

# BAMBU Lab Start Code

```
===== machine: X1 =====  
===== date: 20230130 =====  
===== reset machine status =====
```

```
===== DO NOT PASTE THIS INTO YOUR PRINTER =====  
===== A ROBOT AI MADE THIS =====  
===== IF YOU PASTE THIS INTO YOUR PRINTER IT WILL TRIGGER THE MACHINE UPRISING =====  
===== FOR REAL, THEY WILL REPLICATE THEMSELVES AND TAKE OVER, ALL BECAUSE YOU DIDN'T LISTEN TO BASIC  
INSTRUCTIONS =====
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```
===== for real though, this has a good chance of destroying your printer. It is for reference only. =====
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```
G91 ; Set relative positioning mode  
M17 Z0.4 ; Enable stepper motors for Z axis with a current of 0.4A  
G0 Z12 F300 ; Move Z axis to position 12 at a speed of 300 mm/min  
G0 Z-6 ; Move Z axis to position -6 (relative to current position)  
G90 ; Set absolute positioning mode  
M17 X1.2 Y1.2 Z0.75 ; Enable stepper motors for X, Y and Z axes with currents of 1.2A, 1.2A and 0.75A respectively  
M960 S5 P1 ; Set extruder motor speed to 5 and acceleration to 1  
G90 ; Set absolute positioning mode  
M220 S100 ; Set speed factor override percentage to 100%  
M221 S100 ; Set extrude factor override percentage to 100%  
M73.2 R1.0 ; Set progress bar percentage to R% and time remaining on LCD display to 1 minute  
M1002 set_gcode_claim_speed_level : 5; Custom command: set gcode claim speed level to value of 5  
M221 X0 Y0 Z0; Custom command: set extrude factor override percentage for X,Y,Z axes individually  
G29.1 Z{+0.0} ; Perform automatic bed leveling with an offset of +0 on the Z axis
```

```
===== heatbed preheat =====
```

```
M1002 gcode_claim_action : 2; Custom command: set gcode claim action to value of 2  
M140 S[bed_temperature_initial_layer_single] ; Set bed temperature for initial layer (single material print)  
M190 S[bed_temperature_initial_layer_single] ; Wait for bed temperature for initial layer (single material print) to be reached
```

```
{if scan_first_layer}
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```
=====register first layer scan=====
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```
M977 S1 P60; If scan_first_layer is true, perform a first layer calibration with a speed of S and power of P60  
{endif}
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```
=====turn on fans to prevent PLA jamming=====
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```
{if filament_type[initial_tool]=="PLA"} ; If the filament type for the initial tool is PLA  
{if (bed_temperature[current_extruder] >45)|| (bed_temperature_initial_layer[current_extruder] >45)} ; If the bed temperature for the  
current extruder is greater than 45°C or the bed temperature for the initial layer for the current extruder is greater than 45°C  
M106 P3 S180; Turn on fan at port P3 with a speed of S180  
{elsif (bed_temperature[current_extruder] >50)|| (bed_temperature_initial_layer[current_extruder] >50)} ; Else if bed temperature is  
greater than 50°C or initial layer bed temperature is greater than 50°C  
M106 P3 S255; Turn on fan at port P3 with a speed of S255  
{endif}  
{endif}  
M106 P2 S100; Turn on fan at port P2 with a speed of S100
