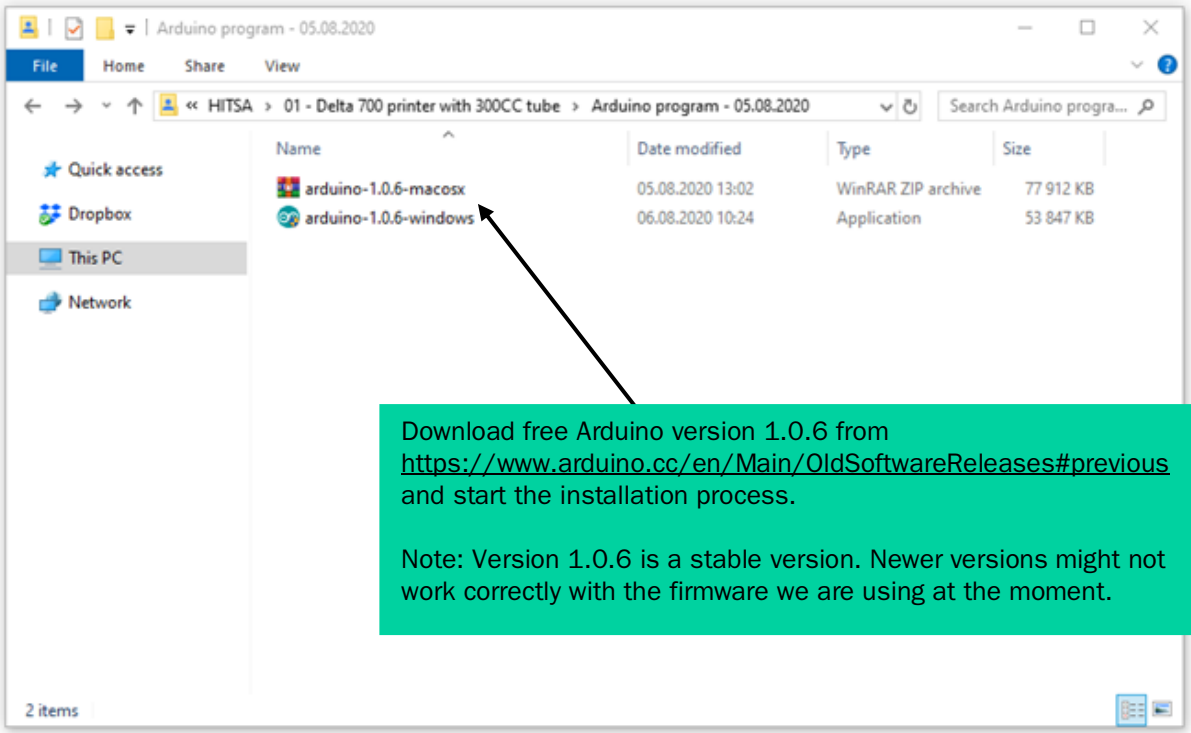
# WASP 2040 3D printer firmware user guide for Arduino IDE and Marlin

# In this document:

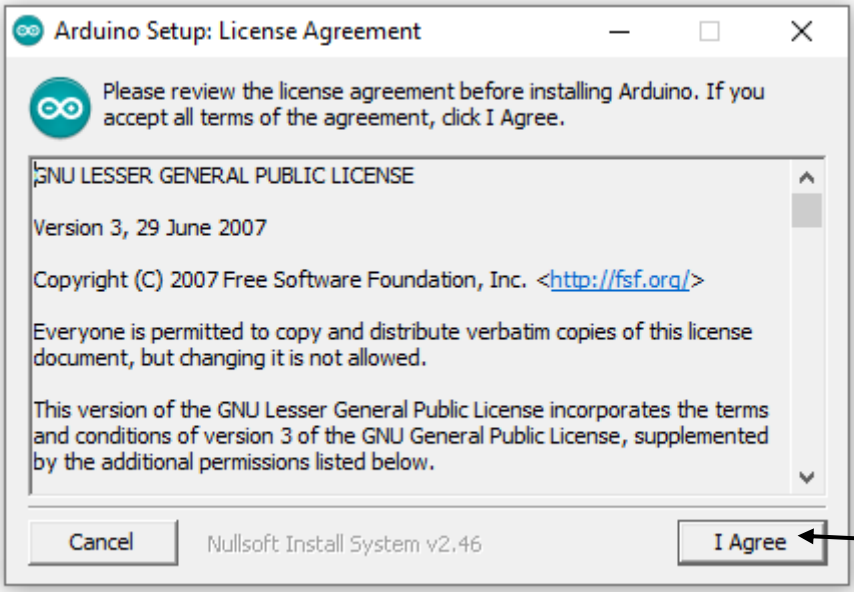
1. Installing and configuring Arduino Integrated Development Environment (IDE) for the **WASP 2040 3D printer** with **pneumatic clay extruder.**
2. Configuring and flashing firmware for the **WASP 2040 3D printer** controller.

