

# Pocket Lab

Abhijith R<sup>1</sup>, Karthika S R<sup>2</sup>, Kavyanjali M M<sup>3</sup>, Suja S<sup>4</sup>, Neethu Susan Alex<sup>5</sup>

<sup>1234</sup>UG Scholar, Department of Electronics and Communication Engineering, Dr. APJ Abdul Kalam Technological University Kerala, India

<sup>5</sup>Assistant Professor, Department of Electronics and Communication Engineering, Dr. APJ Abdul Kalam Technological University Kerala, India

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## ABSTRACT

*In addition to theory, practical instruction is also one of the requirements for engineering courses from the beginning. As such, students are expected to do hands-on exercises with a large number of large devices such as oscilloscopes, function generators, and fixed power supplies. These devices are very large and expensive. Their large size and cost are due to the various features that come with them. As electronics engineering students, we don't use every feature of every device in our lab sessions. Therefore, we present an inexpensive, small and weightless pocket lab that contains all the functions needed only for lab experiments.*

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## INTRODUCTION

We know that buying a large and heavy equipment for testing and measuring the electronics items is costly and need so much space, apart from this we are not using all the functions which coincides with the costly equipment we are only using a few of them. So for the better space, convenience, portability and low cost a portable lab is needed. A pocket electronics lab is a portable device that allows users to perform a variety of electronic measurements and experiments. It typically consists of a small, handheld unit that includes a variety of sensors and test equipment, such as a multimeter, oscilloscope, and function generator. The device may also include a display screen, buttons or switches for controlling the device and selecting different measurement modes, and connectors for attaching probes or other test equipment. Pocket electronics labs are often used by electronic technicians, engineers, and students to test and troubleshoot electronic circuits, measure voltage and current, and perform a variety of other electronic measurements. They are particularly useful for field work or when a full-sized laboratory setup is not available.

## LITERATURE SURVEY

*Arunima B Krishna, Meghana Hari, Nanditha Krishna Kumar, Naveen C.P., Neha Pradeep, Shamleena Begum, and Raghu C.V.*[1], This paper describes the improvement of a transportable oscilloscope that has comparable functionalities as that of a conventional oscilloscope. A transportable PC primarily based totally oscilloscope the use of A Tmega 328 micro-controller is developed. This gadget should obtain the voltage and frequency levels supported with the aid of using the ones to be had withinside the popular university laboratories for ordinary lab experiments. This performs a important function in helping instructional activities, that can now be carried out remotely with no need precise lab facility



**Fig1: Block diagram**

*M. N. A. Aadit, S. G. Kirtania and M. Z. Islam* [2], Although microcontroller-primarily based totally oscilloscopes are famous for his or her low-price implementation and compact shape factor, their predominant negative aspects are that they're restrained in operation to low frequency and voltage tiers. This paper proposes a layout for such an oscilloscope that gives 3x development withinside the enter frequency variety and 20x development withinside the enter voltage swing with 2x decrease bias energy than different microcontroller-primarily based totally oscilloscopes. It can come across frequencies of excessive sensible tiers with precise readability the usage of pre-set coding of the microcontroller. It may be related to enter voltages on a variable variety scale in order that precision and accuracy may be maintained adaptively with each low or excessive voltages. The oscilloscope is auto-calibrated and has an outside reset option. It is

less expensive and portable, in addition to energy-saving. This paper has finished experiments to validate the capability of the oscilloscope, which displays that the layout is nearly implementable

**M. M. N. Arefin, M. N. Ambia, T. Ahammad and A. S. M. Shihavuddin[3]**, This paper affords a low fee tool for each dimension and era of electrical sign utilized in any primary electric experiment. The general challenge has one hardware unit primarily based totally on a microcontroller that could get hold of and generate analog sign with the aid of using the command of PC software program and the PC software program interface that's able to showing the measuring sign, ship command for preferred sign era and export information to different simulation software program. This PC software program is likewise able to doing special easy evaluation and export information to software program like MATLAB. The overall performance of the tool is high-quality and there are numerous scopes to beautify its capabilities withinside the future

**N. F. A. Hakim, A. Najmurokhman, M. S. Arifianto and A. Munir [4]**, One of non-stop waves indicators regularly carried out for thru-wall radar (TWR) software is stepped-frequency non-stop wave (SFCW). As a chief element in SFCW-TWR machine, the SFCW sign need to be generated as viable as viable to depend the machine works properly. In this paper, the SFCW sign generator is supplied and designed primarily based totally on ATmega328 microcontroller blended with R/2R ladder networks. Here, ATmega328 microcontroller is carried out to generate virtual indicators to be transformed into analog indicators with the aid of using R/2R ladder networks. The use of ATmega328 microcontroller and R/2R ladder networks is anticipated to supply excessive high-satisfactory SFCW sign in addition to be low value so that you can be implementable for TWR with running frequency of 1600-2500 MHz. Prior hardware realization, the proposed SFCW sign generator become analysed thru simulation software program in acquiring the SFCW sign satisfiable the requirement. The measured end result suggests that the sign produced with the aid of using found out SFCW sign generator has a step sign shape implementable for the favoured software.

