3D Printing

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WHAT IS 3D PRINTING?

- 3D printing is NOT:

    - Instant creation of pieces

    - Near-zero-cost creation of everything you could want

    - A "replicator" from Sci-Fi

WHAT IS 3D PRINTING?

- 3D printing IS:

  - Rapid way to prototype parts

  - Limited in the size and complexity of pieces

  - Limited in the strength and durability of pieces

  - Inexpensive means to produce simple shapes or pieces

  - Effective way to produce individual, simple plastic parts

  - Effective way to repeatedly produce identical parts

MECHANICS OF 3D PRINTERS

- Different types:
  - Extrusion of single or multiple filaments into additive layers of fused plastic
    - Cheaper
    - Slower (medium prints measured in hours to days)
    - Lower resolution
    - More common for consumer market
  - Light-sensitive vat of liquid plastic hardened into a solid
    - More expensive
    - Faster (medium prints measured in minutes to hours)
    - Higher resolution
    - Not common in consumer market

OVERVIEW OF COSTS

- Printer: Solidoodle 2 ($500 base) with heated bed ($100 extra)

  - Maximum print size approx 150mm (5.9 inches) cube

  - Z-axis "height" resolution 300 micon / 0.3mm (typical) 100 micon / 0.1mm (maximum)

  - Uses one color of 1.75mm diameter filament

- Filament "ink":

  - ABS (petroleum based) Plastic

  - Also available as PLA (corn based) plastic

  - Commonly sold in 1kg / 2.2lb rolls, approx $30-$35 per spool

HOW TO GET PARTS…PART 1

- Download parts off internet to print

  - Makerbot's Thingiverse.com site

  - Google's Sketchup Warehouse

  - Others…

- Examples:

  - CB Mic holder

  - Raspberry Pi case

  - "Frequency Upconverter" Case

  - Star Trek Next Generation "Com-Badge" , Romulan warship, Enterprise-D Starship

  - Spare or Replacement parts for 3D printer
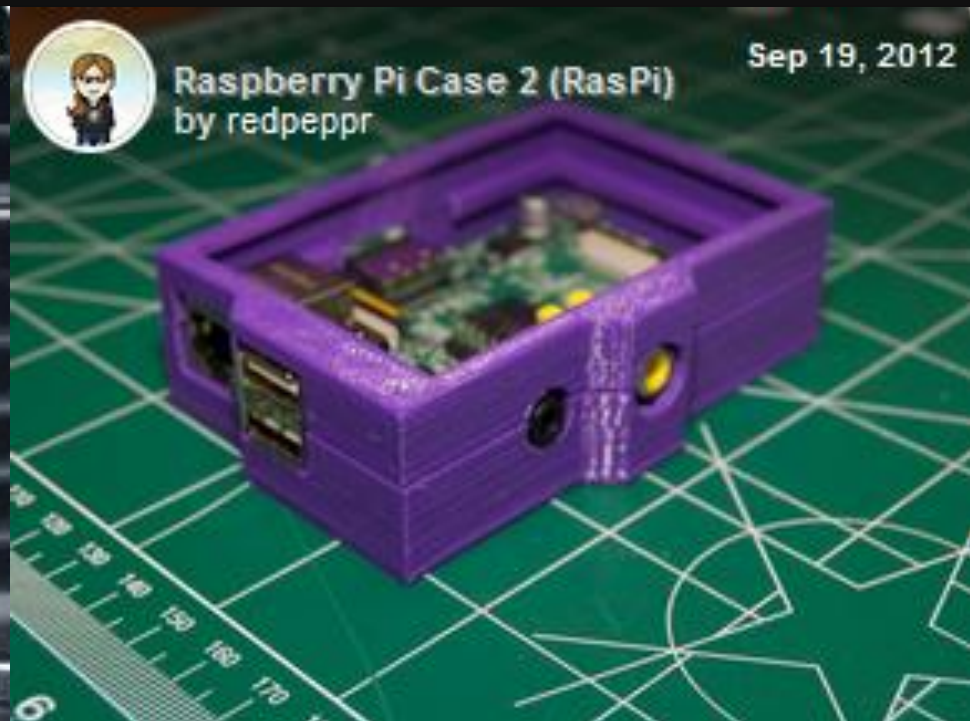
DOWNLOADABLE PARTS

