iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** VI **Month of publication:** June 2020

DOI: http://doi.org/10.22214/ijraset.2020.6078

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com

Multifunctional Electronic Equipment using Arduino

V. Durga Prasad[1], P. Veerababu[2], V. Srilakshmi[3], T. Vivek[4], Mrs. N. Gayathri[5]
[5]*Assistant Professor,* [1, 2, 3, 4]*Electronics and Communication Engineering, V.S.M College of Engineering, Ramachandrapuram, A.P, India.*

Abstract: ***Oscilloscopes are a basic Instrument to observe the change of a signal over Time, Voltage that describes a shape that is continuously waved against the scale. So for this, we need a Device, that can be small in size, low cost, and easy to build. We manufacture the Oscilloscope, by using the ARDUINO by assigning the code to it, which is mainly used to reduce the cost of equipment and it occupies less space when compared to the existed CRO.***
This Technology is used to observe the signals or waveforms by using the Arduino. Arduino can be interface with the designed circuit in Lab view, that provides accurate measurements with small size device that can be easily movable by fit in pockets. These devices tested with the multiple input signals and frequencies and it can measure and give accurate values. The output of that Arduino interface Lab view gave the same values and results as the original oscilloscope gave.

I. INTRODUCTION

The CRO is an instrument is used to display the voltage variations, and fluctuation, periodic or otherwise, that are met with the designed electronic circuits. The word is an etymological hybrid. The first part derives from the Latin, to swing backward and forwards; this in turn is from osculum, a little mask of Bacchus hung from the trees. In vineyards trees moved by the wind
The second part comes from the Classical Greek slope in, to observe, aim at, examine, from which developed the Latin ending opium, Then they have used form names that can be observed by the eye or ear. There are So many types of examples for cathode ray tubes. The best example for the CRT is pen recorder, ultra-violet chart recorded and XY plotters are all oscilloscopes.
However this book is mainly concerned with the cathode-ray oscilloscope, By these, we increase the number of similar instruments using LCD Technology. Whatever type of oscilloscope we are using, whether a CRT or LCD or LED screen, the faced panel can be divided into 3 types

A. Horizontal section
B. Vertical section
C. Trigger section

II. SKETCH DIAGRAM AND HARDWARE DESCRIPTION

Construction of the proposed system is easy we are using some passive components and LCD. The main thing is we are using a controller called Atmega 328 (Arduino) for operating purposes.

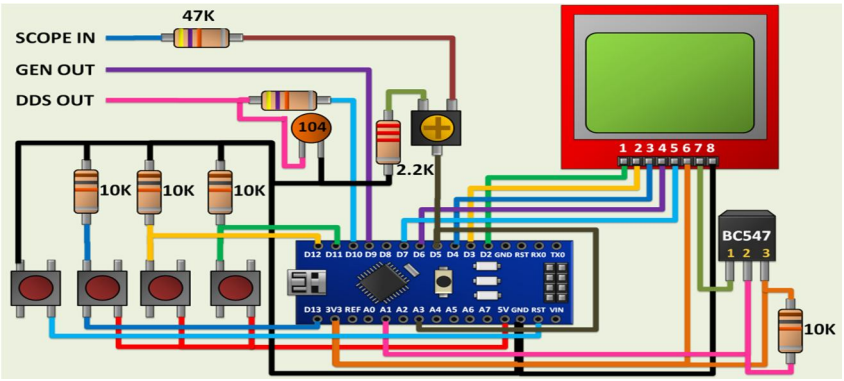


Fig 1: Sketch diagram of the proposed system

From the block diagram, we can mention the main components we are using are Arduino Atmega-328, LCD, switches, and some passive components

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com

A. Arduino ATmega328

The Arduino UNO is a general-purpose microcontroller programming and prototyping platform that you can easily program to react to things going on in the real world.

We can also create a link between the real and digital world by using connecting Arduino by providing internet connection to data on the Internet, or both. We can sense anything thing by using these like finding electronic sensors like temperature pressure, sound, even though we observe the smell also. if we consider environmental pollution to be a smell.