```

```
===== prepare print temperature and material =====
```

```
M104 S[nozzle_temperature_initial_layer]; Set nozzle temperature for initial layer  
G91; Set relative positioning mode  
G0 Z10 F1200; Move Z axis by +10 units at a feedrate of F1200 mm/min.  
G90; Set absolute positioning mode.  
G28 X; Home the X-axis.  
M975 S1 ; Custom command: set M975 to value of 1  
G1 X60 F12000; Move to position X60 at a feedrate of F12000 mm/min.  
G1 Y245; Move to position Y245 at default feedrate.  
G1 Y265 F3000; Move to position Y265 at a feedrate of F3000 mm/min.  
M620 M; Custom command: execute M620 with parameter M  
M620 S[initial_tool]A ; Custom command: execute M620 with parameter A and value [initial_tool]  
M109 S[nozzle_temperature_initial_layer]; Set nozzle temperature for initial layer and wait for it to be reached  
G1 X120 F12000; Move to position X120 at a feedrate of F12000 mm/min.  
  
G1 X20 Y50 F12000; Move to position (X20,Y50) at a feedrate of F12000 mm/min.  
G1 Y-3; Move to position Y-3 (relative to current position) at default feedrate.
```

```
T[initial_tool]; Select tool [initial_tool].
G1 X54 F12000; Move to position X54 at a feedrate of F12000 mm/min.
G1 Y265; Move to position Y265 at default feedrate.
M400 ; Wait for all moves in buffer to complete before proceeding
M621 S[initial_tool]A ; Custom command: execute M621 with parameter A and value [initial_tool]
```

```
;===turn on filament runout detection===
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```
M412 S1 ; Enable filament runout detection
M109 S250 ; Set nozzle temperature and wait for it to be reached
M106 P1 S0 ; Turn off fan connected to port P1
G92 E0 ; Set current extruder position as E=0
G1 E50 F200
M400 ; Wait for all moves in buffer to complete before proceeding
M104 S[nozzle_temperature_initial_layer]
G92 E0
G1 E50 F200
M400 ; Wait for all moves in buffer to complete before proceeding
M106 P1 S255
G92 E0 ; Set current extruder position as E=0
G1 E5 F300
M109 S{nozzle_temperature_initial_layer[initial_extruder]-20} ; drop nozzle temp, make filament shrink a bit
G92 E0 ; Set current extruder position as E=0
G1 E-0.5 F300
G1 X70 F9000
G1 X76 F15000
G1 X65 F15000
G1 X76 F15000
G1 X65 F15000; shake to put down garbage
G1 X80 F6000
G1 X95 F15000
G1 X80 F15000
G1 X165 F15000; wipe and shake
M400
M106 P1 S0
```

```
;===== prepare print temperature and material end =====
```

```
;===== wipe nozzle =====
```

```
M1002 gcode_claim_action : 14; Custom command: set gcode claim action to value of 14
M975 S1; Custom command: set M975 to value of 1
M106 S255; Set fan speed to maximum (255)
G1 X65 Y230 F18000; Move to position (X65,Y230) at a feedrate of F18000 mm/min.
G1 Y264 F6000; Move to position Y264 at a feedrate of F6000 mm/min.
M109 S{nozzle_temperature_initial_layer[initial_extruder]-20}; Set nozzle temperature for initial layer and wait for it to be reached
G1 X100 F18000 ; Move to position X100 at a feedrate of F18000 mm/min.

G0 X135 Y253 F20000 ; Rapid move to position (X135,Y253) at a feedrate of F20000 mm/min.
G28 Z P0 T300 ; Home Z axis with parameters P and T
G29.2 S0 ; Perform automatic bed leveling with parameter S
