CARL VON OSSIETZKY universität OLDENBURG

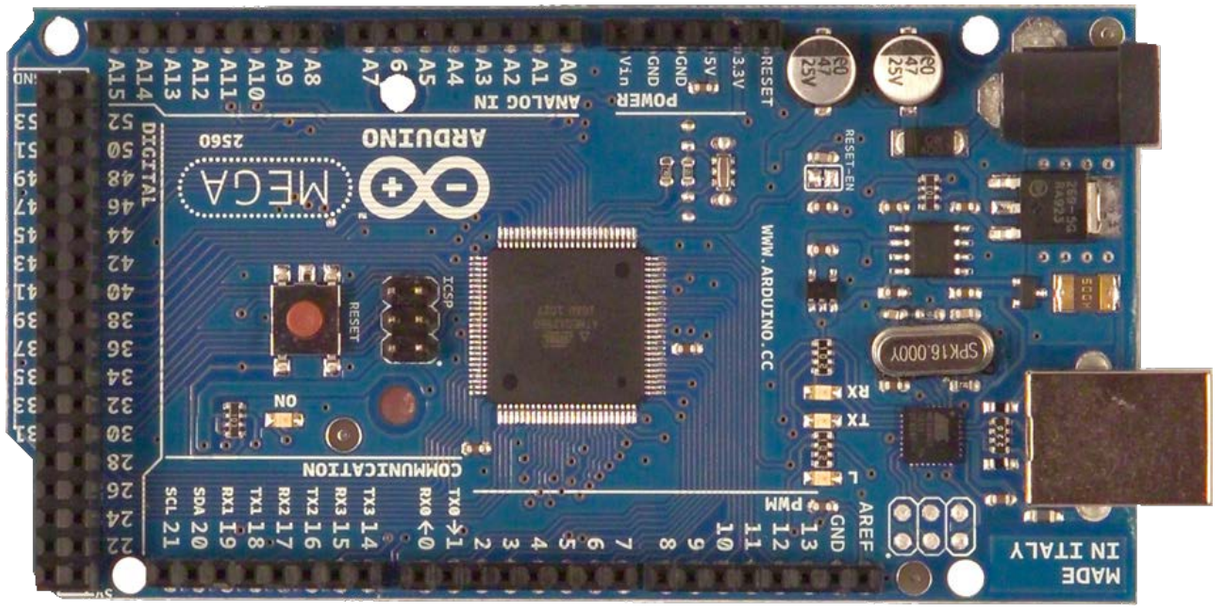
Praktikum Interaktionswerkstatt

Technologies

Arduino

Single-board microcontroller

- Microcontroller: Atmega2560
- Digital I/O Pins: 54
- Analog Input Pins: 16
- SRAM: 8KB
- EEPROM: 5KB
- Clock Speed: 16MHz



Availability and restrictions

- We have ~8

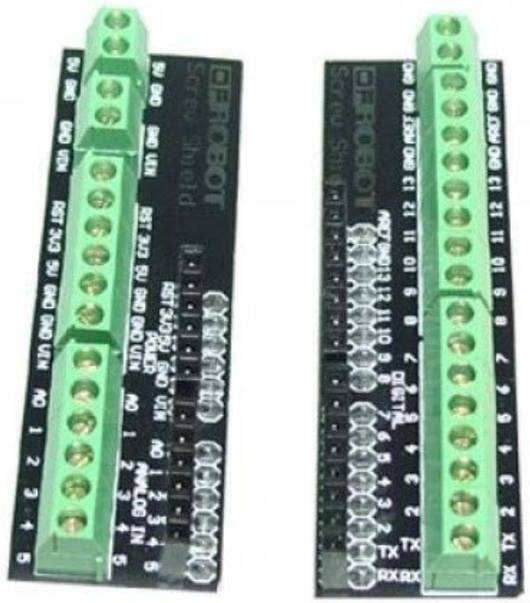
More info

- http://www.arduino.cc/
- http://mouseglove.sourceforge.net/
- jutta.fortmann@uni-oldenburg.de, heiko.mueller@offis.de