DOWNLOADABLE PARTS

http://www.thingiverse.com/thing:18862

http://www.thingiverse.com/thing:240451

DOWNLOADABLE PARTS

CB Radio Mic Holder
by ajibbo

Jan 19, 2013

Raspberry Pi Case 2 (RasPi)
by redpeppr

Sep 19, 2012

http://www.thingiverse.com/thing:43329

http://www.thingiverse.com/thing:30572

HOW TO GET PARTS…PART 2

- Create custom parts

  - Sketchup (free personal maker-edition) – formerly Google Sketchup

  - Most CAD design programs

- Modify downloadable parts to custom specifications

 - Most CAD programs can import the "STL" standard files

HOW TO GET PARTS…PART 2

- Examples
  - Mounting bracket to add "On/Off" switch to 3D Printer
  - Spare Battery Holders for Yaesu FT-60 and VX-6R
  - Bananna Plug Terminal cover
  - Keychain battery holder
  - Arduino case
  - Wireless Router stand
  - Closet door switch box for micro-switch
  - Repair for radio knob "D" slot
  - VFO "dimple" knob
  - Triangle corner-brace for wobbly shelf
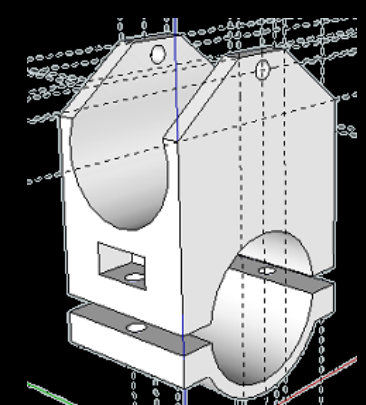 - Toilet paper holder
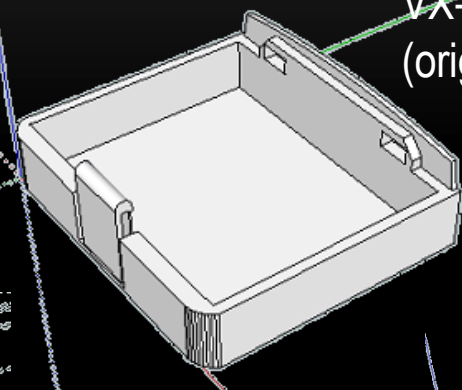
CUSTOM CREATED PARTS