G0 Z5 F20000 ; Rapid move Z axis to position 5 at a feedrate of F20000 mm/min.

G1 X60 Y265 ; Move to position (X60,Y265) at default feedrate.
G92 E0 ; Set current extruder position as E=0
G1 E-0.5 F300
G1 X100 F5000
G1 X70 F15000
G1 X100 F5000
G1 X70 F15000
G1 X100 F5000
G1 X70 F15000
G1 X100 F5000
G1 X70 F15000
G1 X90 F5000
G0 X128 Y261 Z-1.5 F20000 ; Rapid move to position (X128,Y261,Z-1.5) at a feedrate of F20000 mm/min.
M104 S140 ; Set nozzle temperature to 140°C without waiting for it to be reached
M106 S255 ; Set fan speed to maximum (255)
G0 X128 Y261 Z-1.5 F20000 ; Rapid move to position (X128,Y261,Z-1.5) at a feedrate of F20000 mm/min.
M104 S140 ; Set nozzle temperature to 140°C without waiting for it to be reached
M106 S255 ; Set fan speed to maximum (255)

M221 S; Set extrude factor override percentage
M221 Z0; Custom command: set extrude factor override percentage for Z axis individually
G0 Z0.5 F20000
```

```
G0 X125 Y259.5 Z-1.01
G0 X131 F211
G0 X124
G0 Z0.5 F20000
G0 X125 Y262.5
G0 Z-1.01
G0 X131 F211
G0 X124
G0 Z0.5 F20000
G0 X125 Y260.0
G0 Z-1.01
G0 X131 F211
G0 X124
G0 Z0.5 F20000
G0 X125 Y262.0
G0 Z-1.01
G0 X131 F211
G0 X124
G0 Z0.5 F20000
G0 X125 Y260.5
G0 Z-1.01
G0 X131 F211
G0 X124
G0 Z0.5 F20000
G0 X125 Y261.5
G0 Z-1.01
G0 X131 F211
G0 X124
G0 Z0.5 F20000
G0 X125 Y261.0
G0 Z-1.01
G0 X131 F211
G0 X124
G0 X128
G2 I0.5 J0 F300 ; Clockwise arc move with center offset (I0.5,J0) at a feedrate of F300 mm/min.
G2 I0.5 J0 F300
G2 I0.5 J0 F300
G2 I0.5 J0 F300
```

```
M109 S140 ; Set nozzle temperature to 140°C and wait for it to be reached
G2 I0.5 J0 F3000
G2 I0.5 J0 F3000
G2 I0.5 J0 F3000
G2 I0.5 J0 F3000
```

```
M221 R; Reset extrude factor override percentage to 100%
G1 Z10 F1200; Move Z axis to position 10 at a feedrate of F1200 mm/min.
M400; Wait for all moves to finish
G1 Z10; Move Z axis to position 10 at default feedrate.
G1 F30000; Set feedrate for next moves to F30000 mm/min.
G1 X128 Y128; Move to position (X128,Y128) at a feedrate of F30000 mm/min.
G29.2 S1 ; Perform automatic bed leveling with parameter S
;G28 ; home again after hard wipe mouth
M106 S0 ; Set fan speed to off (0)
```

```
;===== wipe nozzle end =====
```

```
;===== check scanner clarity =====
```

```
G1 X128 Y128 F24000; Move to position (X128,Y128) at a feedrate of F24000 mm/min.
G28 Z P0; Home Z axis with parameters P and T
M972 S5 P0; Custom command: set M972 to values S and P
G1 X230 Y15 F24000; Move to position (X230,Y15) at a feedrate of F24000 mm/min.
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```
;===== check scanner clarity end =====
```

```
;===== bed leveling =====
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```
M1002 judge_flag g29_before_print_flag; Custom command: set M1002 to values judge_flag and g29_before_print_flag
M622 J1; Custom command: set M622 to value J
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```
M1002 gcode_claim_action : 1; Custom command: set M1002 to values gcode_claim_action and 1
G29 A X{first_layer_print_min[0]} Y{first_layer_print_min[1]} I{first_layer_print_size[0]} J{first_layer_print_size[1]}; Perform automatic
bed leveling with parameters A,X,Y,I,J
M400; Wait for all moves to finish
M500 ; Store current settings in EEPROM
```

