

Solar Powered Audio System

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INTRODUCTION

On music festivals such as Roskilde Festival, many of the guests bring their music systems. This can be anything from an old fashioned transistor radio to a car stereo system. In common for all of these systems are that they are powered by batteries, of which many are abandoned by the guests when they leave the festival.

Besides offering a solution to reduce the required battery mass, this project also offers a convenient and self-sufficient music system powered by photovoltaic panels, using state of the art, highly efficient audio amplification techniques.

THE SYSTEM

The festival guest requires their audio systems to be functionally many hours a day for periods exceeding a week. A traditional battery powered solutions this gives the festival guest 2 options:

- Bring enough pre-charged batteries to power the system for the entire period.
- Bring at least two batteries and find somewhere to charge the battery not in use during the festival.

Both of these solutions are inconvenient and requires a relatively large battery mass.

By using a combination of a photovoltaic panel and a battery, this project can not only eliminate emissions, but also drastically reduce the total battery mass, since the system at no time needs to store more energy than the amount required to power the amplifier during a single night.

This is a much more convenient solution for the user. Not only is the mass of the overall system reduced, but the only thing the user has to do to maintain power on the system is to position the system out of the shadow. This can, of course, be done without having to turn off the music.

As an extra convenience for the user the system is also equipped with USB ports for charging mobile phones during the day.

The electronics in the system is designed with focus on high efficiency. The audio power amplifier is a highly efficient Class-D topology and care is taken to operate the solar panel around its optimum operating point. The USB charging system is powered by a highly efficient switch-mode buck converter.