FT-60 Battery Holder + clip

VX-6 Battery Holder
(original flex clip)
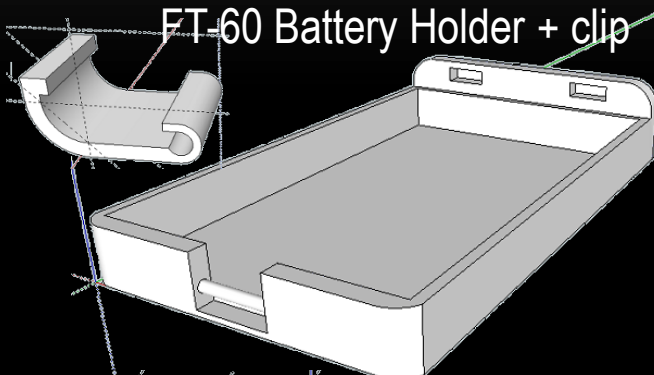
Guide for plywood top
on metal shelving
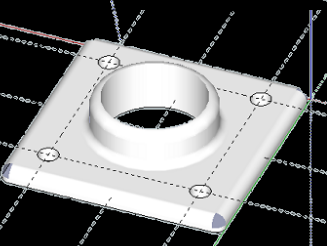
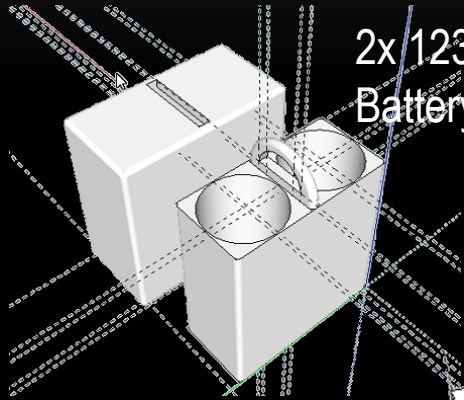Bicycle handlebar
SureFire E2D flashlight mount
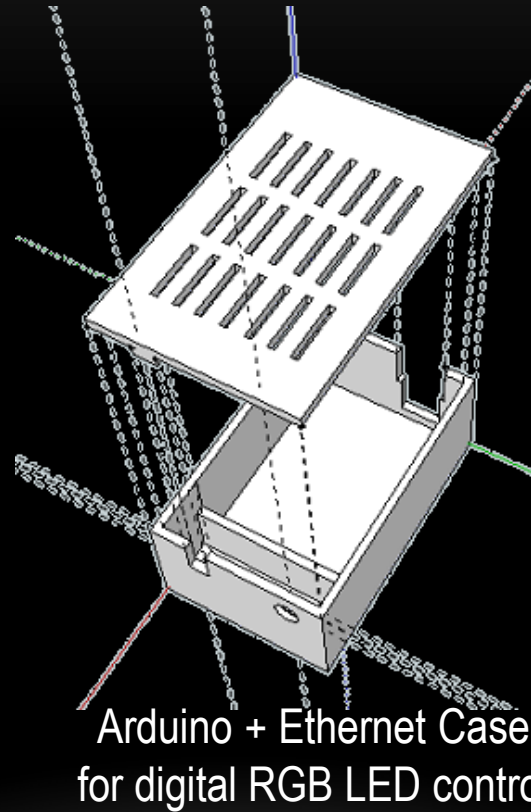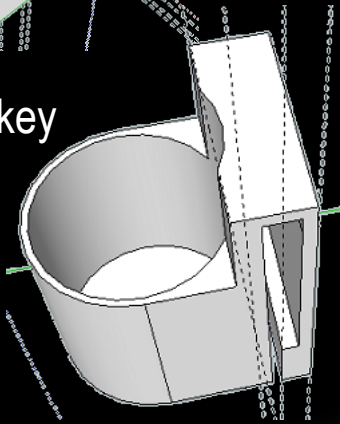
VX-6 Battery Holder
(revised) + clip
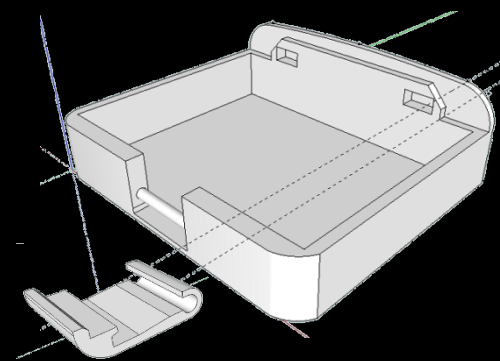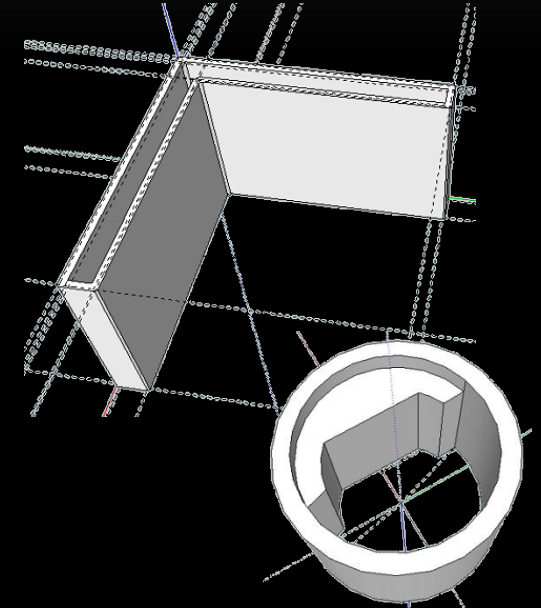
CUSTOM CREATED PARTS