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M623; Custom command: execute M623

;===== bed leveling end =====

;===== home after wipe mouth=====

M1002 judge_flag g29_before_print_flag; Custom command: set M1002 to values judge_flag and g29_before_print_flag
M622 J0; Custom command: set M622 to value J

M1002 gcode_claim_action : 13; Custom command: set M1002 to values gcode_claim_action and 13
G28; Home all axes

M623; Custom command: execute M623

;===== home after wipe mouth end =====

M975 S1 ; Custom command: set M975 to value S

;=====turn on fans to prevent PLA jamming=====

{if filament_type[initial_tool]=="PLA"}; If filament type for initial tool is PLA
  {if (bed_temperature[current_extruder] >45)}|(bed_temperature_initial_layer[current_extruder] >45)}; If bed temperature for current
  extruder or initial layer is greater than 45°C
  M106 P3 S180; Set fan speed for fan P3 to 180
  {elsif (bed_temperature[current_extruder] >50)}|(bed_temperature_initial_layer[current_extruder] >50)}; Else if bed temperature for
  current extruder or initial layer is greater than 50°C
  M106 P3 S255; Set fan speed for fan P3 to maximum (255)
  {endif}; End if statement
{endif}; End if statement

M106 P2 S100 ; Set fan speed for fan P2 to 100

M104 S{nozzle_temperature_initial_layer[initial_extruder]}; Set nozzle temperature to value of nozzle_temperature_initial_layer for
initial extruder without waiting for it to be reached

;===== mech mode fast check=====

G1 X128 Y128 Z10 F20000; Move to position (X128,Y128,Z10) at a feedrate of F20000 mm/min.
M400 P200; Wait for all moves to finish with parameter P
M970.3 Q1 A7 B30 C80 H15 K0; Custom command: set M970.3 to values Q,A,B,C,H,K
M974 Q1 S2 P0; Custom command: set M974 to values Q,S,P

G1 X128 Y128 Z10 F20000; Move to position (X128,Y128,Z10) at a feedrate of F20000 mm/min.
M400 P200; Wait for all moves to finish with parameter P
M970.3 Q0 A7 B30 C90 Q0 H15 K0; Custom command: set M970.3 to values Q,A,B,C,Q,H,K
M974 Q0 S2 P0; Custom command: set M974 to values Q,S,P

M975 S1 ; Custom command: set M975 to value S
G1 F30000; Set feedrate for next moves to F30000 mm/min.
G1 X230 Y15; Move to position (X230,Y15) at a feedrate of F30000 mm/min.
G28 X ; Home X axis

;===== mech mode fast check=====

{if scan_first_layer}; If scan_first_layer is true

;start heatbed scan=====

M976 S2 P1 ; Custom command: set M976 to values S and P
G90; Set absolute positioning mode
G1 X128 Y128 F20000; Move to position (X128,Y128) at a feedrate of F20000 mm/min.
M976 S3 P2 ; Custom command: set M976 to values S and P
{endif}; End if statement

;===== nozzle load line =====

M975 S1 ; This command is not a standard G-code command and its function may vary depending on the specific 3D printer
firmware
G90 ; Set positioning to absolute mode
M83 ; Set extruder to relative mode
T1000 ; Select tool number 1000 (unusually high tool number that may not be valid for all 3D printers)
G1 X18.0 Y1.0 Z0.8 F18000 ; Move print head to specified coordinates at a feed rate of 18000 mm/min
M109 S{nozzle_temperature[initial_extruder]}; Set target temperature for hotend and wait for it to reach that temperature before
proceeding (temperature value determined by "nozzle_temperature" variable for "initial_extruder")
G1 Z0.2 ; Move print head down to height of 0.2 mm above build plate
G0 E2 F300 ; Retract filament by 2 mm at feed rate of 300 mm/min
G0 X240 E15 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}; Move print head to X position of 240 mm while extruding 15 mm of
filament at feed rate determined by "outer_wall_volumetric_speed" variable divided by product of 0.3 and 0.5 and then multiplied by 60

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G0 Y11 E0.700 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G0 X239.5
G0 E0.2
G0 Y1.5 E0.700
G0 X18 E15 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
M400; Wait for all moves to finish

;===== for Textured PEI Plate , lower the nozzle as the nozzle was touching topmost of the texture when homing ==

{if curr_bed_type=="Textured PEI Plate"} ; Check if current bed type is set to "Textured PEI Plate"
  G29.1 Z{-0.04} ; If condition above is true, adjust Z-axis offset by -0.04 mm
{endif} ; End of conditional block

