Repetier™ firmware

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Disclaimer

The information provided into this booklet is provided "as-is" and proved to be exact as supplied with 3ntr A4 printers.

Up to date with Repetier Firmware version 0.83

Values depicted and other settings are just for explanations: your setup may differ (polymer make, color, precision needed) .

In no case Jdeal-Form srl will be liable for any money loss deriving from the reading of this booklet

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www.repetier.com !

If you use Repetier firmware in a professional setting, please donate:

http://www.repetier.com/donate-or-support/

If you are looking for a professional-level printer, visit

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1. Main lcd screens

At startup, the display shows following data :

```
@125.3/200°B: 59/
60'
Z: 15.00
Mul :100    Buf:30
Idle
```

The first line shows current extruder temperature (125.3°) and setpoint (200°), then heated bed current temperature (59) and setpoint (60°).

The second line shows current Z position (15.00).

The third line shows current speed multiplier (100) as percentage of programmed speed*and buffer capacity (30) expressed as moves buffered.

The fourth line tells the current machine status (Idle).

Moving the jogwheel, you can display another page, showing the current extruder position:

```
X: 12.34 mm
Y:  5.50 mm
Z: 15.00 mm
Idle
```

Further scrolling with the jogwheel you will get to heater value/setting/power positions:

```
E1:125.3/200°C> 100%
E2: 25.1/ 20°C>   0%
B:  59.0/ 60°C> 90%
Idle
```

For each extruder (E1 and E2) you can read the current temperature, the setpoint and the power output expressed as percentage.
Same for heated bed (B).

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2. Main LCD menu

Pushing the black button in any of the main LCD screens you are presented with the main menu structure:

```
>Back ^
 Quick settings    >
 Position          >
 Extruder          >
 Fan speed         >
 SD Card           >
 Debugging         >
 Configuration     >
```

Pushing the black button again will get you back to the main LCD screens.
Scrolling the ">" symbol on requested item and pressing the black button will activate the requested item menu.

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3. Main->Quick settings

```
>Back  ^
 Home all
 Preheat PLA
 Preheat ABS
 Speed Mul.:100%
 Flow Mul. :100%
 Cooldown
 Set to origin
 Disable stepper
```

Home all

will move all axes to homing positions.

Warning: be sure start this command when printing area is empty !

Preheat PLA

will set extruder1 to 190° C and heated bed to 60°C (default values may be changed when reflashing firmware).

Preheat ABS

will set extruder1 to 240°C and heated bed to 110°C (default values may be changed when reflashing firmware).

Speed Mul.

When printing, will let you override programmed feed rates.

Warning: you may actually cause filament jams if you set speed too high for extruder to bear.

Flow mul.

When printing, will let you override programmed filament feed.

It is useful when researching correct flow rates.

Warning: you may actually cause filament jams if you set flowrate too high for extruder to bear.

Cooldown

Bring extruder to cooldown temperature

Disable stepper

Power off all axes, letting user move them by hand.

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4.Main->Position

```
>Back  ^
 Home all
 Home X
 Home Y
 Home Z
 X Pos. Fast      >
 X Position       >
 Y Pos. Fast      >
 Y Position       >
 Z Pos. Fast      >
 Estr. Position   >
```

Home all

will move all axes to homing positions.

Warning: be sure start this command when printing area is empty !

Home X / Home Y / Home Z

Will move selected axis to the home position.

X / Y / Z Pos. Fast

with this option useer can move the selected axis at fast rate: each turn of the jogwheel equals 10mm approx. movement.

X / Y / Z Position

this option makes precise movements: each turn of the jogwheel equals 1mm approx movement

Estr. Position

This option lets you jog the filament feed : be sure to use it when extruder is heated at correct setting ! Also, excessive retraction may cause filament jams with some polymers.

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5.Main->Extruder

```
>Back  ^
 Bed Temp.: 60°C
 Temp. 0  :200°C
 Temp. 1  : 30°C
 Extruder 0 OFF
 Extruder 1 OFF
 o Select Extr.0
 o Select Extr.1
 Extr.position   →
 Set origin
```

Bed Temp

This option will let you override the heated bed temperature

Temp.0 / 1

This option lets you override extruder temperature settings

Extruder 0/1 OFF

To turn off desired extruder (temperature is immediately set to 0)

Select Extr.0/1

Lets you select the extruder that you will move with the next option
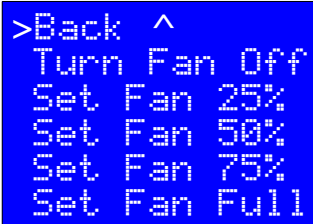
Extr.position

This option lets you jog the filament feed : be sure to use it when extruder is heated at correct setting !

Excessive retraction may cause filament jams with some polymers.

Set origin

Will reset the extruder feed position counter.