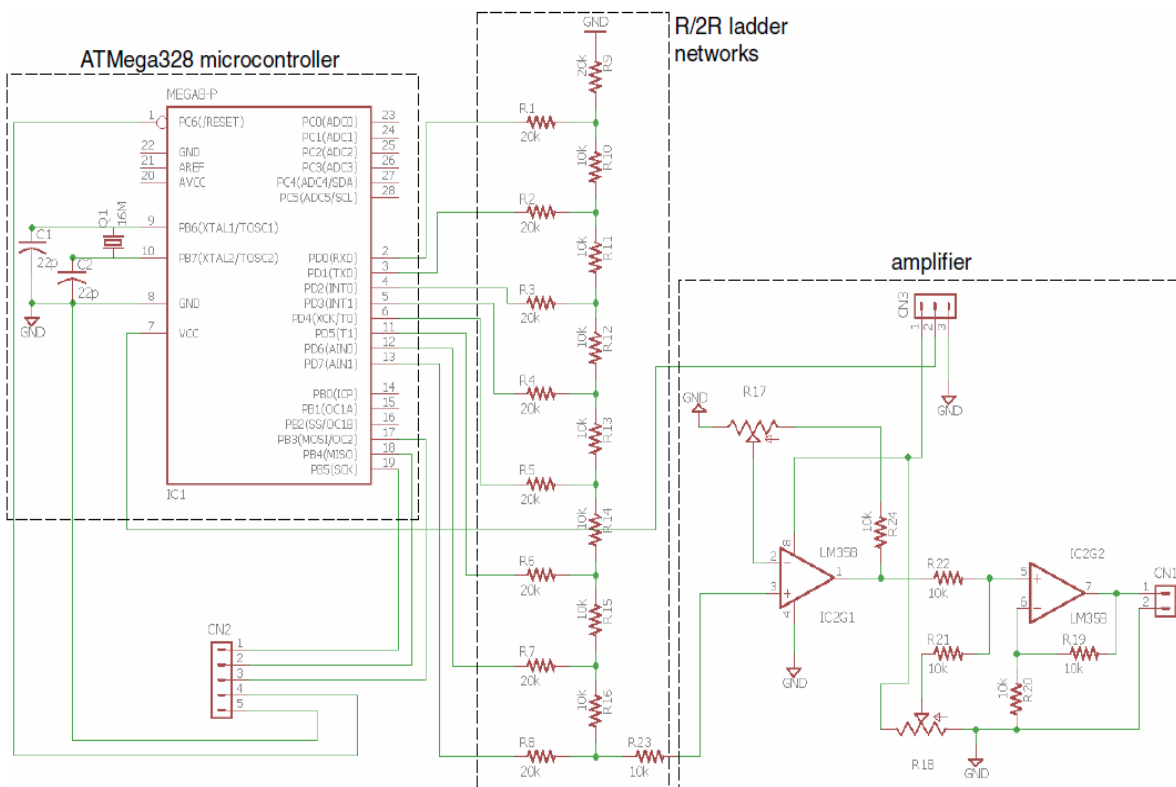
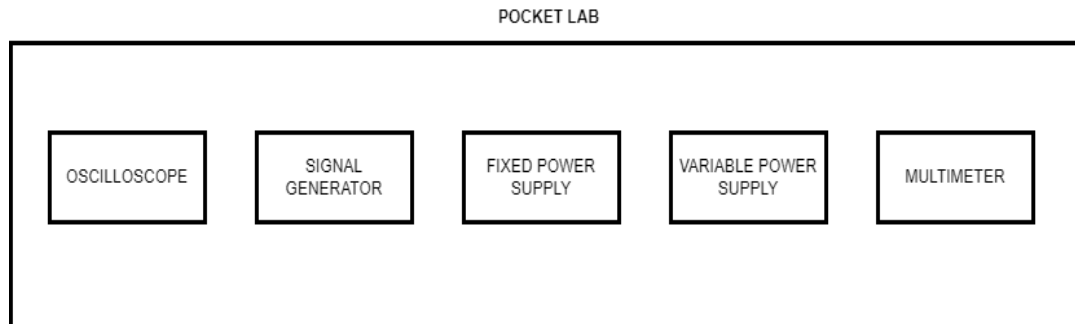


Fig. 2. Schematic circuit of proposed SFCW signal generator

### PROPOSED METHOD

A pocket electronics lab is a compact and portable collection of electronic test and measurement tools that can be used to test and troubleshoot electronic circuits. It can be useful for electronic engineers, technicians, and students who need to perform tests and measurements on the go. To make a pocket electronics lab, we will need to assemble a range of different tools, including an oscilloscope, a signal generator, a fixed power supply, a variable power supply, a transistor tester, a resistor value finder, a voltmeter, and an ammeter. These tools can be built separately.



**Fig:3 Block diagram of proposed system**

## CONCLUSION

It is usually an awesome concept to have a transportable electronics lab, as it could will let your digital tasks and troubleshoot troubles with digital gadgets in numerous locations. Some capacity blessings of a transportable electronics lab include:

- Flexibility: A transportable lab can will let you paintings on digital tasks and troubleshoot troubles anywhere you are, in place of being restricted to operating in a particular region or workshop.
- Efficiency: Having all the important equipment and device in a unmarried transportable package deal could make it less complicated to get began out on a project, and also can shop time through putting off the want to continuously installation and ruin down a workstation
- Cost-effectiveness: Building a transportable electronics lab may be a cost-powerful manner to get began out in electronics, as it could will let you make investments withinside the equipment and device which you want gradually, in place of having to buy the whole lot at once.

Overall, constructing a transportable electronics lab may be a beneficial and handy manner to paintings on digital tasks and troubleshoot troubles with digital gadgets.

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