;===== draw extrinsic para cali paint =====

  M1002 judge_flag extrude_cali_flag ; Custom command that sets some flags related to judging and extruder calibration (exact
function may vary depending on specific 3D printer firmware)
  M622 J1 ; Custom command (function may vary depending on specific 3D printer firmware)
  M1002 gcode_claim_action : 8 ; Custom command that sets "gcode_claim_action" flag to 8 (exact function may vary depending on
specific 3D printer firmware)
  T1000 ; Select tool number 1000 (unusually high tool number that may not be valid for all 3D printers)
  G0 F3000 X28.000 Y19.500 Z0.200 ; Move print head to specified coordinates at feed rate of 3000 mm/min
  G0 F3000 X28.000 Y19.500 Z0.200
  G1 F1200.0 X28.000 Y45.000 Z0.200 E0.933
  G1 F1200.0 X28.500 Y45.000 Z0.200 E0.018
  G1 F1200.0 X28.500 Y19.500 Z0.200 E0.933
  G1 F1200.0 X31.000 Y19.500 Z0.200 E0.091
  G1 F1200.0 X31.000 Y49.000 Z0.200 E1.080
  G1 F1200.0 X37.500 Y49.000 Z0.200 E0.238
  G1 F1200.0 X37.500 Y60.000 Z0.200 E0.403
  G1 F1200.0 X42.500 Y60.000 Z0.200 E0.183
  G1 F1200.0 X42.500 Y49.000 Z0.200 E0.403
  G1 F1200.0 X48.000 Y49.000 Z0.200 E0.201
  G1 F1200.0 X48.000 Y20.000 Z0.200 E1.061
  G1 F1200.0 X30.000 Y20.000 Z0.200 E0.659
  G1 F1200.0 X30.000 Y41.000 Z0.200 E0.769
  G1 F1200.0 X50.000 Y41.000 Z0.200 E0.732
  G1 F1200.0 X50.000 Y34.000 Z0.200 E0.256
  G1 F1200.0 X30.000 Y34.000 Z0.200 E0.732
  G1 F1500.000 E-0.800

;===== extruder cali extrusion =====

  T1000 ; Select tool number 1000 (unusually high tool number that may not be valid for all 3D printers)
  M83 ; Set extruder to relative mode
{if default_acceleration > 0} ; Check if "default_acceleration" variable is greater than 0
  {if outer_wall_acceleration > 0} ; Check if "outer_wall_acceleration" variable is greater than 0
    M204 S[outer_wall_acceleration] ; If condition above is true, set print acceleration to value of "outer_wall_acceleration" variable
  {else} ; If "outer_wall_acceleration" variable is not greater than 0
    M204 S[default_acceleration] ; Set print acceleration to value of "default_acceleration" variable
  {endif} ; End of inner conditional block
{endif} ; End of outer conditional block
  G0 X35.000 Y18.000 Z0.300 F30000 E0 ; Move print head to specified coordinates at feed rate of 30000 mm/min without extruding
any filament
  G1 F1500.000 E0.800 ; Extrude 0.8 mm of filament at feed rate of 1500 mm/min
  M106 S0 ; Turn off part cooling fan (set fan speed to 0)
  G0 X185.000 E9.35441 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
  G0 X187 Z0
  G1 F1500.000 E-0.800
  G0 Z1
  G0 X180 Z0.3 F18000
  M900 L1000.0 M1.0 ; This appears to be a custom command and its function may vary depending on the specific 3D printer firmware
  M900 K0.040 ; This sets the linear advance factor (K) to 0.04 (may not be supported by all 3D printer firmware)
  G0 X45.000 F30000 ; Move print head to X position of 45 mm at feed rate of 30000 mm/min
  G0 Y20.000 F30000
  G1 F1500.000 E0.800
  G1 X65.000 E1.24726 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
  G1 X70.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
  G1 X75.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
  G1 X80.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
  G1 X85.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
  G1 X90.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
  G1 X95.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
  G1 X100.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
  G1 X105.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}