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6. Main->Fan speed

```
>Back  ^
 Turn Fan Off
 Set Fan 25%
 Set Fan 50%
 Set Fan 75%
 Set Fan Full
```

Turn fan off

Shuts down the printing area fan

Set fan 25%-50%-75%-Full

Sets the print area fan speed.

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7. Main->SD Card

```
>Back  ^
 Print file
 Pause Print
 Continue Print
 Unmount Card
 Mount Card
 Delete file
```

Print file

Selecting this option, you will be shown the list of files available on the printer SD card: you can browse and select the file name to print (or hit Back to abort the selection process).

The selected file name will be run immediately.

Pause Print

To temporary stop the printing process.

Depending on your local host/printer setting, you may want to reduce the time the printer is paused to avoid oozing (extruder dripping polymer on your print).

Continue Print

To resume the paused printing process

Unmount Card

Before removing the card from the printer, you need to gracefully close the file management.

Mount Card

If you insert a new card, the printer needs to scan the newly added archive. Failing to use this command you couldn't be able to browse the files available on the memory card

Delete file

To permanently remove files from the memory card

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8. Main->Debugging

```
>Back  ^
 Echo    :Off
 Info    :On
 Errors :On
 Dry run:Off
```

Echo

Will enable sending to host (you PC connected to the printer) feedback about the command received

Usually this option is left off (to avoid wasting communication time)

Info

Will send to host (you PC connected to the printer) diagnostic messages.

Error

Will send to host (you PC connected to the printer) error messages.

Dry run

Will ignore any extrusion command: useful to test program movements without actually wasting polymer.

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9. Main->Configuration

```
>Back  ^
 General         -->
 Acceleration    -->
 Feedrate        -->
 Extruder        -->
 Store to EEPROM
 Read f. EEPROM
```

Be careful with this menu: here you can alter values that could prevent you from being able to use your printer!

Moral: be sure to know what you are doing: write down previous values when you attempt new ones!

It is wise to always write down the actual values you are going to change, to let you regain control if something goes wrong!

Also, changing parameters while printer is running a job may bring unpredictable results.

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10. Main->Configuration->General

```
>Back  ^
 Baudrate:250000
 Stepper inactive->
 Max.Inactive    ->
```

Baudrate

Sets the speed used to talk with the PC: this value must match the one set on your PC host software!

Stepper inactive

Sets the stepper motors inactivity timer: after chosen time, the motors will be powered off and axes position won't be held anymore. Setting to zero disables it (motor will be always powered)

Default is two minutes (120 sec) You set this value to avoid unneeded wast of power after finishing an unattended print.

Max inactive

Sets the system inactivity timer: after chosen time the extruders and heated bed are turned off.

Default is zero (disabled). The heating strategy is set with Gcode (printing files).

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11. Main->Configuration->Acceleration

```
>Back  ^
 Print X:  2000
 Print Y:  2000
 Print Z:    10
 Move  X:  4000
 Move  Y:  4000
 Move  Z:    20
 Jerk   :  30.0
 Z-Jerk :   0.5
```

What is acceleration ?

It is the times it takes to change from zero to the desired speed, and it is expressed as mm/sec squared.

With higher acceleration rates:

- *machine runs faster*

- *corner are printed sharper*

- *more noise*

- *drives and controller electronics run hotter*

- *possibility of loosing steps (positional accuracy) is increased*

- *Machine hardware is more prone to vibration (and the possibility of loosened screws is increased)*

With lower acceleration rates:

- *machine runs slower*

- *corner are rounder*

- *quieter printing*

- *more precision, as machine runs cooler and there are less chances of missing steps*

Print X/Y/Z

Changes the acceleration rate used when printing (units are mm/sec*2)

Too low values won't let your machine reach the maximum speed.

Too high values may ask for acceleration too fast for the machine hardware (loosing steps or overheating)

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Move X/Y/Z

Changes the acceleration rate used when moving (units are mm/sec*2).

Too low values won't let your machine reach the maximum speed.

Too high values may ask for acceleration too fast for the machine hardware (loosing steps or overheating)

Jerk

It is a value that sets the "joining speed" of consecutive segments.

Higher values give you faster speeds and nicer corners (but higher noise and possibly lost steps)

Lower values give longer prints and smoother movements (quieter and definitely more precise prints)

Z-Jerk

It accounts for Z movement inversion.

Usually is best left at less-than-one values.

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12. Main->Configuration->Feedrate

```
>Back  ^
 Max X:    400
 Max Y:    400
 Max Z:     20
 Home X:    60
 Home Y:    60
 Home Z:     5
```

What is feedrate?

It is the axis speed, expressed as mm/sec.

Max X/Y/Z

The maximum speed your system may tolerate: any faster rate from printing instruction will be limited at those values.

