

USER MANUAL

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The information on this manual was written with software running on Microsoft Windows 8.1 but the same software can be found for MAC and Linux and the same instructions may work on other operation systems.

SOFTWARE SETUP

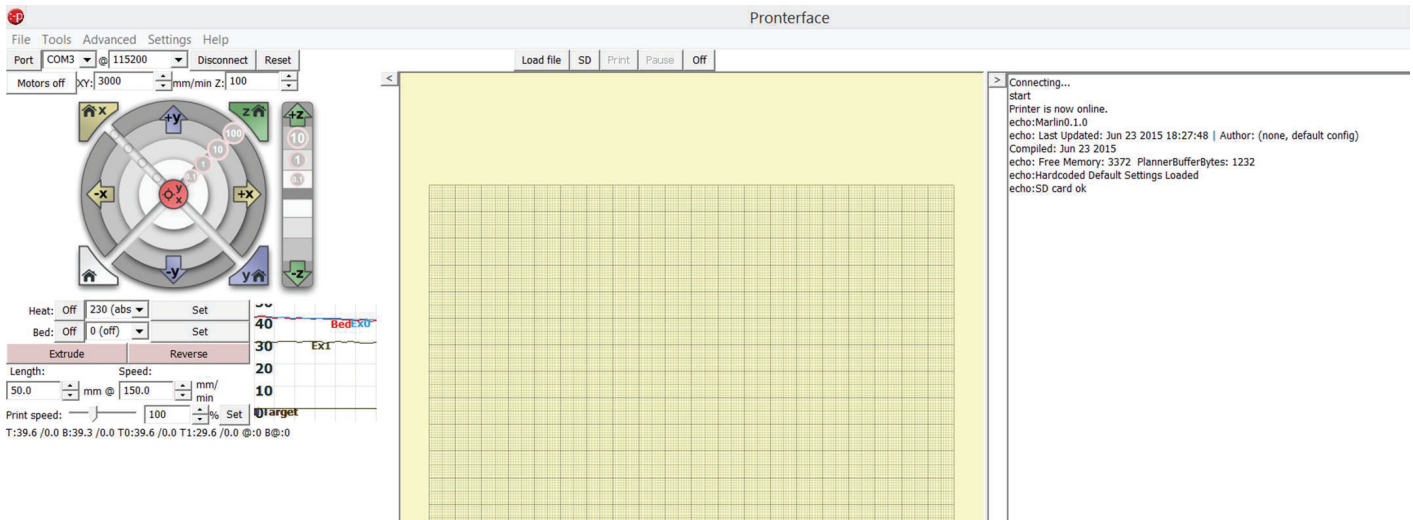
In order to be able to control helloBEEprusa and print, you need to use an OpenSource software that is developed by the 3D printing community.



In order to help you calibrate the print bed, load/unload filament and do other operations, you can use the Pronterface software.

Please download it from this link - version "Printrun-Win-Slic3r-03Feb2015":

