Core components of a low-voltage solar photovoltaic (PV) system

Solar PV module/panel

Generates a direct current when exposed to the radiation of the sun

Solar PV cells are combined to build a solar PV module/panel. There are three main types of solar PV modules; monocrystalline, polycrystalline, and amorphous. While each panel type varies in its efficiency at converting sunlight to electricity, panels that are rated for a certain power output in Watts will generate the same amount of electricity, no matter the type.

Charge controller/regulator

Regulates the cycles of charging and discharging between the battery, solar panel and the devices (i.e. LED lights)

A charge controller/regulator is used to control the Voltage and flow of electricity between the solar PV module, battery, and the loads. The charge controller prevents system damage by ensuring that the battery does not get overcharge by the solar module, does not over-discharge by having the lights turned on too long, and provides protection from the current running backwards to the solar panels. Many charge controllers also provide useful information about the battery's state of charge.

Battery

Stores energy from the panel and provides power to lights and other devices

A battery is where the energy is stored. A battery is needed for systems when electricity is in demand during times when the sun isn't shining. It is also important to have in cases where your need more power than you are generating from the solar PV module at a specific point in time.

Lights

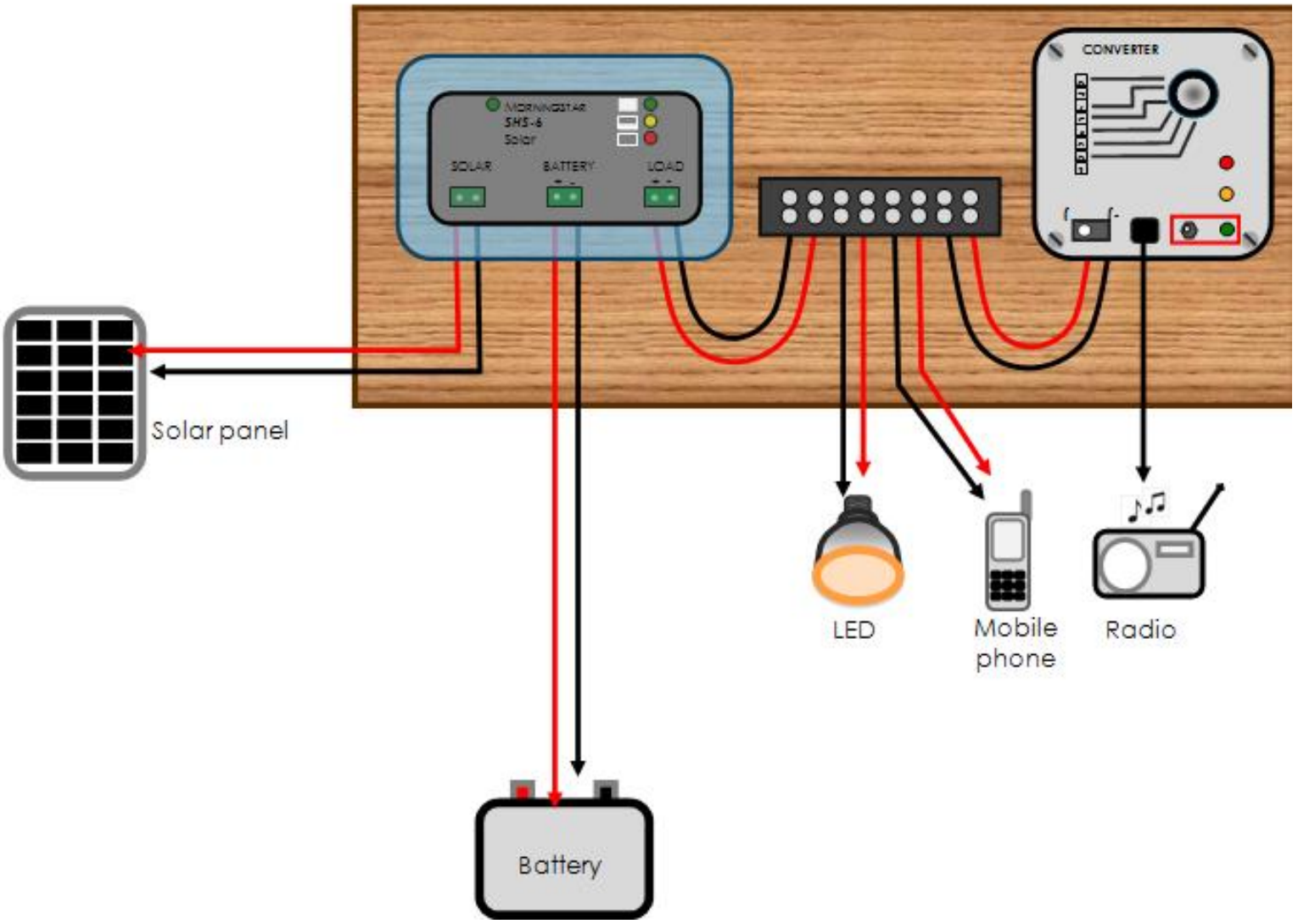
LEDs - Provides bright light with very little power

Light Emitting Diodes (LEDs) are high efficiency sources of lighting. They are called solid state devices because they do not require any filaments, or gas mediums to create light; all the materials are solid. This type of construction has the advantage of efficiency. There is little heating in the device so the majority of the energy is directly converted into light.

DC to DC converter

Converts electricity voltages up or down

A DC to DC converter is a device used to change the voltage output of a plug-in. This means that the converter can receive 12V as an input voltage, but change then change this to a lower voltage. This allows the user to connect highly useful low-voltage devices to their solar PV systems, such as radios.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LED
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