INTRODUCTION

• Target :
Propose a visual guide of the different steps to build and use a µdelta printer

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• Sources :
http://reprap.org/wiki/reprap
http://www.repetier.com/

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• Links :
You can find more informations on the following links :
RepRap community : http://reprap.org/wiki/reprap
Repetier-Host software : http://www.repetier.com/
3D models database : http://www.thingiverse.com/
µdelta is developed by eMotion Tech. This new 3D printer is easy to assemble and to operate without loss of performances.

Data sheet:

- Printing surface Ø110x190mm
- Layer height [0.1-0.35]
- Electronic type Teesylu + 4 Stepsticks (integrated firmware)
- Motor NEMA 17
- Belt type GT2
- Extrusion Head Hexagon 0.4
- Dimensions : Height 440mm, Width 250mm, Depth 250mm
- Nominal printing speed 70mm/s
- Max speed : 200mm/s
- Nominal speed : 130mm/s
- Average precision (X,Y) 100 microns
- Average precision (Z) 50 microns
- Operating system Windows XP, Vista, 7, 8, Ubuntu 12+
- Consumable PLA 1.75mm (or ABS and others plastics with heated bed option)
- Provided with Repetier preset for µdelta
- Connectivity USB
- Power supply provided, 12V, 120W

STRUCTURE
- Lasercut Acrylic 5mm
- Extruder core printed in ABS 0.2mm
- Smooth rod 8mm
- Manufactured plate plywood 12mm

ERGONOMY
- Easy to mount : A 3D printer kit with an intuitive assembly
- Simple electronic, no soldering
- Easy wiring and assembly
- Belt adjustment with ergonomic belt tensioners
- Easy to calibrate : A simplified software
- Fully software calibration
- Pre-configured open-source software (no firmware upload required, Repetier Host and Slic3r pre-configured)
- Easy to maintain
- Quick height adjustment with the software
- Easy to reload the filament
OPTIMISATION AND UPGRADE (Options and Développements soon available)

You can improve the µdelta by adding the following options

• Spool holder with fan
• LCD screen controller to print without computer
• Lighting with circular LED
• Heated bed

SAFETY INSTRUCTIONS

General safety instructions

NEVER LEAVE THE PRINTER WORKING WITHOUT SUPERVISOR.

The nozzle can reach 270°C, to avoid burning, do not touch the nozzle while the printer is working.

A supervisor is needed when the printer is used with young people.

KEEP PRINTER AWAY FROM CHILDREN AND ANIMALS

Operate un a ventilated room. Plastic fumes effects are not known. In case of use in a closed rom, we recommend the use of an extractor fan.

The addition of protections is your own responsibility. Safety can be improved by:

• An emergency stop button
• Housing protection
• Smoke detector

CE marking

µdelta is a 3D printed kit. It includes all the parts you need for assembling but does not include additional protections.

Electrical safety

The power supply provided is labelled CE. The power supply is protected against short-circuit and do not need any modifications.

µdelta operate at voltage of 12V and is not concerned by the low voltage directive.

Further informations

Information above are not exhaustive.

We used sources of informations we consider as reliable. However, we cannot guarantee that all these information are true and complete.

We assume no liability for loses, injuries or damages due to assembly, transporting, storage or removal of the product.
BILL OF MATERIALS

A. Printed parts

- 1x Core
- 1x Filament Guide

B. Acrylic parts

- 6x eM 1
- 6x eM 2
- 6x eM 3
- 6x eM 4
- 6x eM 5
- 6x eM 14

Acrylic parts can be covered with protection and it may remain pieces of plastic. Remove it before use.

We provide additional parts.
C. Smooth rods and connecting rods

6x Ø8x400 Smooth rod
6x Connecting rod
3x Ø8x400 Bearing
1x Drive wheel

D. Mechanical parts

9x Linear bearing
1x Spring
3x GT2 Pulley
3x GT2 Belt

E. Screws, nuts and washers

6x M2.5x16 screw
1x M3x12 screw
12x M3x20 screw
4x M3x25 screw
3x M3x30 screw
10x M3x50 screw
16x M4x25 screw
1x M4x50 screw
12x M5x30 screw
3x Wood screw