If set too high you may experience lost steps (loose precision!)

Home X/Y/Z

The speed you want to use when seeking the home limit switches.

Usually, slower speed allow for better precision, especially if the electronics are somewhat slow-performing.

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13. Main->Configuration->Extruder

```
>Back ^
 o Select Extr.0
 o Select Extr.1
 X-Offset:    0,000
 Y-Offset:    0,000
 Steps/MM:280,0
 Start/FR:     5
 Max FR: 3000
 Accel: 6000
 Stab.Time:    1
 Wait Units:   0 mm
 Wait Temp.   150°C
 Advance lin:   0
 Control:PID
 PID P:    5,45
 PID I:    0,85
 PID D:   65,44
 Drive Min: 50
 Drive Max:200
 PID MAX:255
```

Select Extr.0/1

Lets you select the extruder whose parameter are displayed below.

X/Y-Offset

It is expressed as X and Y steps (therefore refer to your machine data sheet before attempting to change those valuse) : for example, if you want an X offset of 24mm and your X axis needs 100 steps/mm you must enter "2400".

The offset is needed when dealing with multimaterial prints: the printer needs to know what is the offset between nozzles to correctly align the prints.

Usually the offsets for extruder #0 are set to zero values.

Steps/MM

How many steps are needed to feed one mm of filament.

Start/FR

Minimum feedrate (mm/minute) for the extruder motor

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Max/FR

Maximum feedrate (mm/minute) for the extruder motor

Acceleration

Acceleration (mm/sec2) for the extruder motor

Stab.Time

Time to wait (in seconds) when temperature is reached, to let system settle, before starting the printing process

Wait units

How much filament must be retracted when heating up.

Wait temp

Automatic retraction (when waiting) will be performed after reaching this temperature

Advance lin.

Enable the advance linear trajectory algorithm. Usually best if left disabled.

Control: PID

This option lets you choose between PID and BANGBANG heating strategy.

The PID lets you precisely tune the heating strategy, but can be overwhelming for novices and usually cannot be used with traditional relay devices (the PID process may ask for tens or hundred on-off cycles per minute, easily burning any relay... use this strategy ONLY if you have SCR or solid-state relays)

The BANGBANG is simply ON until temperature is below the set limit, and OFF when temperature is reached. Usually this strategy is recommended for heated beds.

PID P/I/D

The parameter that set the rules for the PID heater.

Usually all you need to do is sending the "M303 Px Syyy" to the printer (where x stands for the extruder # and yyy the desired working temperature), then copying the found values into those fields.

Why one should perform the PID autotuning (aka "M303....")?

- Usually if you always worked with PLA and suddenly decide to move to a much higher melting point polymer, you may experience a bit less precise temperature readings... if you can live with this, no problem. If you want topmost precision, then you know what to do.

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- If you changed the heating cartridge or the temperature probe, chances are you modified a bit the heating tranfer mechanism: doing a PID autotuning may give you a better knowledge of the situation.

Important: the M303 doesn't change the printer setting, it is up to you to put the found value in the P/I/D register and save them in the EEPROM.

Drive Min

Sets the minimum I-drive value (the "I" in PID). Usually left low enough to allow for cooling phase (value range 0..255)

Drive Max

Sets the maximum I-drive value (the "I" in PID). Usually left high enough to reach desired temperature (value range 0..255)

PID Max

Set the maximum voltage you can send to your heater (0..255).

If your heater is rated at same voltage of your power supply, let the value at 255.

If your heater is rated at a fraction of your power supply (i.e.: 12V heater with a 24V power supply) you should start with values around ¼ of full setting (64) and slowly increase until you are satisfied with your PID behavior. Do note that PID should be re-tuned each time you change PID_Max.

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Main->Configuration->Store to EEPROM

You choose this option when you have changed some configuration parameter and you are fully satisfied with the results: writing the value into EEPROMwill make sure that next time you will turn on printer it will start with new settings.

Main->Configuration->Read f. EEPROM

Use this option to overwrite current machine setup with last saved settings.

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Don't be an obsessive printer and polluter:

-Don't print this manual, rather keep it as a PDF file on your PC / Laptop / Pad / E-reader / Smartphone / Clock / brain implant ROM / ….   Conserve trees, energy and paper!

-ANY plastic is an environmental costly medium. Therefore think twice before printing yet another yoda™ that nobody will really need.

-Infill (how much dense is the inside of your models) will add cost and time to your prints. Usually 20% is enough for 80% of prints.

-Any polymer will pollute (yes, even PLA) when melted.

- Volatile compounds will develop, especially with darker shades of color.

- Don't use your printed in a small un-vented closet.

- Keep an open window when printing (especially when using higher melting points products).

- Enclose your printer in a box, to confine smoke.

- Recycle your scrapped prints and rafts!

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