Open Hardware

Introduction
Open Hardware (OH) or “Open Source Hardware (OSH)” is a term for tangible artifacts — machines, devices, or other physical things — whose design has been released to the public in such a way that anyone can make, modify, distribute, and use those things.

The benefits of open source methods and open tech innovation are:

- Access to knowledge and product designs
- Fast and distributed exchange of skills and knowledge
- Accelerated innovation due to collaborative development
- Lower development costs and more expertise

Easy adaptation and customization

What do you need for OH?

Tools & Materials

- Screwdriver
- Dremel Saw
- Breadboard
- Makey Makey
- Arduino
- Raspberry Pi

Lessons Learned

- Non-functional prototypes are critical for success.
- Clear, concise documentation is essential.
- Testbeds are a great way to validate ideas.

Open Tech Linux Software Installation

(on Ubuntu based OS)

- Download
- Install
- Update

Open Tech Skills

- Training and Team
- Experience
d• Improvements
• Motivational Skills
• Creativity
• Basic Tool Skills
• Knowledge
• Good Listening
• Entertaining
• Time Management Skills
• Hopeful
• Social Skills
• Passionate
• Mission
• Commitment
• Social Skills
• Approachability
• Technical Skills
• Visual Skills

Open Hardware Process - Documentation Principles

- One key component of Open Hardware is clear documentation. In order to stay in touch with developers, it is necessary to maintain a project in a way that is easy for others to follow. This is done through open documentation.

Open Process Documentation - Open Tech Guide

Using your Open Process Documentation (OPD) will help you create a clean and consistent Open Tech Guide for your project.

Step 1: Define the Purpose and Scope

- Define the goals of your project
- Identify the target audience
- Create a roadmap for your project

Step 2: Collect and organize data

- Gather information from various sources
- Organize data into a structured format

Step 3: Create the outline

- Develop a logical structure for the guide
- Use clear headings and subheadings

Step 4: Write the content

- Write clear, concise, and informative content
- Use appropriate formatting

Step 5: Review and edit

- Have others review the content
- Make necessary revisions

Step 6: Publish

- Publish the guide online
- Promote the guide to your audience

Resources

- OPEN SOURCE ECOLOGY
- OPEN TECH, OPEN HARDWARE - ELECTRONICS
- MODULAR WIRE LITERACY
- OPEN SOURCE HARDWARE ASSOCIATION

NOTES:

- Resources available online
- Links to additional information

INSTRUCTIONS

- Share your project with others
- Encourage feedback and contributions

OPEN SOURCE EDUCATION

- OPEN SOURCE HARDWARE
- OPEN SOURCE SOFTWARE

- A guide to open source software and hardware
- Information on licensing, sharing, and distributing open source projects

APPROACHES

- OPEN SOURCE THINKING
- OPEN SOURCE PRACTICE

- Strategies for success in open source
- Best practices for collaboration

NOTE:

- Share your experiences and lessons learned
- Encourage others to join in and contribute
**Phone Stand**

**Tools**
- scissors
- tape
- drill or screwdriver
- cardboard

**Materials**
- cardboard
- duct tape
- paper clips
- phone

**Steps**

1. Preparation of working space
2. Get the cardboard and place it on the table
3. Measure the length and thickness of the phone and choose suitable material
4. Cut the cardboard and place it on the table
5. Measure the phone holder and glue them together using suitable adhesive on the phone side
6. Cut the side flaps and glue them together using suitable adhesive on the phone side
7. Cover it with duct tape (optional)

**LED Light**

**Tools**
- Breadboard (non-straight type)
- Various LED strips (red, blue, green, etc.)
- Multimeter
- Soldering iron and stand
- Solder

**Materials**
- Resistor (560 ohm, 5W)
- 3V Battery
- Switch

**Steps**

1. Measure battery voltage
2. Calculate and sort out resistors
3. Measure and cut circuit wires
4. Identify the negative and positive bar
5. Start to solder the resistors (not solder on breadboard)

**Solar Charger**

**Tools**
- Color coded wires (black and red)
- Soldering iron
- Soldering flux
- Jumper cables
- Heat shrinkable tubing (blue and red)

**Materials**
- Solar panel 2V - 250mA
- Resistor 200 ohm (1/8 watt)
- Resistor 330 ohm (1/2 watt)
- Switch S1 (SPST)
- Switch S2 (DPDT)
- Capacitor 0.1uF
- Resistor 330 ohm
- Resistor 100 ohm
- 5V Regulator

**Steps**

1. Build the solar charger with DC-DC converter connected to the solar regulator high
2. Fix the regulator with black side facing you and connect forward diode and resistor
3. Connect the other side of the solar charger in the regulator (tip with black connected)
4. Connect the solar charger (red) to the negative side of the LED light (red and white)
5. Connect the solar charger (black) to the negative side of the LED light (red and white)

**Tips and Usage**
- Can be used for charging phones
- Can be used as a night light
- Can be used as an emergency light
- Can be used as a warning light

**Open Hardware Guide**

Pioneering Open Tech Innovation for South Sudan

**PARTNERS ORGANIZATIONS**

- JHUB
- iHub
- OpenONU
- Open Innovation Hub
- Open Hardware

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