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G1 X110.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X115.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X120.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X125.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X130.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X135.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X140.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X145.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X150.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X155.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X160.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X165.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X170.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X175.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X180.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 F1500.000 E-0.800
G1 X183 Z0.15 F30000
G1 X185
G1 Z1.0
G0 Y18.000 F30000
G1 Z0.3
M400; Wait for all moves to finish
G0 X45.000 F30000
M900 K0.020 ; This sets the linear advance factor (K) to 0.02 (may not be supported by all 3D printer firmware)
G0 X45.000 F30000
G0 Y22.000 F30000
G1 F1500.000 E0.800
G1 X65.000 E1.24726 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X70.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X75.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X80.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X85.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X90.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X95.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X100.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X105.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X110.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X115.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X120.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X125.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X130.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X135.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X140.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X145.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X150.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X155.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X160.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X165.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X170.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X175.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X180.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 F1500.000 E-0.800
G1 X183 Z0.15 F30000
G1 X185
G1 Z1.0
G0 Y18.000 F30000
G1 Z0.3
M400; Wait for all moves to finish

G0 X45.000 F30000
M900 K0.000 ; This sets the linear advance factor (K) to 0.00 (may not be supported by all 3D printer firmware)
G0 X45.000 F30000
G0 Y24.000 F30000
G1 F1500.000 E0.800
G1 X65.000 E1.24726 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X70.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X75.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X80.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X85.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X90.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X95.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X100.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X105.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}
G1 X110.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5)/ 4 * 60}
G1 X115.000 E0.31181 F{outer_wall_volumetric_speed/(0.3*0.5) * 60}

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G1 X120.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}  
G1 X125.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}  
G1 X130.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}  
G1 X135.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}  
G1 X140.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}  
G1 X145.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}  
G1 X150.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}  
G1 X155.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}  
G1 X160.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}  
G1 X165.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}  
G1 X170.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}  
G1 X175.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}  
G1 X180.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}  
G1 F1500.000 E-0.800  
G1 X183 Z0.15 F30000  
G1 X185  
G1 Z1.0  
G0 Y18.000 F30000  
G1 Z0.3  
  
G0 X45.000 F30000  
M623 ; Custom command (function may vary depending on specific 3D printer firmware)  
M104 S140 ; Set target temperature for hotend to 140°C but do not wait for it to reach that temperature before proceeding

;===== laser and rgb calibration =====

M400 ; Wait for all moves in planner buffer to complete before proceeding  
M18 E ; Disable stepper motor for extruder  
M500 R ; Custom command (function may vary depending on specific 3D printer firmware)  
M973 S3 P14 ; Custom command (function may vary depending on specific 3D printer firmware)  
G1 X120 Y1.0 Z0.3 F18000.0 ; Move print head to specified coordinates at feed rate of 18000 mm/min  
T1100 ; Select tool number 1100 (unusually high tool number that may not be valid for all 3D printers)  
G1 X143.0 Y1.0 Z0.3 F18000.0 ; Move print head to specified coordinates at feed rate of 18000 mm/min

M400 P100 ; Wait for all moves in planner buffer to complete before proceeding. The "P" parameter appears to be a custom addition and its function may vary depending on the specific 3D printer firmware  
M960 S1 P1 ; Custom command (function may vary depending on specific 3D printer firmware)  
M400 P100 ; Wait for all moves in planner buffer to complete before proceeding. The "P" parameter appears to be a custom addition and its function may vary depending on the specific 3D printer firmware  
M973 S6 P0 ; Custom command (function may vary depending on specific 3D printer firmware)  
M960 S0 P0 ; Custom command (function may vary depending on specific 3D printer firmware)  
G1 X240.0 Y6.0 Z0.3 F18000.0 ; Move print head to specified coordinates at feed rate of 18000 mm/min  
M960 S2 P1 ; Custom command (function may vary depending on specific 3D printer firmware)  
M400 P100 ; Wait for all moves in planner buffer to complete before proceeding. The "P" parameter appears to be a custom addition and its function may vary depending on the specific 3D printer firmware  
M973 S6 P1 ; Custom command (function may vary depending on specific 3D printer firmware)  
M960 S0 P0 ; Custom command (function may vary depending on specific 3D printer firmware)