# 1. Installing and configuring the Arduino Integrated Development Environment (IDE) for Wasp 2040 3D printer with pneumatic clay extruder.

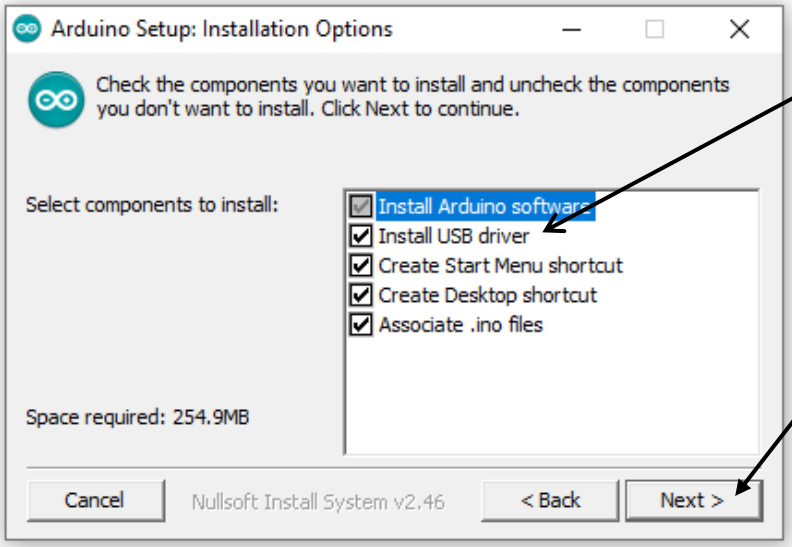



Download free Arduino version 1.0.6 from https://www.arduino.cc/en/Main/OldSoftwareReleases#previous and start the installation process.

Note: Version 1.0.6 is a stable version. Newer versions might not work correctly with the firmware we are using at the moment.