Arduino Shields

Extensions for Arduino

- Ethernet shield
  - IP Stack
  - 4 simultaneous connections
- Xbee Shield
  - Wireless Network
  - One-to-One, Peer-to-Peer
  - 30m (Indoor), 100m (Outdoor)
- Screw Shield



Availability and restrictions

- We have ~8

More info

- jutta.fortmann@uni-oldenburg.de, heiko.mueller@offis.de

Arduino LilyPad

Arduino microcontroller board

- For wearables and e-textiles
- Sewing skills advantageous
- Some accessories available (cables, sensors, …)

Availability and restrictions

- 4 sets free during the term

photo from http://www.flickr.com/photos/leahbuechley/sets/72157601404004841/

More info

- http://www.arduino.cc/en/Main/ArduinoBoardLilyPad
- Jutta.fortmann@uni-oldenburg.de

Arduino LilyPad Accessories

Sensors

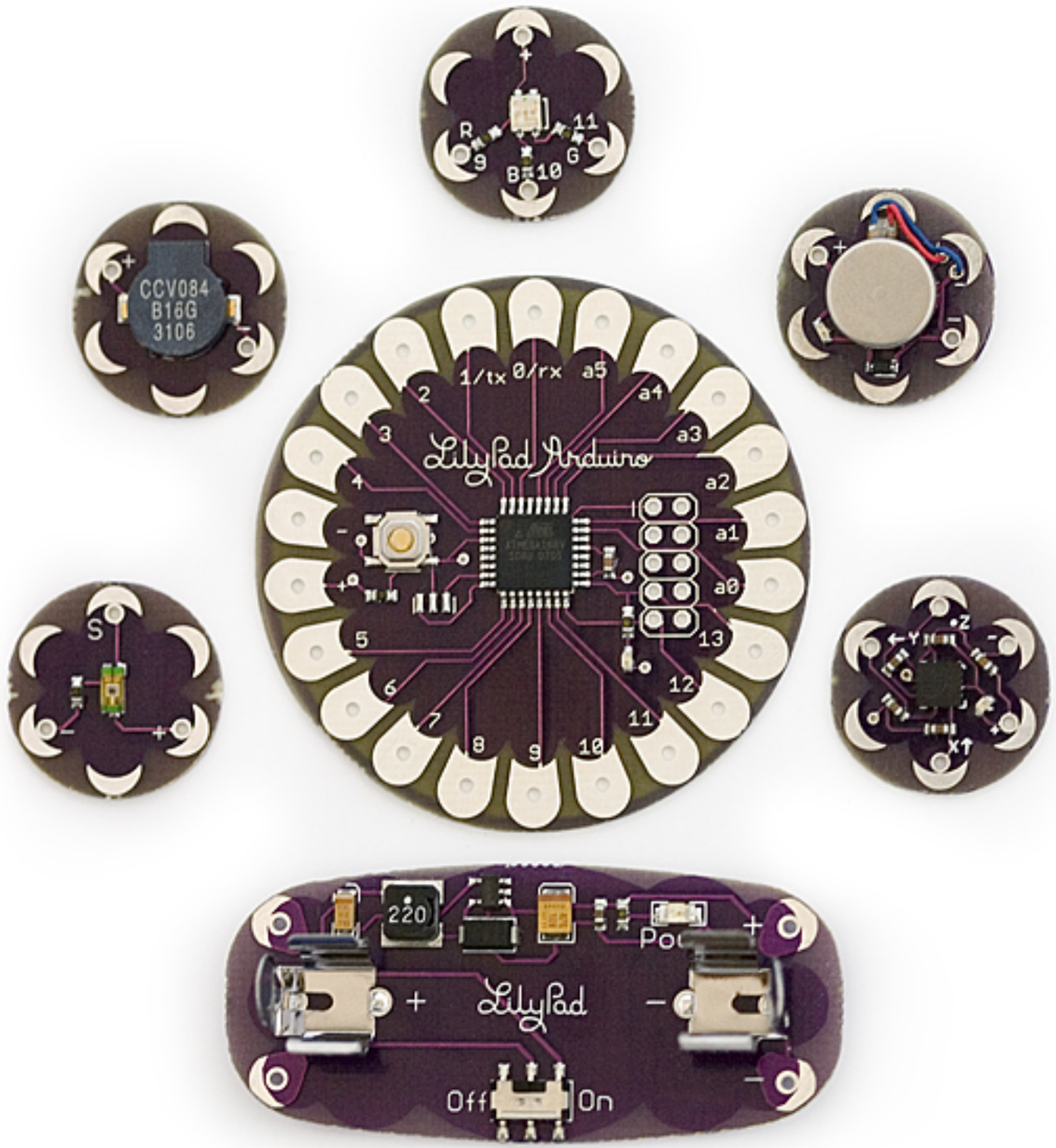
- Light
- Temperature
- Pressure
- Flex
- Accelerometer