<http://koti.kapsi.fi/~kliment/printrun/>



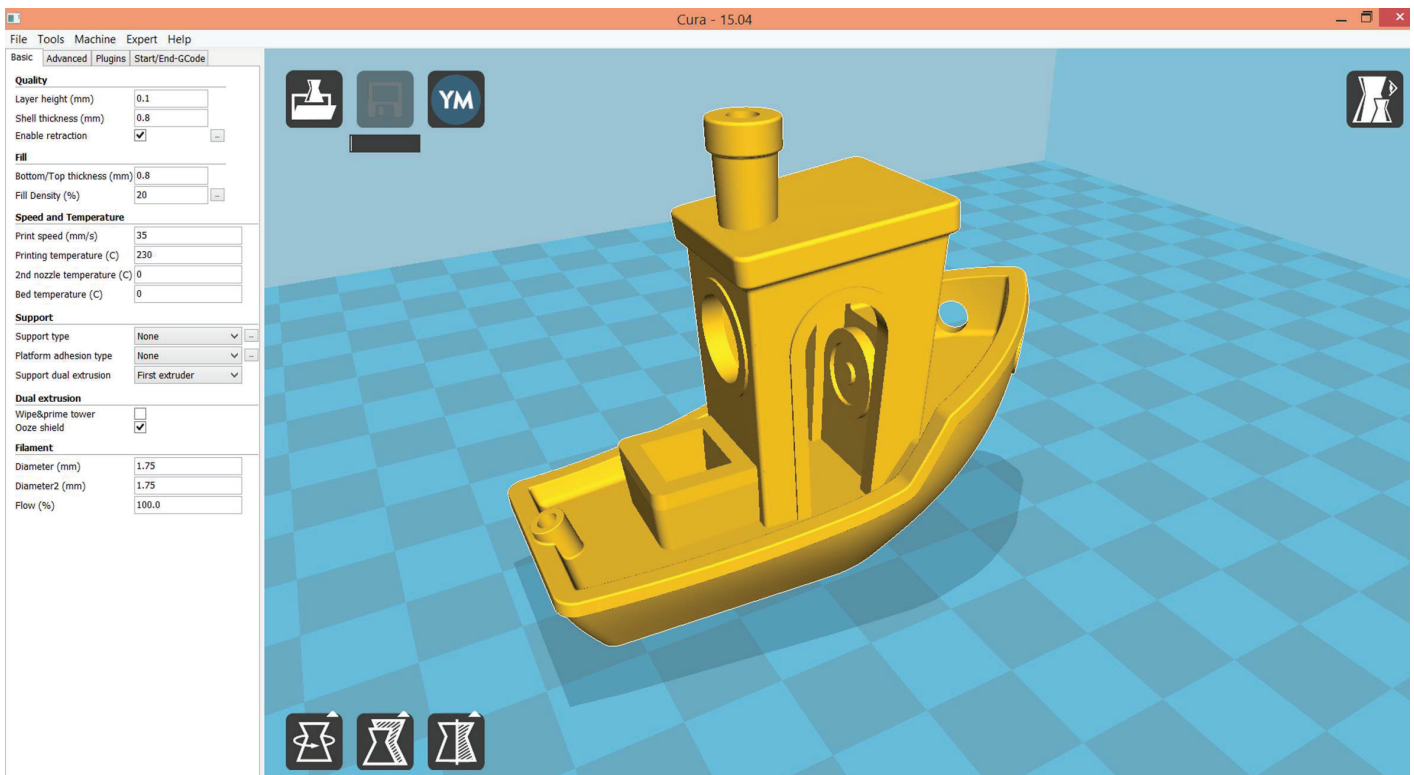
Pronterface screenshot



In order to generate the G-code for printing, you can use the Cura 15.04.

Please download it from this link - version "Version: 15.04":

<https://ultimaker.com/en/cura-software/list>



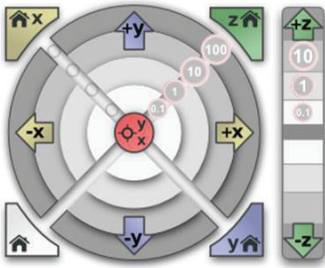
Cura 15.04 screenshot

PREPARING FOR FIRST PRINT

In order to be able to print you need to first calibrate your bed and load/unload the filament.

BED CALIBRATION

You need to evenly calibrate the bed so the first layer of the print can adhere well to the bed, otherwise it may ruin your print.



Before starting to level the bed, you can jog the extruder and the bed using the jog buttons on Pronterface. You can move the Z axis in a way that the nozzle stays a bit closer to the bed and is essential for the following steps.

