

DESIGN OF A SMART EMBEDDED UNINTERRUPTED POWER SUPPLY SYSTEM FOR PERSONAL COMPUTERS

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ABSTRACT

Digital equipment such as computers, telecommunication systems and instruments use microprocessors that operate at high frequencies allowing them to carry out millions or even billions of operations per second. A disturbance in the electrical supply lasting just a few milliseconds can affect thousands or millions of basic operations. The result may be malfunctioning and loss of data with dangerous or costly consequences (e.g. loss of production). That is why many loads, called sensitive or critical loads, require a supply that is protected. Many manufacturers of sensitive equipment specify very strict tolerances, much stricter than those in the distribution system for the supply of their equipment, one example being Computer Business Equipment Manufacturer's Association for computer equipment against distribution system disturbances. The design of this uninterrupted power supply (UPS) for personal computer (PC) is necessitated due to a need for enhanced portability in the design of personal computer desktop workstations. Apart from its original functionality as a backup source of power, this design incorporates the unit within the system unit casing, thereby reducing the number of system components available. Also, the embedding of this unit removes the untidiness of connecting wires and makes the whole computer act like a laptop. Not to be left out is the choice of a microcontroller as an important part of the circuitry. This has eliminated the weight and space-consuming components that make up an original design. The singular use of this microcontroller places the UPS under the class of an advanced technology device.

KEYWORDS

Embedded System, Uninterrupted Power Supply, Personal Computer, Automation, Power Electronics.

1. INTRODUCTION

An uninterruptible power supply, commonly called a UPS is a device that has the ability to convert and control direct current (DC) energy to alternating current (AC) energy. It uses a conventional battery of 12V rating as the input source and by the action of the inverter circuitry, it produces an alternating voltage which is sent to the load. This particular UPS is designed for a small scale load like a personal computer and hence only a basic power rate is generated by the UPS. Many believe that because an inverter is operating from a nominal 12V battery and it cannot deliver as much output as a normal mains power outlet, it's relatively safe. This is not usually true. Even a low power inverter rated at a mere 60watts has an output which is potentially fatal if