Department of Electronic & Telecommunication Engineering
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EN2160 - Electronic Design Realization

IDENTIFY THE PRODUCT- MINI UPS FOR ROUTER

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This report is submitted as the initial report of module EN2160

$27^{th} March 2023$

ABSTRACT

This is the identification of a product that I am going to implement at the end of the semester for the module EN2160. I have considered products (<$50) available in AliExpress, eBay, etc., and incorporated some extra features. At the same time, I have discussed the Problem Description, Problem validation, Motivation for selection, Solutions, Constrains, Reasoning, and Innovative Rating.

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1 IDENTIFICATION OF THE PRODUCT

I have selected mini-ups for wifi router. This is the product that I am going to implement at the end of the semester for the module EN2160. I have considered products (<$50) available in marketing platforms.

This 12V uninterruptible mini ups initially designs to drive my fiber optic modem/router. The key reason to build this power supply is to get continuous internet and phone connection during power failures. The core components of this power supply are PIC Microcontroller, Display, a constant voltage charger, 12V DC power supply, AC line monitoring unit, and 12V high capacity sealed lead-acid battery. The entire system will be designed using locally available components.

The charging circuit of this system builds around using the popular LM350 voltage regulator. This regulator calibrates to provide both 14.4V fast charging and 13.6V trickle charging. Based on the condition of the battery, the MCU will determine the appropriate charging mode.

Similar product in alibaba.com (To view - Click here):- Mini dc ups for 12v wifi router battery backup

1.1 Problem Description

There are lots of issues due to power failures. After Covid-19 lot of companies switched to work-from-home. At the same time education system of Srilanka(World wide also) also moved to online mode. If we need to continue everything we need a stable and continuous network connection. So we need a continuous power supply at least for the router.

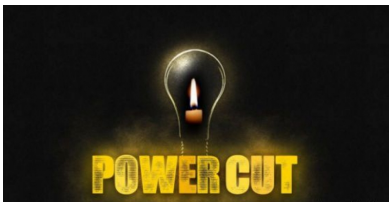
Figure 1 — Workfrom home after covid

1.2 Problem validation

For the above problem, We can have a ups/power bank but the main issue is, sometime we can't connect the power bank to the router. Therefore, If we designed a mini ups then we can overcome the following issues.

1. Even though we have a power bank, sometime there won't be an appropriate port
2. Even though we have a power bank, We couldn't able to get the needed voltage.
3. Usually routers are connected to the 230V. If the power is gone then we have to plug out the power bank then we need to switch to the power bank. Within that time gap, we will disconnect and we need more time to reconnect

I hope the above things validate my problem Then I read a lot of surveys and blogs. There are a lot of questions and requests asked during the power cut and covid period.



(a) Powercut

(b) online-Education

(c) work-from home

Figure 2 — Problem validation

1.3 Motivation for selection

I am also an undergraduate. I also suffered due to power failure and I also didn't connect to the Online classes properly in my semester 1. The main reason is even though I have the Fibre network connection due to a power cut automatically router also came off. Due to that, there were a lot of lecture recordings remaining to watch Then I got depressed during the exams. After that, I heard about the WIFI Ups/power Backup. That was my own past experience. That motivated me to design this with some extra features.

1.4 Solutions

This 12V uninterruptible mini ups initially designs to drive my fiber optic modem/router. It can provide suitable voltage and with needed ports. At the same time, there is no need to unplug it. It will work automatically when power fails and it will provide the directly regulated voltage rest of the time.

1.5 Innovative Rating

My system is an improved model. There already exists a system, which is mini ups without display and it can provide power for 2 hours. I expect to make a system with a display, which can display the charge going from ups or direct power supply. Then if it's from ups then it will show the percentage of charge remaining in the power bank. And planned to make it, which able to provide power for approximately 7 hours.

1.6 Constrains

I have listed out the constraints, I got during analyzation and selection of this product The constraints are :

* It is risky to handle with 230V
* Its price is approximately 12,500 LKR (50$) in Ali Express. But If we designed only one product. Then we need to have more than 15,000 LKR.
* There maybe hardness when finding a rechargeable battery that can provide a charge for 7 hours.

1.7 Reasoning

I have analyzed the available UPS routers. Personally, I felt from my past experiences, if the above innovative ratings will be included, then It will be better than others. I have a little bit checked about the feasibility. That's why I have identified this product as my EN2160 - Electronic Design Realization project.

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