Input/Output components

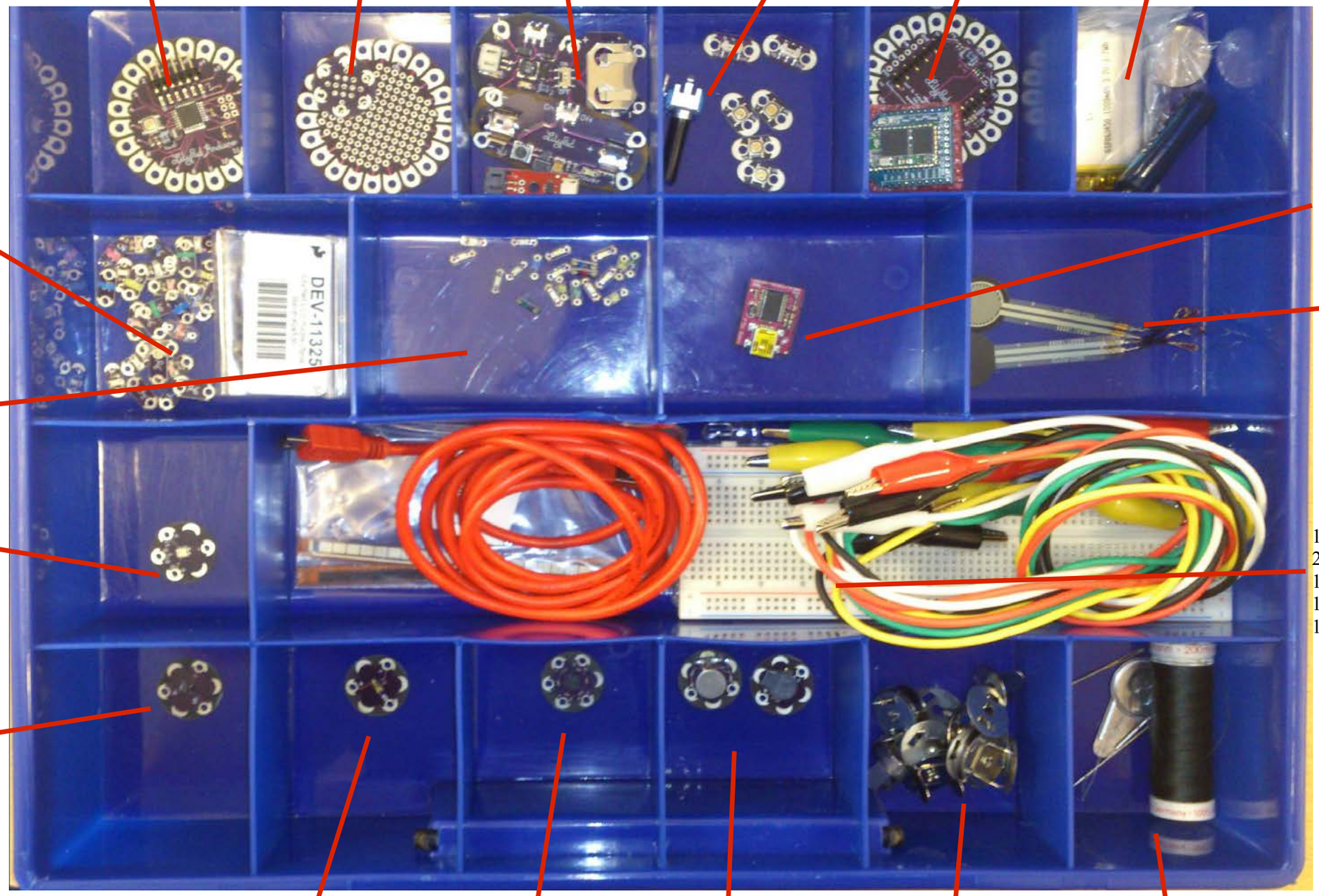
- Switch
- Button
- Potentiometer
- Vibration
- LEDs
- Speaker

