Solar based Multiple DC Voltage Sources

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***Abstract*— Most of the circuits in the physics & electronics laboratory runs on fixed or adjustable regulated DC power supplies, may be 5V, 12V, 15V or 18V. However, all these supplies are based on the same concept, that is 220 V AC utility is reduced to lower value of AC voltage using step down transformer which in turn is rectified, filtered & regulated, finally we get steady DC voltage.**

In this research work we have entirely different approach, we store the energy from the photovoltaic solar panels to a 12V battery and in turn buck or boost it to 5V, 12V, 15V and 18V. Finally all the electronic circuits are running on the Solar Based DC Supplies.

***Index Terms:* Photovoltaic, Buck converter, Boost converter, Battery, Charge Controller.**

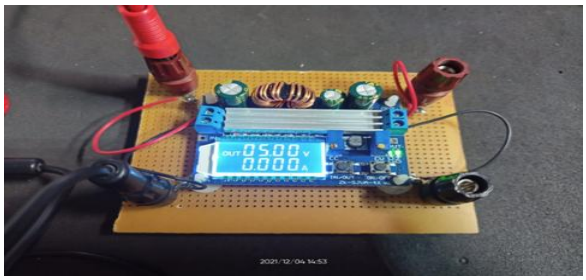
INTRODUCTION

Why not to use the DC voltage obtained from solar panels to run the various circuits in the physics &electronics laboratory, rather than converting the solar panels' DC into 220 V AC using inverter (appreciable loss in conversion) and then converting higher voltage AC into lower voltage AC employing a step down transformer (again having heat losses in conversion) and then converting AC into regulated DC using rectification, filtration and regulation (each stage & at every interface there is appreciable loss of energy) and so on.

DC electric power is an emerging disruptive technological area that has the potential to stimulate economic growth, inspire innovation, increase research and development opportunities, create jobs and simultaneously advance environmental sustainability.

This research work is an outcome of pure experimentation. The innovation in this paper is solar panel provides 12V DC which in turn is stored in a 12 V battery. Further, by using appropriate buck and boost circuits the 12 V battery voltage can be enchaced or reduced to the desired voltage.

1. Buck Converter – 5V:

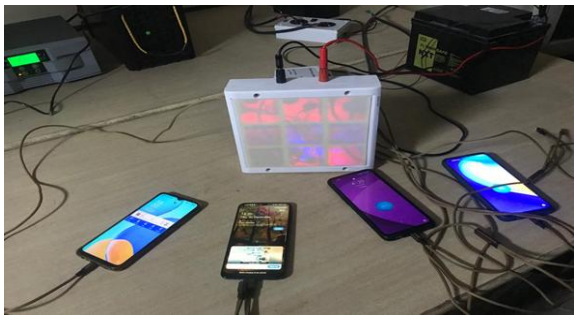


2. 12 V:

3. Boost Converter – 15 V:

3. Boost Converter – 18 V

An application: 18 Point Solar Based Mobile Charging Station



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