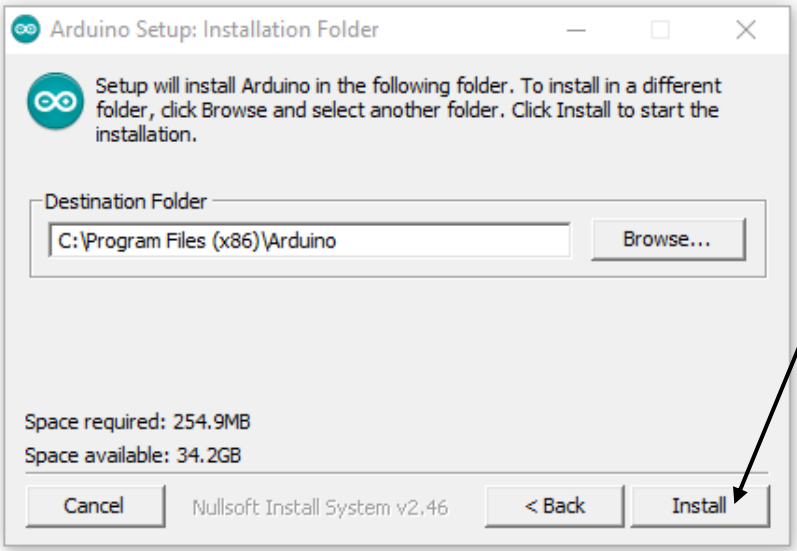



Agree

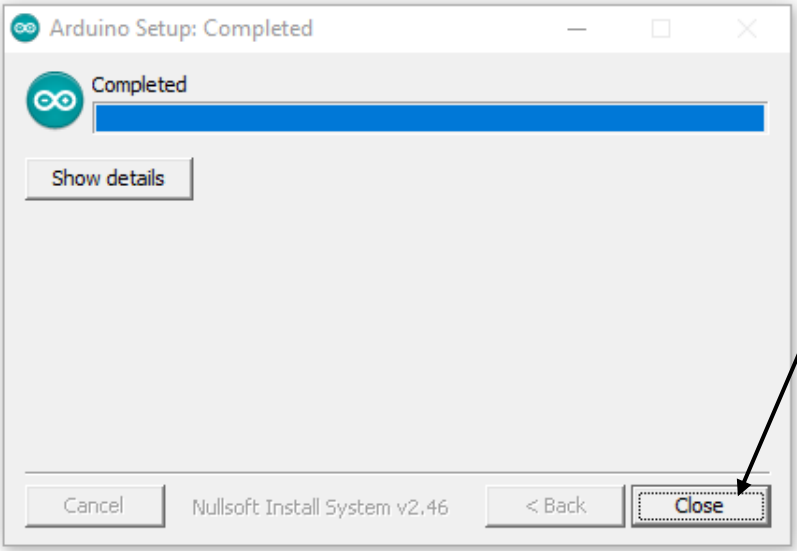



