



Emona telecoms- trainer
101 kit

Operation manual

Royal team

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The Final Diagram

صورة الكيـت كامـلة

1. Buffer

It is an electronic circuit used to amplify or amplify the input signal received without changing its shape or distorting it. It is usually used in electronic control and distribution applications.

We input the signal from the function generator to the input (in) of the circuit and receive it from the output (out) to the oscilloscope.



2. Comparator

This electrical circuit compares the positive and negative voltages and is used to turn on lighting automatically and also in many devices and equipment that require digitization of analog signals, such as the analog to digital converter.

We enter voltage for one signal and voltage for reference signal, and by oscilloscope the we can know whether the reference voltage is greater or vice versa by square wave according to the following relationship:

$$V_{in} > V_{ref} \Rightarrow +V_{CC}$$

$$V_{in} < V_{ref} \Rightarrow -V_{CC}$$



3. Adder (3 signal)

An operational amplifier is an integrated circuit that amplifies the difference in voltage between two inputs. It is so named because it was developed for perform arithmetic operations Operational amplifier is an integrated circuit that can amplify weak electric signals.

We enter three signal from function generator to pins (A), (B) and (C). and we can get their addition form pin (A + B +C).

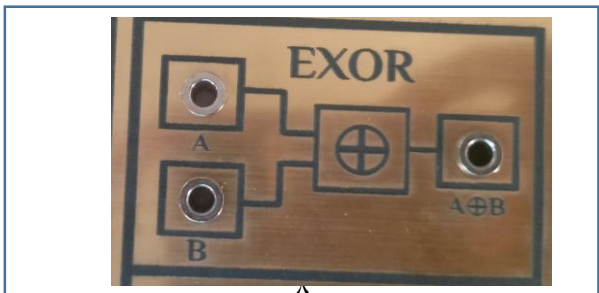


4. XOR

The XOR gate, or as it is known as the exclusion gate, is widely used in logical operations such as binary addition and in communications fields such as cryptography.

It consists of two inputs and a single output, and this output is 1 if and only if one of the inputs is 1, but not both. This can be represented by the following truth table.

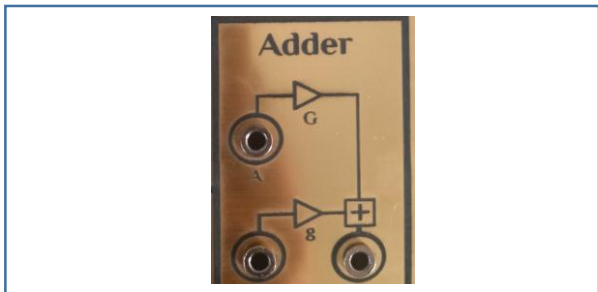
Input 1	Input 2	Output
0	0	0
0	1	1
1	0	1
1	1	0



5. Adder

The addition circuit is based on combining two signals, and each signal can be controlled in its amplification rate. This circuit is used in many applications such as modulation.

It consists of two inputs, which are the signals from the function generator to pins (A) and (B), and a single output that can be represented by oscilloscope.



6. Noise generator

An electronic circuit used to produce a random signal containing a variety of frequencies. It can be used in a wide range of applications, including electronic testing and measurements, achieving sound distortion in acoustics, as well as in generating signals for electronic music and sound design.



7. RCLPF

It filters the signal to low frequencies based on the value of the resistor and capacitor.

We introduce a signal with different frequencies, which causes decay at the high and medium frequencies, and then it is filtered at the low frequencies.



8. RCLPF with diode

It performs the same work as the previous circuit, with the difference in the function of the diode, which is to rectifier the wave.



9. Speaker

A speaker circuit is a combination of electronic parts used to operate speakers and convert electrical signals into sound.

We input the signal into the circuit and it produces an audio signal after amplification and processing.

صورة الدائرة

10. Power supply

The basic electrical power supply for the project. It is to power most of the electronics circuits in the project. It can be used as external source and contains:

- Fixed positive voltage (+5V, +9V, +12V).
- Fixed negative voltage (-5V, -9V, -12V).

To obtain any voltage we connect pin form the desired voltage and connect wire form ground.



11. Phase shifter

This circuit shifts the router by 90 degrees.

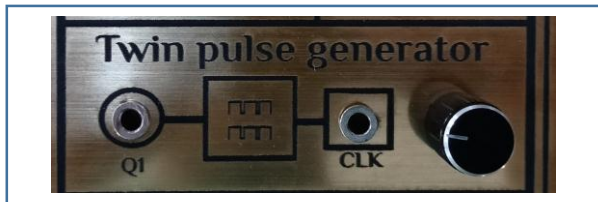
We enter signal in pin (input) and get output after amendment form pin (output), and we can control the amplitude of the variable resistance.