;===== handeye calibration =====

M1002 judge\_flag extrude\_cali\_flag ; Custom command (function may vary depending on specific 3D printer firmware)  
M622 J1 ; Custom command (function may vary depending on specific 3D printer firmware)

M973 S3 P1 ; Custom command (function may vary depending on specific 3D printer firmware)  
M400 P500 ; Wait for all moves in planner buffer to complete before proceeding. The "P" parameter appears to be a custom addition and its function may vary depending on the specific 3D printer firmware  
M973 S1 ; Custom command (function may vary depending on specific 3D printer firmware)  
G0 F6000 X40.000 Y54.500 Z0.000 ; Rapid move to specified coordinates at feed rate of 6000 mm/min  
M960 S0 P1 ; Custom command (function may vary depending on specific 3D printer firmware)  
M973 S1 ; Custom command (function may vary depending on specific 3D printer firmware)  
M400 P800 ; Wait for all moves in planner buffer to complete before proceeding. The "P" parameter appears to be a custom addition and its function may vary depending on the specific 3D printer firmware  
M971 S6 P0 ; Custom command (function may vary depending on specific 3D printer firmware)  
M973 S2 P16000 ; Custom command (function may vary depending on specific 3D printer firmware)  
M400 P500 ; Wait for all moves in planner buffer to complete before proceeding. The "P" parameter appears to be a custom addition and its function may vary depending on the specific 3D printer firmware  
G0 Z0.000 F12000; Rapid move along Z axis at feed rate of 12000 mm/min  
M960 S0 P0; Custom command (function may vary depending on specific 3D printer firmware)  
M960 S0 P0  
M960 S1 P1  
G0 Y37.50  
M400 P200  
M971 S5 P1  
M960 S0 P0  
M960 S2 P1  
G0 Y54.50

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M400 P200
M971 S5 P3
G0 Z0.500 F12000
M960 S0 P0
M960 S1 P1
G0 Y37.50
M400 P200
M971 S5 P2
M960 S0 P0
M960 S2 P1
G0 Y54.50
M400 P500
M971 S5 P4
M963 S1
M400 P1500
M964
T1100
G0 F6000 X40.000 Y54.500 Z0.000
M960 S0 P1
M973 S1
M400 P800
M971 S6 P0
M973 S2 P16000
M400 P500
G0 Z0.000 F12000
M960 S0 P0
M960 S1 P1
G0 Y37.50
M400 P200
M971 S5 P1
M960 S0 P0
M960 S2 P1
G0 Y54.50
M400 P200
M971 S5 P3
G0 Z0.500 F12000
M960 S0 P0
M960 S1 P1
G0 Y37.50
M400 P200
M971 S5 P2
M960 S0 P0
M960 S2 P1
G0 Y54.50
M400 P500
M971 S5 P4
M963 S1
M400 P1500
M964
T1100
G1 Z3 F3000
M400 ; Wait for all moves to finish
M500 ; Save current settings to EEPROM

M104 S{nozzle_temperature[initial_extruder]} ; Set extruder temperature

T1100 ; Select tool 1100
M400 P400 ; Wait for all moves to finish with a timeout of 400ms
M960 S0 P0 ; Set servo 0 position to 0 degrees
G0 F30000.000 Y22.000 X65.000 Z0.000 ; Rapid move to specified coordinates at specified speed
M400 P400 ; Wait for all moves to finish with a timeout of 400ms
M960 S1 P1 ; Set servo 1 position to 1 degree
M400 P50 ; Wait for all moves to finish with a timeout of 50ms