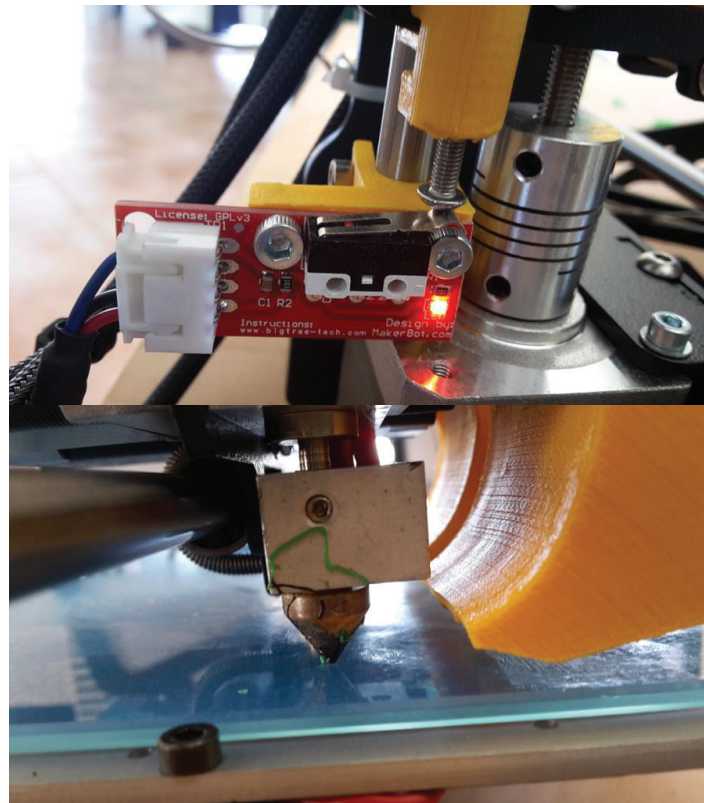
Now use the 3 screws to level the bed. You need to do it keeping the same distance from the nozzle on all points of the bed.



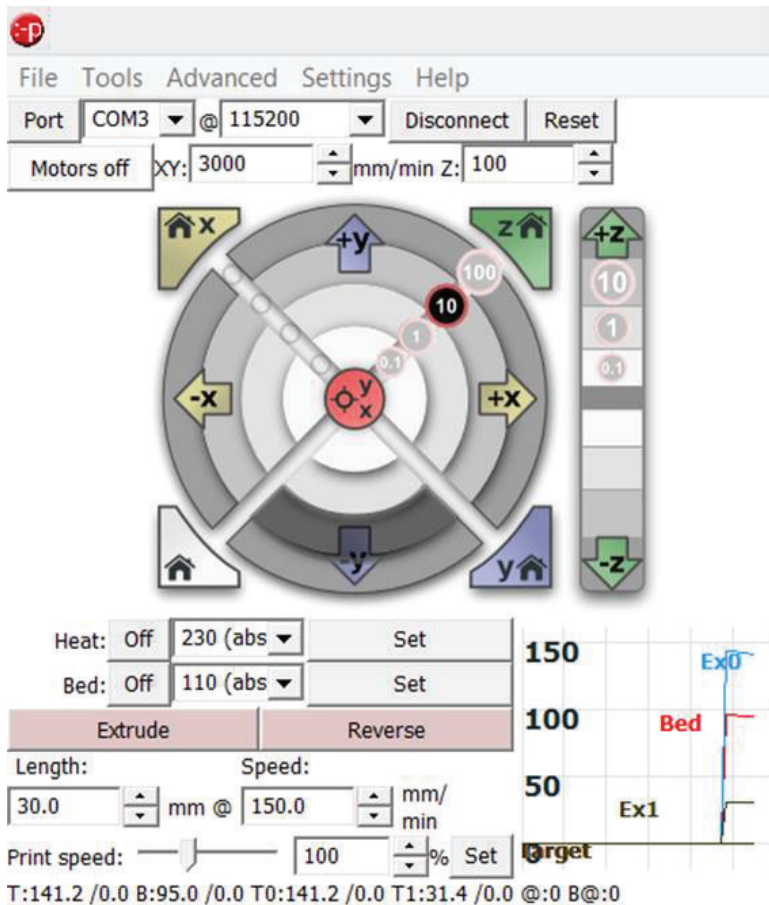
Next step is to adjust the home Z axis so the nozzle can stay at a distance of about 0.2mm from the bed. You can use a paper sheet as reference for the needed distance.

Use the Pronterface jog panel to home the Z axis.

Now adjust the placement of Z endstop so when the home of Z axis ends, the nozzle stays at a distance of about 0.2mm from the bed.



LOAD/UNLOAD THE FILAMENT



You can load/unload filament using the Pronterface control panel.

To load, first you need to set the extruder heating temperature and wait for the temperature to reach that value.

You can look at the graph to verify. When the extruder reaches the temperature, then you can click on the Extrude button and then you can insert the filament on the extruder.

To unload, you also need to set the same extruder heating temperature. Afterwards, just click the Reverse button and gently pull the filament from the extruder.

If you want to control the second extruder (ex 1), send the command "T1" on the Pronterface console in order to control the second extruder. Send the command "T0" to control again the first extruder.

