3D printing

Notes related to 3D printing.

- Creality Ender 3 Pro
  - Creality Ender 3 Pro - START & END gcode for Cura
  - Creality Ender 3 Pro - My setup

Creality Ender 3 Pro

Creality Ender 3 Pro - START & END gcode for Cura

These are my custom start and end gcodes **for Cura slicer** to be used with the **Creality Ender 3 Pro** with BLTouch/3DTouch installed.

Why this and not some other custom gcode I found on Reddit?

Well, that's what I was using for a long time, but I wanted to address some isues:

- ☑ heat up the printer as quickly as possible
- ☑ don't heat up the extruder all the way until just before nozzle priming (to prevent oozing from the nozzle during auto bed leveling, which takes 60 seconds)
- ☑ print quick and efficient, Prusa-like, priming line of filament
- ☑ after finishing the print, retracting the filament plenty back so that I can change it while the printer is cold, if need be.
- ☑ present finished print ASAP

It does all of this somewhat nicely, took me two hours and 12 test prints. :D

Disclaimer

Take this as-is, I take no responsibility in breaking your printer if used incorrectly. Test it couple of times with your finger on the PSU shut off switch.

It works for my setup, which is:

- Ender 3 Pro with 4.2.7 silent board
- Marlin 2.0.9.1 firmware
- 3DTouch installed on Satsana
- Cura slicer (the macros like `{material_print_temperature_layer_0}` would need to be adjusted for other slicers accordingly, for Prusa Slicer see their docs on Macros)

Start code

```
; Ender 3 Pro – Cura Custom START G-code
; NOTE:
; This is for Ender with auto bed leveling probe.
; For printers without it, remove the line with G29 (I have not tested this, though!)

; Preheat bed fully
M140 S{material_bed_temperature_layer_0}

; Preheat extuder half way to 160 C to prevent oozing during auto bed leveling.
M104 S160

; Home X and Y axes
G28 X Y

; Absolute positioning
G90

; Move to homing position for Z axis
G1 X168 Y126 F5000

; Wait for bed to be at printing temperature and then...
M190 S{material_bed_temperature_layer_0}

; ... home Z axis...
G28 Z

; ... start heating up the extruder all the way and meanwhile do...
M104 S{material_print_temperature_layer_0}

; ... automatic bed leveling
G29

; Move to start position for priming
G1 X5 Y5 Z10 F5000

; Wait for extruder to fully heat up to set temperature
M109 S{material_print_temperature_layer_0}
```

```
; Reset extruder
G92 E0

; Extrude line of filament
G1 Z0.8 F500
G1 X45 Z0.8 E40 F750
G92 E0
G1 X65 Z0.8 E10 F500

; Reset extruder again
G92 E0

; Move quickly away from prime line to prevent blob squish
G1 X75 F5000
```

End code

```
; Ender 3 Pro - Cura END G-code
; If making any changes here, change them BOTH in Cura (End G-Code) AND OctoPrint (GCODE Scripts -> After print job is cancelled)

;Relative positioning
G91

;Retract 30 mm and raise Z +2 mm
G1 X-10 Z10 E-30 F3000

;Absolute positioning
G90

; Put away X and present print
G1 X3 Y225 ;Present print

; Shutdown fan, hotend and bed
M106 S0 ;Turn-off fan
M104 S0 ;Turn-off hotend
M140 S0 ;Turn-off bed
M84 X Y Z E ;Disable all steppers
```

Creality Ender 3 Pro - My setup

Hardware parts

- **Printer:** Creality Ender 3 Pro (AliExpress)
- **Motherboard:** Creality OEM Silent Board 4.2.7 (AliExpress)
- **Bed leveling sensor:** Trianglelab 3DTouch v3 (AliExpress)
- **All metal hotend:** Trianglelab Bi-Metal Heatbreak (AliExpress)
- **Belt tensioners:** no name (AliExpress)
- **Print surface:** Creality PEI Metal Sheet (AliExpress)
- **Metal extruder:** noname (AliExpress)
- **Stronger springs:** yellow noname (AliExpress)
- **Filament runout sensor:** generic (AliExpress)
- **Heatbreak cooling:** Noctua 40x40x20 mm fan with stepper down

3D printed upgrades

- Satsana with 3DTouch mount (Thingiverse)
- Cable clips for cable management (Thingiverse)
- Spool holder with ball bearings (printed by the first owner)
- Some LCD display cover

Software

- Marlin firmware
- OctoPi for remote control on Raspberry Pi 3B

Enclosure

- 2x IKEA Lack table
- 6 mm birch plywood
- acoustic foam (more for looks than anything else)

Upgrades to do

- [ ] Noctua fans for PSU and motherboard
- [ ] enclosure ventilation system (by summer)