12. Twin pulse generator

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

We enter signal to pin (Q1) and get signal after amendment form pin (CLK).



13. VCO

It is a group of oscillators that control voltage.

In the form of the resulting wave (harmonic oscillators (linear)-oscillators relaxation (sawtooth)).

We enter any signal to pin (in) and we will obtain digital signal from pin (digital) and also we will obtain triangle wave from pin (triangle).



14. Voltammeter

It is a screen that displays the voltage measurement.

We measure voltage by two wires connect in parallel with circuit.

15. Ammeter

It is a screen that displays the current measurement.

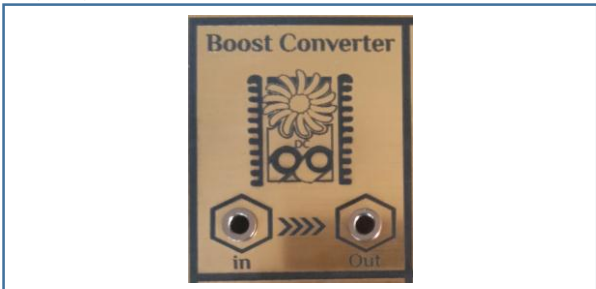
We measure current by two wires connect in series with circuit.



16. Boost converter

This converter is used to raises the voltage.

We input the signal with a certain voltage to pin (in) and will obtain the signal with the highest voltage from pin (out).



17. Buck converter

This converter is used to reduce the voltage.

We input the signal with a certain voltage to pin (in) and will obtain the signal with the least voltage from pin (out).



18. Rectifier

This circuit unifies the direction of the wave and smoothes it through the capacitor.

We enter signal in pin (in) and we will obtain signal after amendment from pin (out).



19. VDC

This circuit generate variable positive voltage and negative voltage.

To obtain positive voltage we connect pin (+) by wire and connect ground by wire and to obtain negative voltage we connect pin (-) by wire and connect ground.

صورة الدائرة

20. Function generator

This circuit generate three signal (sine wave – triangle wave – square wave).

In this circuit find variable resistor and switch in this picture we will explain by details.

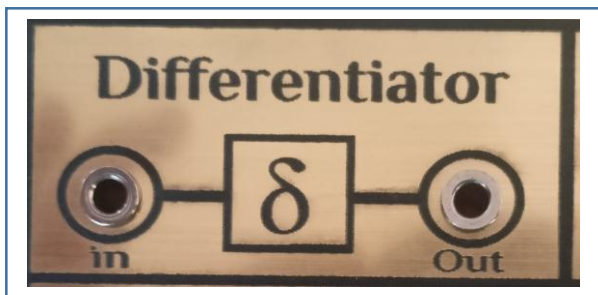


To obtain sine wave we will open switch (1) and connect any pin is called (sine).

To obtain triangle wave we will open switch (2) and connect any pin is called (triangle).

To obtain digital wave or square wave we will connect any pins is called (digital).

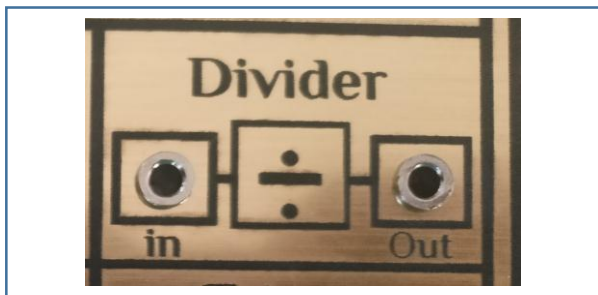
21. Differentiator



22. Integrator



23. Divider



24. Trigger

It converts any signal in income to square.

We enter signal in pin (in) and we will obtain signal after amendment from pin (out).



25. Sampling



26. channel module

a. 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).

b. 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).

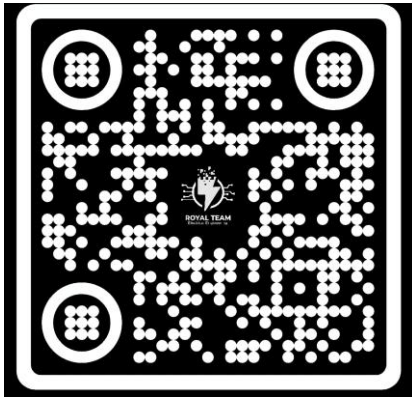


27. Tester

This circuit test component and produce a voice by buzzer.

صورة الدائرة

For more



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