FIRST PRINT

For our first print we will be using the free 3DBenchy 3D model - you can download it here:
<http://www.3dbenchy.com/>

We will also configure Cura 15.04 to export the G-code.

Finally we will save the G-code file on the SDCard and print it.

ADD HELLOBEEPRUSA AS A NEW MACHINE ON CURA 15.04

Go to "File --> Machine settings" and click on "Add new machine".

Follow the next screenshots and use the same options.

The image displays three sequential screenshots of the Cura 15.04 Configuration Wizard, illustrating the process of adding a new machine.

Screenshot 1: Add new machine wizard
This window shows the initial step where the user selects a machine profile. The title is "Add new machine wizard". Below the title, it says "This wizard will help you in setting up Cura for your machine." The main section is titled "Select your machine" and lists various machine profiles under the heading "What kind of machine do you have:". The profiles include Ultimaker2, Ultimaker2extended, Ultimaker2go, Ultimaker Original, Ultimaker Original+, Printbot, Lulzbot TAZ, Lulzbot Mini, and Other (Ex: RepRap, MakerBot, Witbox). The "Other" option is selected. At the bottom, there is a note about anonymous usage information and a checkbox to submit it, which is checked. Navigation buttons at the bottom are "< Back", "Next >", and "Cancel".

Screenshot 2: Other machine information
This window shows the "Other machine information" step. The title is "Other machine information". It lists pre-defined machine profiles that are available, including BFB, DeltaBot, Hephestos, Hephestos_XL, MakerBotReplicator, Mendel, Ord, Prusa Mendel i3, Rigid3D, RigidBot, RigidBotBig, Witbox, Zone3d Printer, julia, katiha, punchtec Connect XL, and Custom... The "Custom..." option is selected. Navigation buttons at the bottom are "< Back", "Next >", and "Cancel".

Screenshot 3: Custom RepRap information
This window shows the "Custom RepRap information" step. The title is "Custom RepRap information". It provides instructions for setting up custom RepRap machines. The main section is titled "You will have to manually install Marlin or Sprinter firmware." Below this, there are input fields for "Machine name" (set to "helloBEEprusa"), "Machine width X (mm)" (set to 250), "Machine depth Y (mm)" (set to 200), "Machine height Z (mm)" (set to 200), "Nozzle size (mm)" (set to 0.4), "Heated bed" (checked), and "Bed center is 0,0,0 (RoStock)" (unchecked). Navigation buttons at the bottom are "< Back", "Finish", and "Cancel".

Access to "Machine --> Machine settings..." and compare with the following screenshot

Machine settings

Ultimaker2BeethefirstHellobeeprusa

Machine settings

E-Steps per 1mm filament0

Maximum width (mm)250

Maximum depth (mm)200

Maximum height (mm)200

Extruder count2

Heated bed☒

Machine center 0,0☐

Build area shapeSquare

GCode FlavorRepRap (Marlin/Sprinter)

Extruder 2

Offset X0

Offset Y0

Printer head size

Head size towards X min (mm)0

Head size towards Y min (mm)0

Head size towards X max (mm)0

Head size towards Y max (mm)0

Printer gantry height (mm)0

Communication settings

Serial portAUTO

Baudrate115200

Ok

Add new machine

Remove machine

Change machine name

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Access to "Expert --> Open expert settings..." and compare with the following screenshot

Expert config

Dual extrusion

Wipe&prime tower volume per layer (mm3)

Retraction

Minimum travel (mm)

Enable combing

Minimal extrusion before retracting (mm)

Z hop when retracting (mm)

Skirt

Line count

Start distance (mm)

Minimal length (mm)

Cool

Fan full on at height (mm)

Fan speed min (%)

Fan speed max (%)

Minimum speed (mm/s)

Cool head lift ☐

Infill

Solid infill top ☒

Solid infill bottom ☒

Infill overlap (%)

Infill prints after perimeters ☐

Support

Structure type

Overhang angle for support (deg)

Fill amount (%)

Distance X/Y (mm)

Distance Z (mm)

Black Magic

Spiralize the outer contour ☐

Only follow mesh surface ☐

Brim

Brim line amount

Raft

Extra margin (mm)

Line spacing (mm)

Base thickness (mm)

Base line width (mm)

Interface thickness (mm)

Interface line width (mm)

Airgap

First Layer Airgap

Surface layers

Surface layer thickness (mm)

Surface layer line width (mm)

Fix horrible

Combine everything (Type-A) ☐

Combine everything (Type-B) ☐

Keep open faces ☐

Extensive stitching ☐

CONFIGURE SETTINGS AND EXPORT GCODE

Follow these screenshots and use the same options.