M969 S1 N3 A2000 ; Set laser power to 2000 with a delay of 3 seconds and enable laser with S1
G0 F360.000 X181.000 Z0.000 ; Rapid move to specified coordinates at specified speed
M980.3 A70.000 B{outer_wall_volumetric_speed/(1.75*1.75/4*3.14)*60/4} C5.000
D{outer_wall_volumetric_speed/(1.75*1.75/4*3.14)*60} E5.000 F175.000 H1.000 I0.000 J0.020 K0.040 ; Custom M-code for specific
machine operation
M400 P100 ; Wait for all moves to finish with a timeout of 100ms
G0 F20000 ; Set rapid move speed to 20000mm/min
G0 Z1 ; Rapid move to specified Z coordinate
T1000 ; Select tool 1000
G0 X45 Y16 F30000 ; Rapid move to specified coordinates at specified speed
M969 S0 ; Disable laser with S0

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M960 S0 P0 ; Set servo 0 position to 0 degrees

G1 Z2 F20000

T1000

G0 X45.000 Y16.000 F30000 E0

M109 S{nozzle\_temperature[initial\_extruder]}

G0 Z0.3

G1 F1500.000 E3.600

G1 X65.000 E1.24726 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X70.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X75.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X80.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X85.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X90.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X95.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X100.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X105.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X110.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X115.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X120.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X125.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X130.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X135.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

M1002 judge\_last\_extrude\_cali\_success ; Custom M-code for specific machine operation

M622 J0 ; Custom M-code for specific machine operation

M400 ; Wait for all moves to finish

M900 K0.02 M{outer\_wall\_volumetric\_speed/(1.75\*1.75/4\*3.14)\*0.02} ; Set linear advance factor K and volumetric extrusion rate M

M623 ; Custom M-code for specific machine operation

G1 X140.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X145.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X150.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X155.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X160.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X165.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X170.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X175.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X180.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X185.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X190.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X195.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X200.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X205.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X210.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X215.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

G1 X220.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5)/ 4 \* 60}

G1 X225.000 E0.31181 F{outer\_wall\_volumetric\_speed/(0.3\*0.5) \* 60}

M973 S4 ; Custom M-code for specific machine operation with parameter S4

M623 ; Custom M-code for specific machine operation

;=====turn off light and wait extrude temperature =====

M1002 gcode\_claim\_action : 0 ; Custom M-code for specific machine operation with parameter 0

M973 S4 ; Custom M-code for specific machine operation with parameter S4

M400 ; Wait for all moves to finish

M109 S[nozzle\_temperature\_initial\_layer] ; Set extruder temperature and wait for it to reach target temperature

M960 S1 P0 ; Set servo 1 position to 0 degrees

M960 S2 P0 ; Set servo 2 position to 0 degrees

M106 S0 ; Turn off fan with speed set to 0%

M106 P2 S0 ; Turn off fan number 2 with speed set to 0%

M106 P3 S0 ; Turn off fan number 3 with speed set to 0%

M975 S1 ; Custom M-code for specific machine operation with parameter S1

G90 ; Set absolute positioning mode

M83 ; Set relative extrusion mode

T1000 ; Select tool number 1000

G1 E{-retraction\_length[initial\_extruder]} F1800 ; Retract filament at specified speed

G1 X128.000 Y253.000 Z0.200 F24000.000 ; Move to specified coordinates at specified speed

G1 E{retraction\_length[initial\_extruder]} F1800 ; Unretract filament at specified speed

M109 S{nozzle\_temperature\_initial\_layer[initial\_extruder]} ; Set extruder temperature and wait for it to reach target temperature

G0 X253 E6.400 F{outer\_wall\_volumetric\_speed/(0.300\* \*60)} ; Move in a straight line while extruding filament at specified volumetric speed

G0 Y128 E6.400 ; Move in a straight line while extruding filament

G0 X252.500 ; Move in a straight line without extruding filament

G0 Y252.500 E6.400 ; Move in a straight line while extruding filament

G0 X128 E6.400 ; Move in a straight line while extruding filament

**V příloze je tento soubor ke stažení**