You can even build your sensors. The reaction of Arduino is depending on the program assigned to it. We can use the output of the controller as opening doors, sensing the movable things or motors the possibilities are almost endless.

Arduino is used to prototype the ideas then we can work on it. Prototyping means-testing alternatives to come up with creative solutions to problems and we try out the project to see the response of the sensor and Arduino function depending on the best work of you.

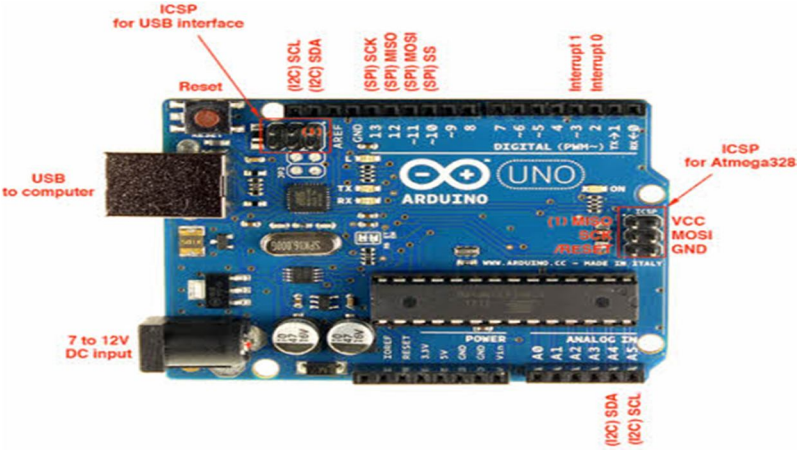


Fig 2: Arduino Atmega-328

B. ATmega328 Features

Table 1: features of ATmega328

Microcontroller	ATmega328
Operating Voltage	5V
Input Voltage	7-12V
Input Voltage (limits)	6-20V
Digital I/O Pins	14
Analog Input Pins	6
DC Current per I/O Pin	40 Ma
DC Current for 3.3V Pin	50 Ma
Flash Memory	32 KB
SRAM	2 KB (ATmega328)
EEPROM	1 KB (ATmega328)

C. Passive Components

We are using the passive components for better result and

D. Resistors

We used to restrict the flow of current. We are using the 4 types of resistors in this project.

E. Capacitors

To store the energy and discharge when we need it. We are using the 1 capacitor

F. BC547 Transistor

BC547 is an NPN transistor. It's nothing but transferring of resistance which can be to amplify the given current. The main function of this transistor is to amplify the input current and switching purpose. The gain current occurred is 80A, same as BC548, 549

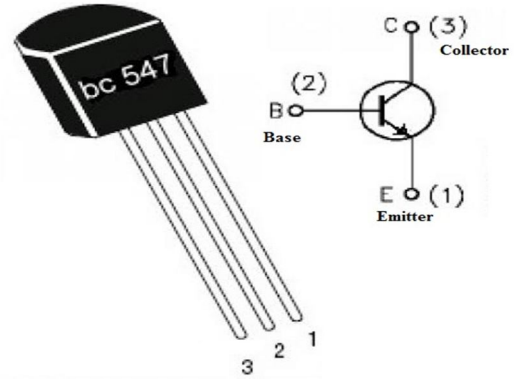


Fig 3: BC547 transistor

1) Pin1 (Collector): The flow of current will be through the "Collector" terminal.
2) Pin2 (Base): Transistor Biasing is controlled by "Base" terminal.
3) Pin3 (Emitter): The flow of current will be supplies out through the "Emitter" terminal.

G. Switches

We are using the 4 types switches for 4 purposes by using theses switches we can operate or control the whole process

1) 1st switch:- By using these we can selecting the operation
2) 2nd switch:- By these we reset the whole process
3) 3rd and 4th are used for the navigation purpose

H. LCD Module

Nokia 5110 module is one of the devices is commonly connected with Arduino and any microcontroller. It can work on 3.3 V and hence all the pins are only 3.3V tolerant according to the datasheet. So if you are using a 5 V microcontroller then it is recommended to use a logic level shifter like a potential divider to access the SpI pins of the display module.