6x M2.5 Nut
3x M3 Wing Nut
32x M3 Nut
20x M4 Nut
12x M5 Nut
1x M5 Nylstop Nut
4x M3x3 Grub Screw

45x Ø3 Washer
19x Ø4 Washer
4x Ø4 Big washer

F. Electronic

1x Teensylu
4x Nema 17 motor
3x Endstop
2x 3x3 Fan
4x Stepstick
1x Power supply
1x USB Link

G. Others

1x Superior frame
1x Inferior frame
1x Print bed
1x Ø4xM6 Pneufit
1x Ø4x1/8" Pneufit
1x PTFE tube
3x motor Bracket
6x Shaft Support
1x Braided sleeve
30x Zip 9e
3x Pad
1x Adhesive tape
H. Hexagon Kit

1x Hexagon hot end
1x Cartridge heater
1x Thermistor
1x Allen key 3
1x Wrench 4.5

I. Options

1x Heated bed and thermistor
3x Idler
1x Tube
1x tube holder
1x Polymide tape

HEATED BED KIT

1x Spool holder frame
3x Spool blocks
1x 60x60 Fan
3x 624 Bearing
3x M4x20 Screw
3x M4 Nut
3x Ø4 Washer

SPOOL HOLDER KIT

1x LED ring

LED KIT
ASSEMBLY

MECHANICAL ASSEMBLY

TOOLS

• Mallet
• Slot screwdriver
• Philips screwdriver
• Wrench 5.5 et 7
• Allen key (fournis)
• Long nose pliers
• Cutting pliers
• Utility knife
• Meter
1. Use a mallet to insert completely the rod without exceeding the plate.

2. Smooth rods must be normal to the inferior frame.

- Wood screw (x3)

- M3 nut tighten against the frame

- Repeat this operation for each corners.
Caution: for this step, take care of the orientation of the tensioner.

Acrylic parts can be covered with protection and it may remain pieces of plastic, remove it before use.

Tighten nuts moderately to avoid breaking acrylic parts.

Tighten against the washer.
Caution: Assemble all sliders in the same way.

Repeat this operation for the others tensioners.
**Notes**:
- After tightening screw, eM 3 parts may move, it is not a problem.
- The 4 fixations must be on the same side than the 2 linear bearings.
- Insert a zip tie in each holes, tighten the zip ties to fasten the slider.

**Version 1.4**

- Hole for belt
- Linear bearings
- Holes for belt

**Linear bearings**
- This bearing must not exceed the slider.
- The 4 fixations must be on the same side than the 2 linear bearings.
- Tighten moderately.
Shaft Support

Take care of the way of shafts supports

Note: Do not tighten

Assemble the endstop as it's show on the figure

Note: To improve the visibility, endstops wires were not represented

M2.5 nut

Endstop

M2.5x16 Screw

Visible side

Hidden side

eM 14

Small side

Big side
Take care to assemble the frame correctly.

- **Filament Guide**: The side with the big hole is the upper side.
- **Ø4x1/8" pneufit**: Must be normal to the frame.

Put the endstop wires before the motors brackets.

- **M4x25 Screw**
- **Endstop wire**
- **Ø4 washer**
- **M4 Nut**
**MECHANICAL ASSEMBLY**

**Note:** Use the Allen key given in the kit to tighten the pulley.

1. **Motor pulley**
   - Position the pulley at 3mm from the end of the motor axe.

2. **Motor**
   - Motor wire must be on the side.
   - Tighten moderately.

**Components:**
- M3x12 Screw
- M3 Washer
- Grub screw
- M5x30 Screw
- M5 Nut
Caution: the distance must be the same for each smooth rod.

Distance between the bottom of the bottom frame and the top of the top frame: 39.8 cm

Tighten

Teeth in the direction of the pulleys

Belt

Zip tie

Position the zip tie as close as possible to the slider.
Make sure the belt is slightly tight when the tensioner is on the top of the screw.

Tighten the nut to tighten the belt. The belt does not have to be too tight to avoid deformation.

M3x50 Screw

Tensioner

Zip tie

Wing nut

Ø3 Washer
Position the M4 nut of the M3x50 screw between the two eM8.
- Position the M3 nut into the eM8 "back".
- Position the hollow of the drive wheel in front of the eM9.

* A wrench can be printed to simplify the tightening (available on our download center).