Arduino USB driver is needed to connect the printer with the computer

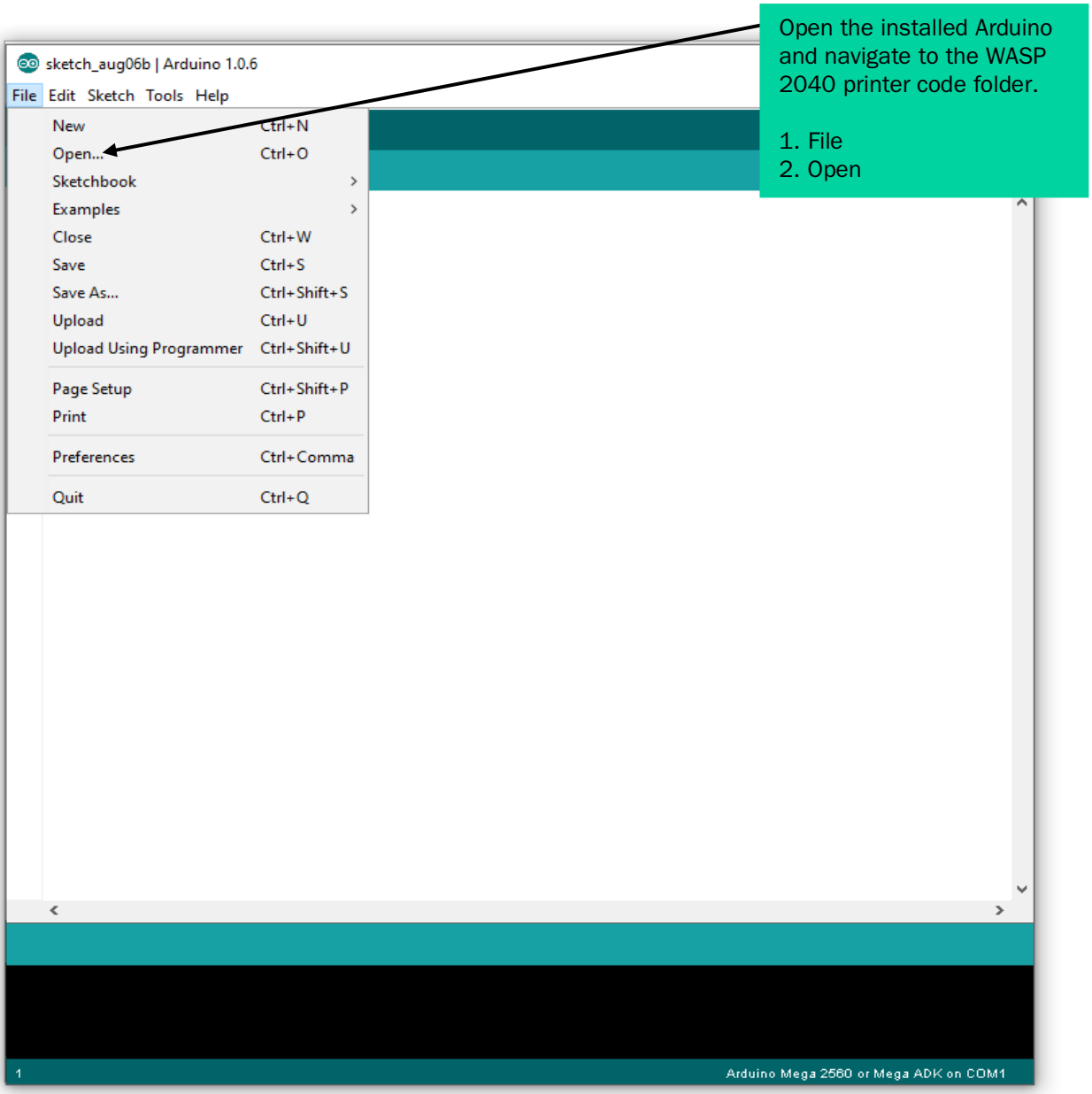