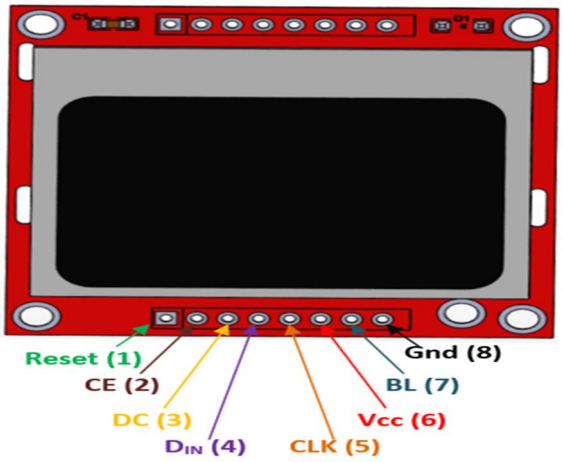


Fig 4: LCD module

By the pin configuration of the LCD module connect to the microcontroller. The main aim of this device is to display the required things or waveforms. Due to the small size, it can be easily portable.

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com

III. WORKING AND RESULT OF THE PROPOSED SYSTEM

After connecting the circuit write the Arduino code by using the ARDUINO IDE software.
After the successful installation of the program LCD ON and it displays the 4 options then selecting the various functions like an oscilloscope, generator, and DDS generator.
From that, we select an option OSCILLOSCOPE to calculate the waveforms. We can also select the GENERATOR option for the generation required frequency.

Fig 5: options displayed in the LCD module

From selecting the OSCILLOSCOPE option it can display the 3 option by using these option we calculate the characteristics of the output waveform.

A. Frequency in HZs
B. Input voltage
C. Intensity adjusting

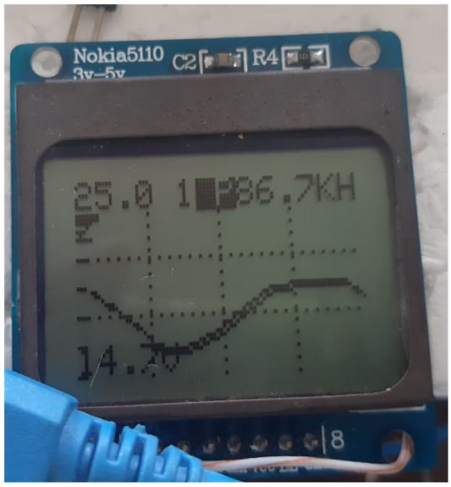


Fig 6: Display the sine wave

1) Function Generator: We can also select the GENERATOR option to generate the Frequency at a different level. It can display the range, we can check the generator frequency by using the Multimeter.

IV. CONCLUSION

CRO's are the very basic and required component to test or to analyze any signal at various applications. So, maintaining and affording the existing systems are complex so, the system which we are proposing is cheaper and can easily afford to utilize at many applications. ON the other hand, it also reduces e-waste at a higher level. This makes analysis simple and overcomes the drawbacks of the conventional CROs.
The project has been tested with multiple signal voltages (0 to 25) V Ac and multiple frequencies (30Hz to 100 kHz) and it can measure more voltage Depends on signal condition circuit. The result that gave the Arduino is efficient

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue VI June 2020- Available at www.ijraset.com