The M3 Screw have to be tightened but the assembly should rotate.
1. Use a screwdriver to make it easier.

2. Untighten the central pipe.

3. Tighten moderately.
1. Tighten the nozzle
   - Key 7 (not provided)
   - Use a screwdriver to make it easier

2. Tighten the central pipe
   - Key provided
   - It must not have space between the head and the nozzle

1. Key provided

2. Hole for thermistor

Insert the resistor
- Wires must be on the same side than the thermistor hole

Tighten with a M3 grub screw
Unscrew the filament guide.

Fasten the cables to the hot end with zip tie. The zip tie must be positioned around the Hexagon. Don’t position it too tight on the hexagon.

Caution! If the thermistor goes out of the hot end, your printer could be damaged.

Polyimide can be used to maintain the thermistor (optional).

* For printing ABS with heated bed option, protect your heater block with polyimide.
Make sure the core is free of impurities.

Put the cables through the wire hole.

Position the Hexagon against the core before screwing.

Tighten M3x20 screw.

Hole for wires

Hole for Zip tie
The side with the sticker must be oriented toward the hotend.

Fan
Ø3 Washer
M3x20 Screw

Tighten moderately

Note: Check this nut is tightened

M3 Nut
Tighten firmly

M3x50 Screw
Connecting Rod
Caution: The assembly must not twist the slider.

ø3 Washer
M3 Nut
M3 Nut

ø3 Washer
M3 Nut
M3 Nut

ø3 Washer
M3 Nut
Connecting rod
M3x50 Screw

Repeat the operation with the others sides
Push the cables and the PTFE tube through the braided sleeve. PTFE tube length must be 35cm.

Fasten the cables with zip ties if needed.
Stick the three pads under the inferior frame.

Zip tie

Braided sleeve
Pay attention to the teensylu orientation

M3x25 Screw
Ø3 Washer
M3 Nut
Tighten moderately

Motor 1
Motor 2
Motor 3
Extruder
Motor
Endstop
Power supply
Motor
Heated bed (option)
Cartridge heater
Thermistor
Fan
Ventilateur
USB
1. Make sure that you have 12 jumpers connected to the teensy4.

2. Plug the stepstick according to the illustration.

3. Make sure the flat is positioned as shown in the image.

Be careful: The orientation is very important! (A wrong connection of the stepstick could cause permanent damage)

Endstops
- Plug the endstops
- The endstops can be plugged in only one orientation
- Plug the motors
  - The motors can be plugged in only one orientation

Screw the cables of the cartridge heater
There is no specific way, don’t forget to denude it

Plug the fans
There is no specific way
CONGRATULATION!
You’re printer is now operationnal
HEATED BED
1. Hardware update

Kit:
- 1x Adhesif heat patch
- 3x Idler
- 1x Tube
- 1x Tube mount
- 1x Polyimide tape

Prerequisite, you need an operational 3D printer

1. Remove the adhesif protection

2. Patch the heatbed in the center of the aluminium sheet. Place the wire output close to one hole.
Place the idler and align all holes.

Wire pass-trough holes.

Heat patch under.

Wood screw.

Aluminium sheet.

Idler.

Tube mount.

Wood screw.

Tube.
2. Software update

Prerequrement:

- Computer with window 7+ (others OS coming soon)
- Download and install the Serial_install.exe from our download center on our website

Where download:

- All files can be found on our download center or on our github

1/ Download the Manual_update_vx_xx.zip
2/ Unzip the file and open the folder
3/ Run the batch script .bat
Choose the Firmware

Choose the firmware n°2, head bed without LCD

Press 2, and enter

Select the programming mode

1/ Remove the jumper

2/ Press the reset button

Please wait patiently before your computer detects and installs the new COM port.
Press Enter key and check your COM port name:

Ports are detected here

Note: Usually, the COM1 is your internal modem device, COM1 might not be the right port.

Type your COM port name (COM26 in our case) then press Enter key.

Caution: the syntax have to be perfect, ex: COM2

Your screen will be filled with the hexadecimal data transfer.
Final screen:

Leave the programming mode:

1/ Set up the jumper back in place

2/ Press the reset button

Your printer is now ready to print with the heated bed!

Thank you to choose the µdelta