Network Communication

- Xbee Shields, Bluetooth



Arduino LilyPad – Your Equipment per Group



1x LilyPad Mainboard 328

1x Protoboard groß
1x Protoboard klein

1x LiPower
1x LilyPad Power Supply
1x Battery Holder – switched
1x LiPo-Charger auf Micro-USB

4x Button Board
2x Slide Switch
1x Potentiometer

1x LilyPad Xbee
1x Bluetooth Bee

1x 3V Knopfzelle
1x AAA Batterie
1x LiPo-Akku 1000mAh

5x LilyPad LED Weiß groß
5x LilyPad LED Blau groß
5x LilyPad LED Gelb groß
5x LilyPad LED Grün groß
5x LilyPad LED Rot groß
5x LilyPad LED Rosa groß
5x LilyPad LED Lila groß

5x LilyPad LED Blau klein
5x LilyPad LED Gelb klein
5x LilyPad LED Grün klein
5x LilyPad LED Rot klein

1x RGB LED

1x Temperatursensor

1x FTDI Breakout Board

2x Drucksensor

1x USB-Kabel
2x Flexsensor
1x Breadboard
1x Breadboard Verbinder
10x Krokodilklemmen

1x Lichtsensor

1x Beschleunigungssensor

1x Lautsprecher
1x Vibrationsmotor

5x Magnetic Snap

1x Polyester Nähgarn schwarz
2x Nähnadel
1x Nadeleinfädler

Arduino: Useful Links and References

Arduino IDE Download

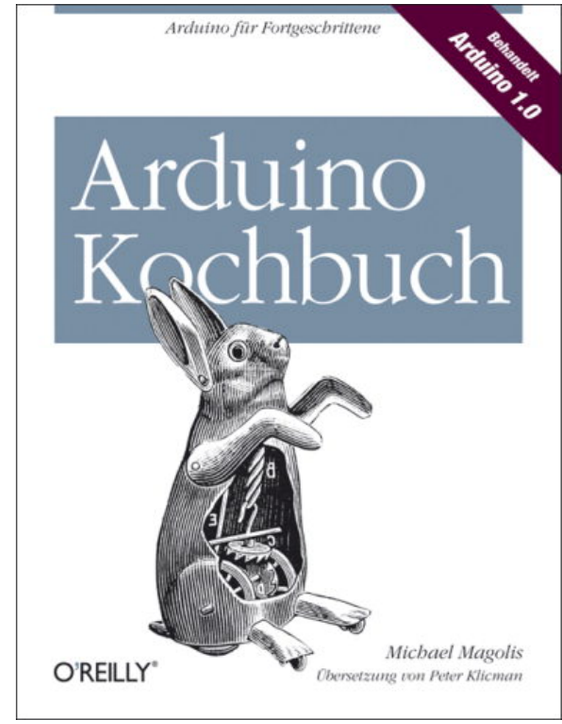
- http://www.arduino.cc/en/Main/Software