NOTE:

For ABS filament, choose Printing temperature of about 240°C and Bed temperature of 100°C or more.

For PLA filament, choose Printing temperature of about 190°C and Bed temperature of about 60°C.

The image displays four screenshots of the Cura software interface, showing various configuration settings for printing.

Screenshot 1: Basic Settings

- Quality:** Layer height (mm) 0.1, Shell thickness (mm) 0.8, Enable retraction ☒.
- Fill:** Bottom/Top thickness (mm) 0.8, Fill Density (%) 20.
- Speed and Temperature:** Print speed (mm/s) 35, Printing temperature (C) 240, 2nd nozzle temperature (C) 240, Bed temperature (C) 100.
- Support:** Support type Touching buildplate, Platform adhesion type None, Support dual extrusion Second extruder.
- Dual extrusion:** Wipe&prime tower ☐, Ooze shield ☒.
- Filament:** Diameter (mm) 1.75, Diameter2 (mm) 1.75, Flow (%) 100.0.

Screenshot 2: Machine Settings

- Machine:** Nozzle size (mm) 0.4.
- Retraction:** Speed (mm/s) 40.0, Distance (mm) 4.5, Dual extrusion switch amount (mm) 16.5.
- Quality:** Initial layer thickness (mm) 0.3, Initial layer line width (%) 100, Cut off object bottom (mm) 0.0, Dual extrusion overlap (mm) 0.2.
- Speed:** Travel speed (mm/s) 150.0, Bottom layer speed (mm/s) 20, Infill speed (mm/s) 0.0, Top/bottom speed (mm/s) 0.0, Outer shell speed (mm/s) 0.0, Inner shell speed (mm/s) 0.0.
- Cool:** Minimal layer time (sec) 5, Enable cooling fan ☒.

Screenshot 3: Plugins

- Pause at height:** Tweak At Z 4.0.2.
- Enabled plugins:** (List of plugins is empty).

Screenshot 4: G-code Export

- Start.gcode:** start.gcode, end.gcode, preSwitchExtruder.gcode, postSwitchExtruder.gcode, start2.gcode, end2.gcode.
- G-code:** ;Sliced at: {day} {date} {time}, ;Basic settings: Layer height: {layer_height}, ;Print time: {print_time}, ;Filament used: {filament_amount}m {filament_}, ;Filament cost: {filament_cost}, ;M190 S(print_bed_temperature) ;Uncomment to , ;M109 S(print_temperature) ;Uncomment to add , G21 ;metric values, G90 ;absolute positioning, M107 ;start with the fan off, G28 X0 Y0 ;move X/Y to min endstops, G28 Z0 ;move Z to min endstops, G1 Z15.0 F(travel_speed) ;move the platform d, G92 E0 ;zero the extruded le, G1 F200 E3 ;extrude 3mm of feed , G92 E0 ;zero the extruded le, G1 F(travel_speed), ;Put printing message on LCD screen, M117 Printing...

USE THE FOLLOWING COMMANDS FOR START.GCODE:

```
;Sliced at: {day} {date} {time}
;Basic settings: Layer height: {layer_height} Walls: {wall_thickness} Fill: {fill_density}
;Print time: {print_time}
;Filament used: {filament_amount}m {filament_weight}g
;Filament cost: {filament_cost}
;M190 S{print_bed_temperature} ;Uncomment to add your own bed temperature line
;M109 S{print_temperature} ;Uncomment to add your own temperature line
G21 ;metric values
G90 ;absolute positioning
M107 ;start with the fan off
G28 X0 Y0 ;move X/Y to min endstops
G28 Z0 ;move Z to min endstops
G1 Z15.0 F{travel_speed} ;move the platform down 15mm
G92 E0 ;zero the extruded length
G1 F200 E3 ;extrude 3mm of feed stock
G92 E0 ;zero the extruded length again
G1 F{travel_speed}
;Put printing message on LCD screen
M117 Printing...
```

