



INTRODUCTION



INTRODUCTION

• Target :

Prupose a visual guide of the differents steps to build and use a $\ensuremath{\mu}\ensuremath{\mathsf{d}}\xspace$ printer

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• Sources :

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

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• Update :

Last Update : 03/12/2014

• Links:

You can found 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/





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µDELTA INTRODUCTION

µdelta is developed by eMotion Tech. This new 3D printer is easy to assemble and to operate without loss of performances.

Data sheet :

DATAS

- 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 opton)
- · Provied 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 adjustement with the software
- · Easy to reload the filament

Version 1.4



OPTIMISATION AND UPGRADE (Options and Développements soon avalaible)

You can improve the μ delta 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 CHILDRN AND ANIMALS

Operate un a ventilated room. Plastic fumes effets 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. The μ delta 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.



ASSEMBLY



BILL OF MATERIALS

A. Printed parts





C. Smooth rods and connecting rods









9x Linear bearing



3x GT2 Pulley



3x GT2 Belt



6x Connecting rod



3x 624 Bearing 1x 604 Bearing

1x Drive wheel



E. Screws, nuts and washers



6x M2.5x16 screw 15x 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





1x M3 Nylstop Nut

6x M2.5 Nut

32x M3 Nut

20x M4 Nut

12x M5 Nut

3x M3 Wing Nut



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



4x M3x3 Grub Screw





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F. Electronic





4x Nema 17 motor



3x Endstop



2x 3x3 Fan



4x Stepstick



1x Power supply 1x USB Link

G. Others

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H. Hexagon Kit











1x Hexagon hot end

1x Cartridge heater

1x Thermistor

1x Allen key 3

1x Wrench 4.5



I. Options





TOOLS

- Mallet
- Slot screwdriver
- Philips screwdriver
- Wrench 5.5 et 7
- Allen key (fournie)
- Long nose pliers
- Cutting pliers
- Utility knife
- Meter



MECHANICAL ASSEMBLY









- Repeat this operation for each corners



Inside the µdelta



Outside the µdelta







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



1



Tighten nuts moderately to avoid breaking acrylic parts



2

3









Repeat this operation for the others tensioners

Inside the µdelta

<u>_</u> 0

Outside the µdelta





Caution : Assemble all sliders in the same way.





Note : After tightening screw, eM 3 parts may move, it is not a problem



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Insert a zip tie in each holes, tighten the zip ties to fasten the slider





Take care of the way of shafts supports

Note : Do not tighten







Back









Put the endstop wires before the motors brackets







Take care of the way of the pulley Position the pulley at 3mm from the end of the motor axe





Motor wire

Motor wire must be on the side



 $\left(1\right)$















Teeth in the direction of the pulleys



1

2 \bigcirc Ê 5 \triangleleft \frown R









The belt don't have to be too tight to avoid deformation









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 Tighten the nozzle
 Tighten the central pipe

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Tighten with a M3 grub screw





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



2

Fasten the cables to the hot

The zip tie must be positioned around the Hexagon

Don't position it to hight on the hexagon

Poliymide can be used to maintain the thermistor (optional)

* For printing ABS with heated bed option, protect you're heater bllock with polyimide



Unscrew the filament guide













 \bigcirc

M3x20 screw



1

Position the Hexagon against the core before screwing

3

Tighten

0



The side with the sticker must be oriented toward the hotend







Note : Check this nut is tighten







Caution : The assembly must not twist the slider.

eM 5 must remain parallel

BOC



3





















ELECTRONIC ASSEMBLY









Version 1.4





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





- 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 thermistor There is no specific way



There is no specific way



CONGRATULATION ! You're printer is now operationnal





ADD-ONS



HEATED BED

1. Hardware update

Kit :



Prerequirement, you need an operational 3D printer



0

Remove the adhesif protection

6

2

0

0

Patch the heatbed in the center of the aluminium sheet. Place the wire output close to one hole.

1

















2. Software update

Prerequirement :

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

Name	Date modified	Туре	Size
Irmwares_emt	16/10/2014 16:58	File folder	
avrdude.conf	22/09/2014 17:53	CONF File	538 KB
avrdude.exe	22/09/2014 17:10	Application	502 KB
ibusb0.dll	08/11/2011 21:19	DLL File	43 KB
🚳 manual_update.bat	29/10/2014 18:25	Windows Batch File	2 KB

3/ Run the batch script .bat







Select the programming mode



Please wait patiently before you computer detect and install the new COM port

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Press Enter key and check your COM port name :



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



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

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

Your screen will be filled with the hexadecimal data transfer

C:\Windows\sy	stem32\cmd.exe		
Remove the ju it will switc //fr: Enlevez Press any key ====================================	Imper close to the main chip ar ch to programming mode c le cavalier proche de la teer y to continue -PORT SCANNER===================================	nd press reset on your boar nsylu et appuyez sur le bou	d, ton Reset ≡
CAUTION? Writ umber fr: ECRIVEZ U PORT: COM26	ce down your portname using the JOTRE PORT SOUS LA FORME "COMX"	e format "COMX" where X is " X etant le numero de port	your port n
avrdude.exe:	Version 5.11, compiled on Sep Copyright (c) 2000-2005 Brian Copyright (c) 2007-2009 Joerg	2 2011 at 19:38:36 Dean, http://www.bdmicro.co Wunsch	om/
al_Update_v1.	System wide configuration file .0\avrdude.conf"	e is "C:\Users\ghunt\Deskto	p∖demo∖Manu
	Using Port Using Programmer Overriding Baud Rate	: \\.\COM26 : avr109 : 115200	





Final screen :

🔤 C:\Windows\system32\cmd.exe	x
avrdude.exe: safemode: hfuse reads as DB	
avrdude.exe: Send: 4 [51]	
avrauae.exe: xecv: . [10]	
avruuue.exe. saremoue reau 1, eruse value. ro	
aurdude exe: Beru: [f0]	
auvdude eye: safemode pead 2 efuse value: f0	
aurduide exe: Send: Q [51]	
avrdude.exe: Becv: . [f0]	
avrdude.exe: safemode read 3. efuse value: f0	
avrdude.exe: safemode: efuse reads as F0	
avrdude.exe: safemode: Fuses OK	
avrdude.exe: Send: L [4c]	
avrdude.exe: Recy: _ [0d]	
avrdude.exe: Send: E [45]	
avrdude.exe: Recv: . [Ød]	
avrdude.exe done. Thank you.	
894 894	
\mathbf{P} = \mathbf	10
13. Do not forget to restore the Jumper and press reset to switch to normal mot	16
PS: //fr: oubliez has de remettre le caualier et rannuer sur reset	
Fridult	=
Press any key to continue	-

Leave the programming mode :

1/ Set up the jumper back in place



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





Thank you to choose the µdelta