Arduino Tutorials and Code

- http://www.arduino.cc/en/Tutorial/HomePage
- http://www.ladyada.net/learn/arduino/
- http://www.arduino-tutorial.de/grundlagen/
- http://web.media.mit.edu/~leah/LilyPad/index.html
- http://www.freeduino.org/

Books

- Bartmann, E.: „Die elektronische Welt mit Arduino entdecken“, O‘Reilly, 2011
- Margolis, M.: „Arduino Kochbuch“, O‘Reilly, 2012



And many videos on YouTube

Bluetooth Heartrate Sensor

Zephyr HxM BT Heartrate Sensor

- Measures the heartrate
- Transmits it via Bluetooth to e.g. a mobile phone, laptop or Arduino
- Open protocol specification

Availability and restrictions

- Free during the term

More info

- http://www.zephyr-technology.com/consumer-hxm
- benjamin.poppinga@offis.de

SHIMMER 9DoF Sensor

9 DoF Sensor, Bluetooth

- 8 MHz CPU, 48KByte Flash
- Magnetometer, Gyro, and Accelerometer
- Open source firmware (based on Tiny OS)
- Default firmware: Open Bluetooth Protocol Spec.

Availability and restrictions

- Free during the term

More info

- http://www.shimmer-research.com
- benjamin.poppinga@offis.de

SHIMMER GSR Sensor

GSR Sensor, Bluetooth

- 8 MHz CPU, 48KByte Flash
- Galvanic Skin Response
- Open source firmware (based on Tiny OS)
- Default firmware: Open Bluetooth Protocol Spec.

Availability and restrictions

- Free during the term

More info

- http://www.shimmer-research.com
- benjamin.poppinga@offis.de

Microsoft Kinect for Windows

Laser scanner

- Scan 3D Models
- Track movements
- Touch-free input device

Availability and restrictions

- Free during the term

More info

- http://www.microsoft.com/en-us/kinectforwindowsdev/start.aspx
- http://openkinect.org/wiki/Main_Page
- torben.wallbaum@offis.de

You want more?

Additional HW needed for particular topics will be provided

Further things can be ordered – Please ask

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FabLab

Makerbot Digitizer

Laser scanner

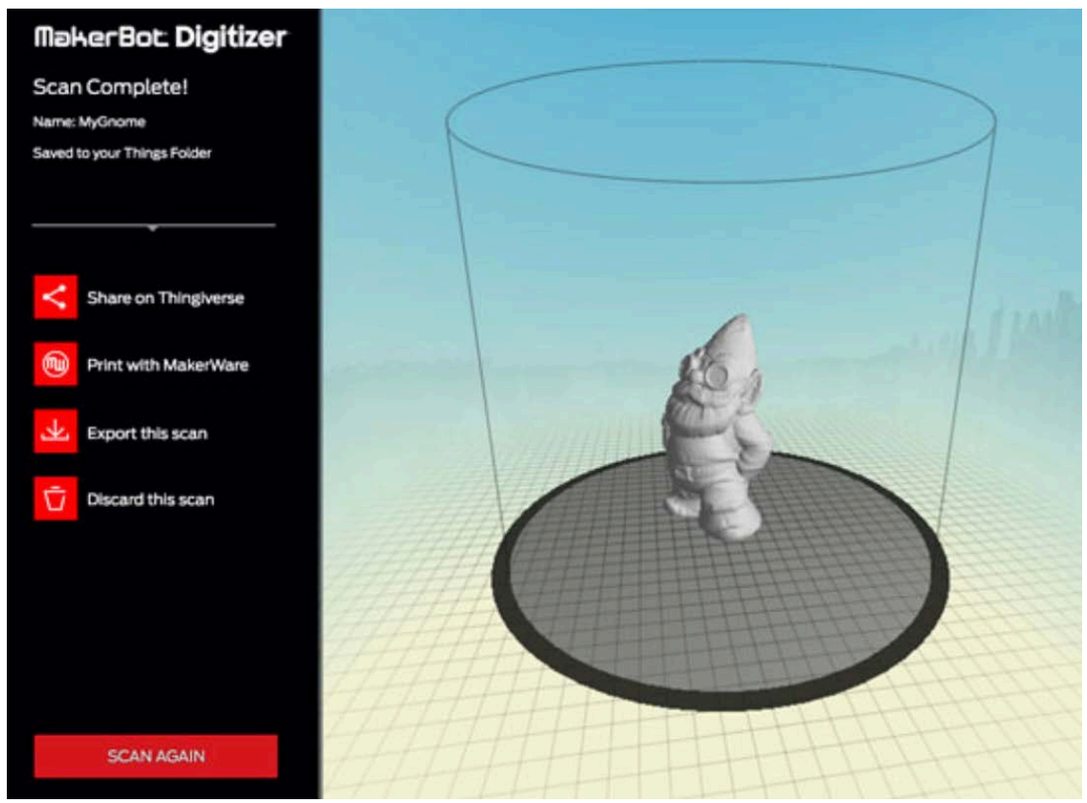
- Make 3D models from existing things
- Turntable, Laser, and Camera
- Needs extensive calibration
- Accuracy is just OK