USE THE FOLLOWING COMMANDS FOR END.GCODE:

```
;End GCode  
M104 S0 ;extruder heater off  
M140 S0 ;heated bed heater off (if you have it)  
G91 ;relative positioning  
G1 E-1 F300 ;retract the filament a bit before lifting the nozzle, to release some of the pressure  
G1 Z+0.5 E-5 X-20 Y-20 F{travel_speed} ;move Z up a bit and retract filament even more  
G28 X0 Y0 ;move X/Y to min endstops, so the head is out of the way  
M84 ;steppers off  
G90 ;absolute positioning
```

USE THE FOLLOWING COMMANDS FOR PRESWITCHEXTRUDER.GCODE:

```
;Switch between the current extruder and the next extruder, when printing with multiple extruders.  
;This code is added before the T(n)
```

USE THE FOLLOWING COMMANDS FOR POSTSWITCHEXTRUDER.GCODE:

```
;Switch between the current extruder and the next extruder, when printing with multiple extruders.  
;This code is added after the T(n)
```

USE THE FOLLOWING COMMANDS FOR START2.GCODE:

```
;Sliced at: {day} {date} {time}
;Basic settings: Layer height: {layer_height} Walls: {wall_thickness} Fill: {fill_density}
;Print time: {print_time}
;Filament used: {filament_amount}m {filament_weight}g
;Filament cost: {filament_cost}
;M190 S{print_bed_temperature} ;Uncomment to add your own bed temperature line
;M104 S{print_temperature} ;Uncomment to add your own temperature line
;M109 T1 S{print_temperature2} ;Uncomment to add your own temperature line
;M109 T0 S{print_temperature} ;Uncomment to add your own temperature line
G21 ;metric values
G90 ;absolute positioning
M107 ;start with the fan off
G28 X0 Y0 ;move X/Y to min endstops
G28 Z0 ;move Z to min endstops
G1 Z15.0 F{travel_speed} ;move the platform down 15mm
T1 ;Switch to the 2nd extruder
G92 E0 ;zero the extruded length
G1 F200 E10 ;extrude 10mm of feed stock
G92 E0 ;zero the extruded length again
G1 F200 E-{retraction_dual_amount}
T0 ;Switch to the first extruder
G92 E0 ;zero the extruded length
G1 F200 E10 ;extrude 10mm of feed stock
G92 E0 ;zero the extruded length again
G1 F{travel_speed}
;Put printing message on LCD screen
M117 Printing...
```

USE THE FOLLOWING COMMANDS FOR END2.GCODE:

;End GCode

M104 T0 S0 ;extruder heater off

M104 T1 S0 ;extruder heater off

M140 S0 ;heated bed heater off (if you have it)

G91 ;relative positioning

G1 E-1 F300 ;retract the filament a bit before lifting the nozzle, to release some of the pressure

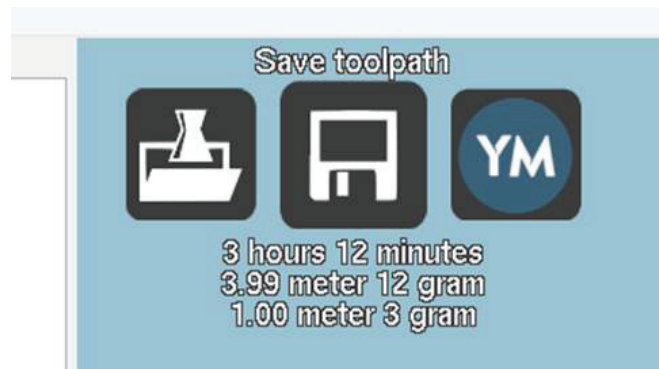
G1 Z+0.5 E-5 X-20 Y-20 F{travel_speed} ;move Z up a bit and retract filament even more

G28 X0 Y0 ;move X/Y to min endstops, so the head is out of the way

M84 ;steppers off

G90 ;absolute positioning

Finally export the Gcode by doing "Save toolpath" and choose the folder of your SDCard on your computer.



Now insert the SDCard on the printer by using the jog button, navigate to "Print from SD" and choose the file. Your printer will start heating and will then print the object.



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