V. FUTURE SCOPE

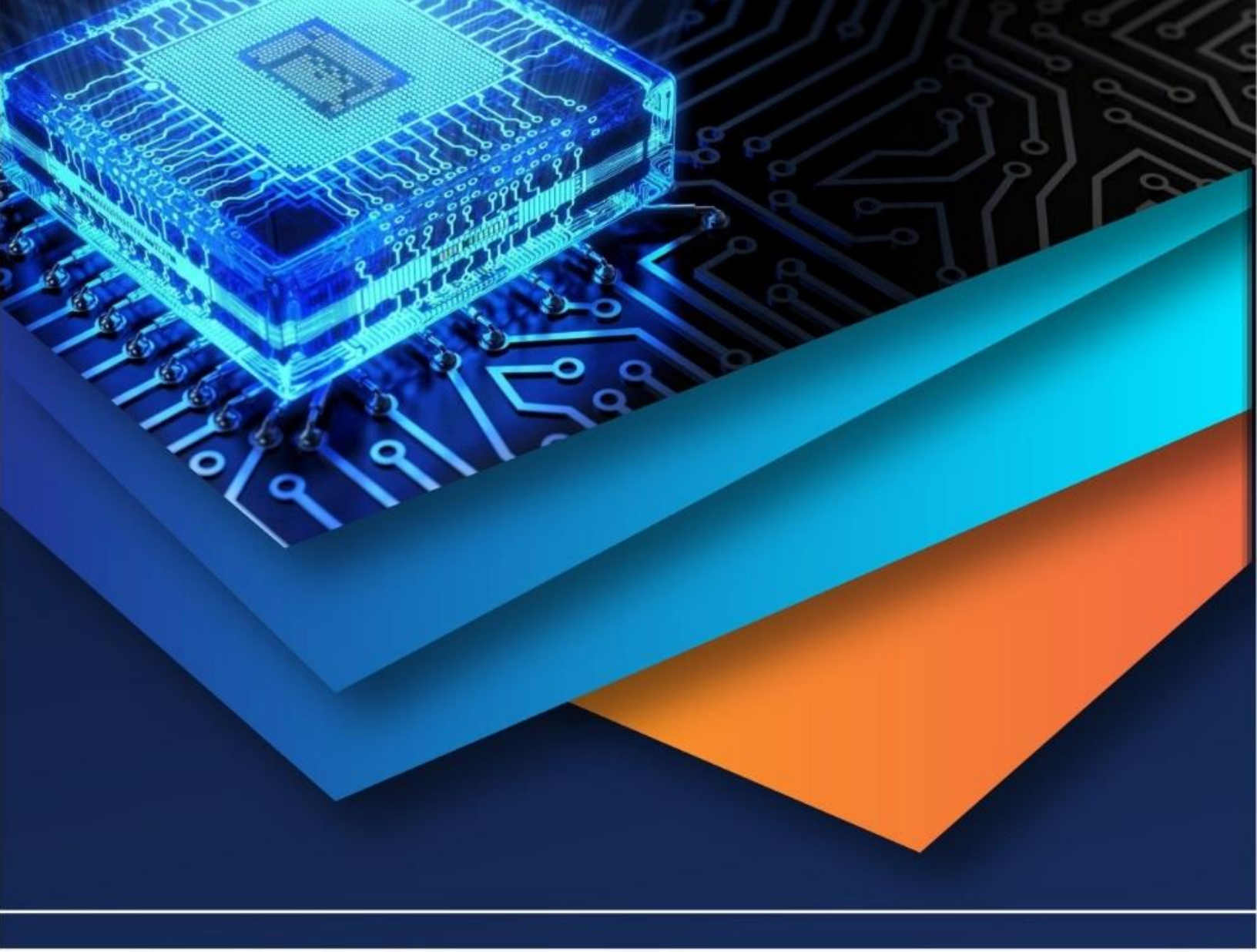
For the implementation of project manufacturing, we can additionally attach the extra features like DDS GENERATOR & TERMINATOR. By adding these two applications it can more useful to students.

By the proper design of these projects, it can more helpful to students and everyone utilizes these project because of low cost and easy to maintain.

Main advantages are that manufacturing of this project is very easy and everyone as builds their oscilloscope use it any time when is needed.

REFERENCES

[1] https://www.arduino.cc/
[2] https://www.wikipedia.org
[3] www.tektronix.com
[4] Oscilloscopes, 5th Edition by Ian Hickman
[5] https://www.elprocus.com/atmega328-arduino-uno-board-working
[6] https://www.electronicsforu.com/electronics-projects/pc-based-oscilloscope-using-arduino
[7] https://arduino.cc/en/tutorial/homerage



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY