

Engineer / *Basmala Galal*

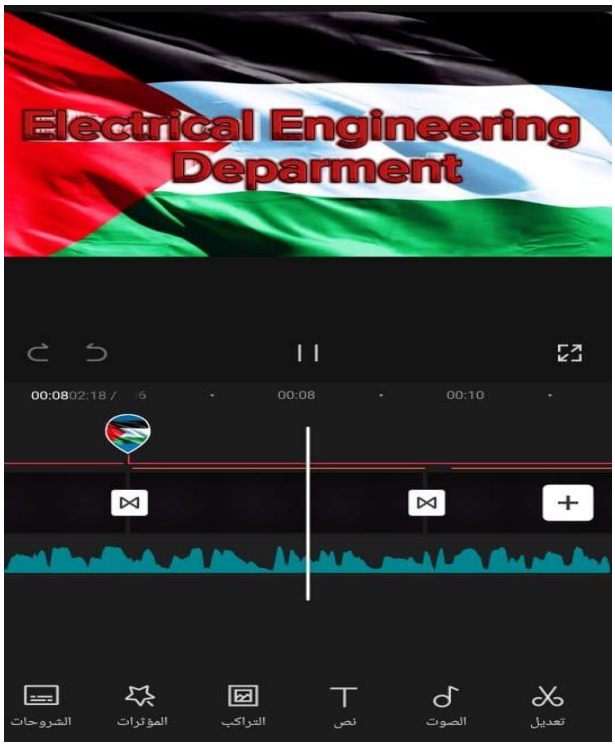


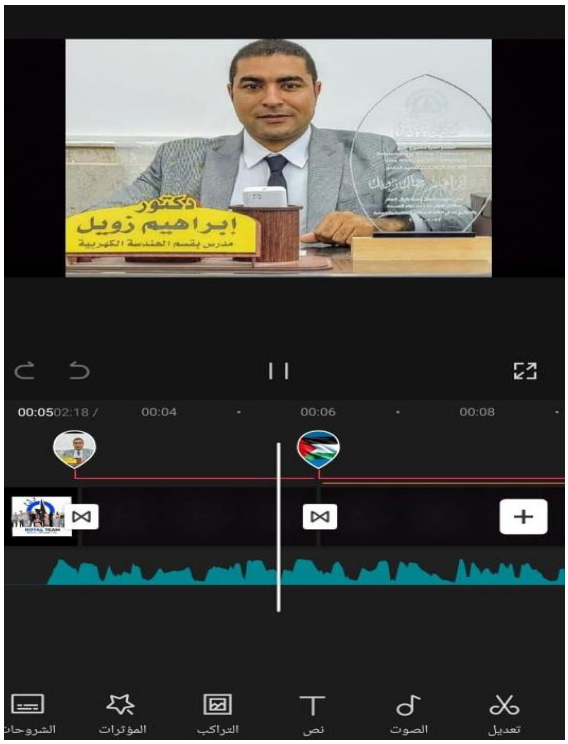
33) Team Video

The video shows the team's cooperation in completing the project and the stages of its delivery and construction

Help us make Video

Engineer / *Kamal Thabet*





33) Team Photo

Help us make Photo

Engineer / *Mohamed Shawer*

34) Nice Pic

اثناء متابعه الدكتور للمشروع