Availability and restrictions

- Free during the term

More info

- http://www.makerbot.com/
- benjamin.poppinga@offis.de



Lasercutter

Cut or engrave various materials with laser

- Organic materials: Acrylic glass, wood, laminate, etc.
- 3D Shapes only with advanced techniques
  - Slicing, Kerfing, LaserOrigami

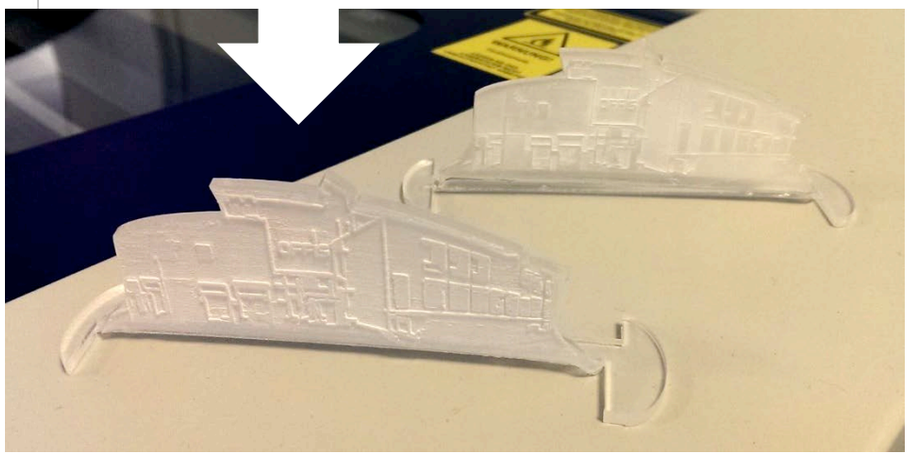
Availability and restrictions

- Available at predefined time-slots

More info

- http://www.thingiverse.com/andyLo/collections/lasercutting/
- http://www.instructables.com/id/How-to-Use-a-Laser-Cutter/
- andreas.loecken@offis.de, benjamin.poppinga@offis.de

0. black (engrave, use printjob without color settings):
1. green (cut)
2. yellow (cut out of focus)
3. red (cut the rest)



3D-Printer

Print 3D-objects

- Melted filament is added in layers
- No structural support for freely hanging structures

Availability and restrictions

- Available at predefined time-slots

More info

- http://www.thingiverse.com/search/page:1?q=cubex&sa=
- http://www.instructables.com/tag/type-id/category-technology/channel-3D-Printing/
- heiko.mueller@offis.de