2x 123A Battery Holder

Bed frame end cap

Car wheel key clip for glove box

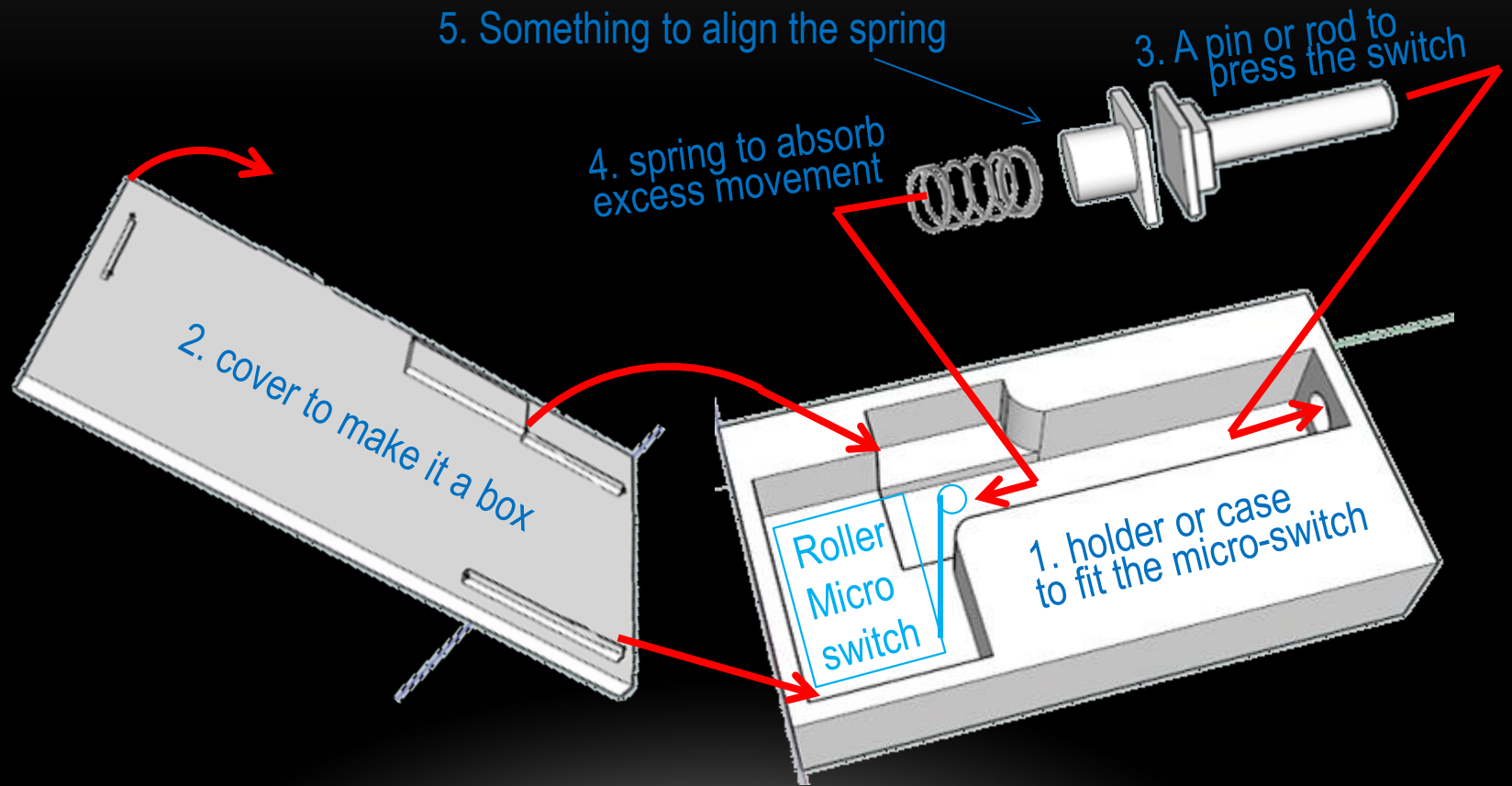Arduino + Ethernet Case for digital RGB LED control

Replacement back for broken car radio knob

VFO DIMPLE KNOB

CREATION OF MORE COMPLEX PARTS: MICRO-SWITCH FOR DOOR

5. Something to align the spring

3. A pin or rod to press the switch

4. spring to absorb excess movement

2. cover to make it a box

Roller Micro switch

1. holder or case to fit the micro-switch

CREATION OF MORE COMPLEX PARTS: MICRO-SWITCH FOR DOOR