Next

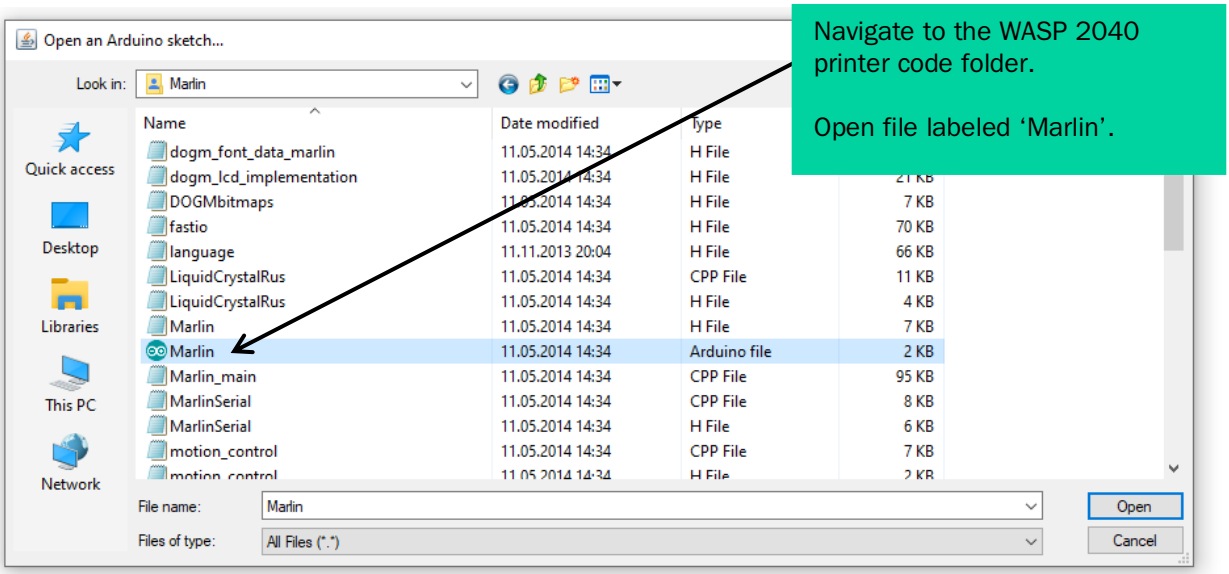


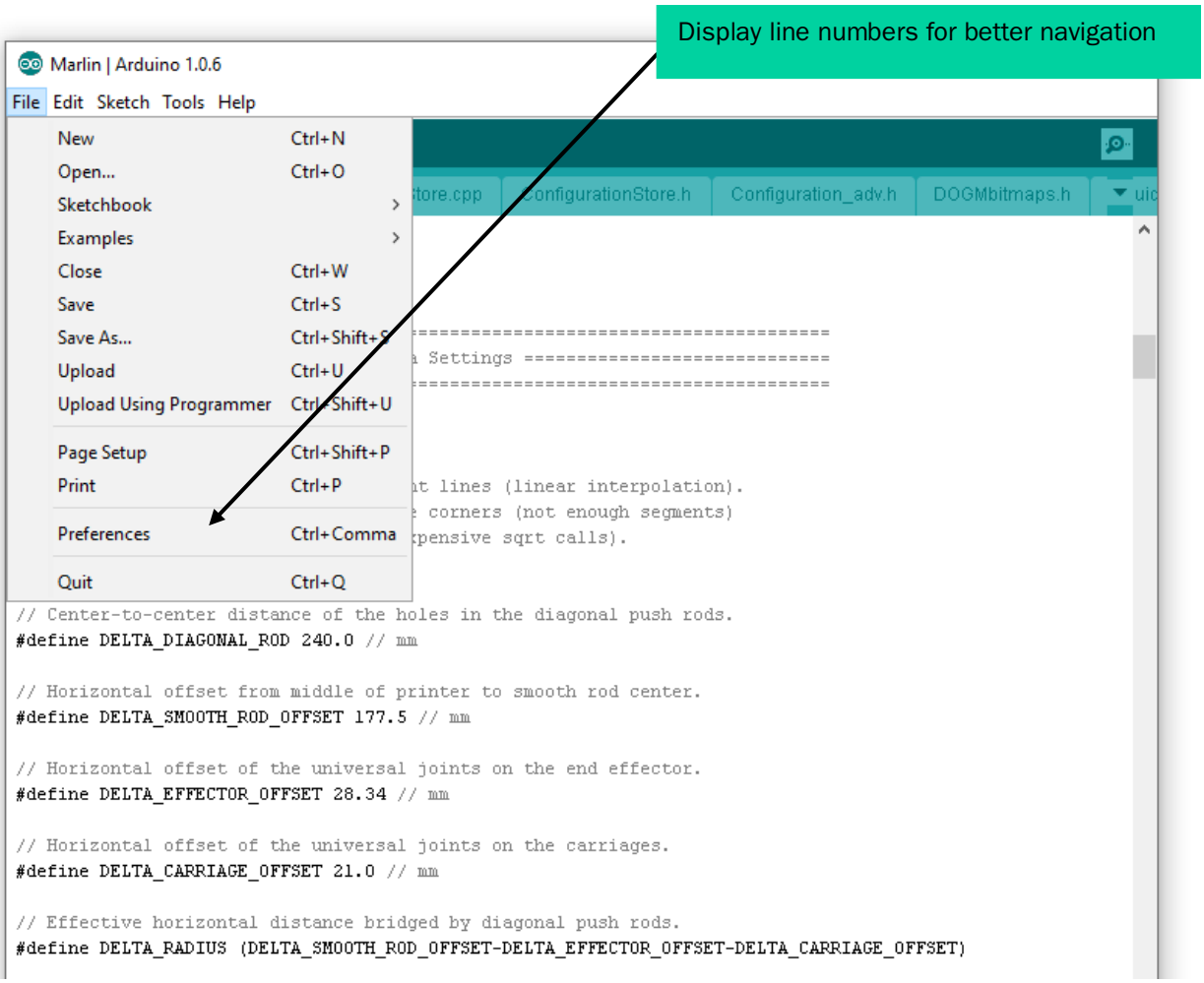

Install

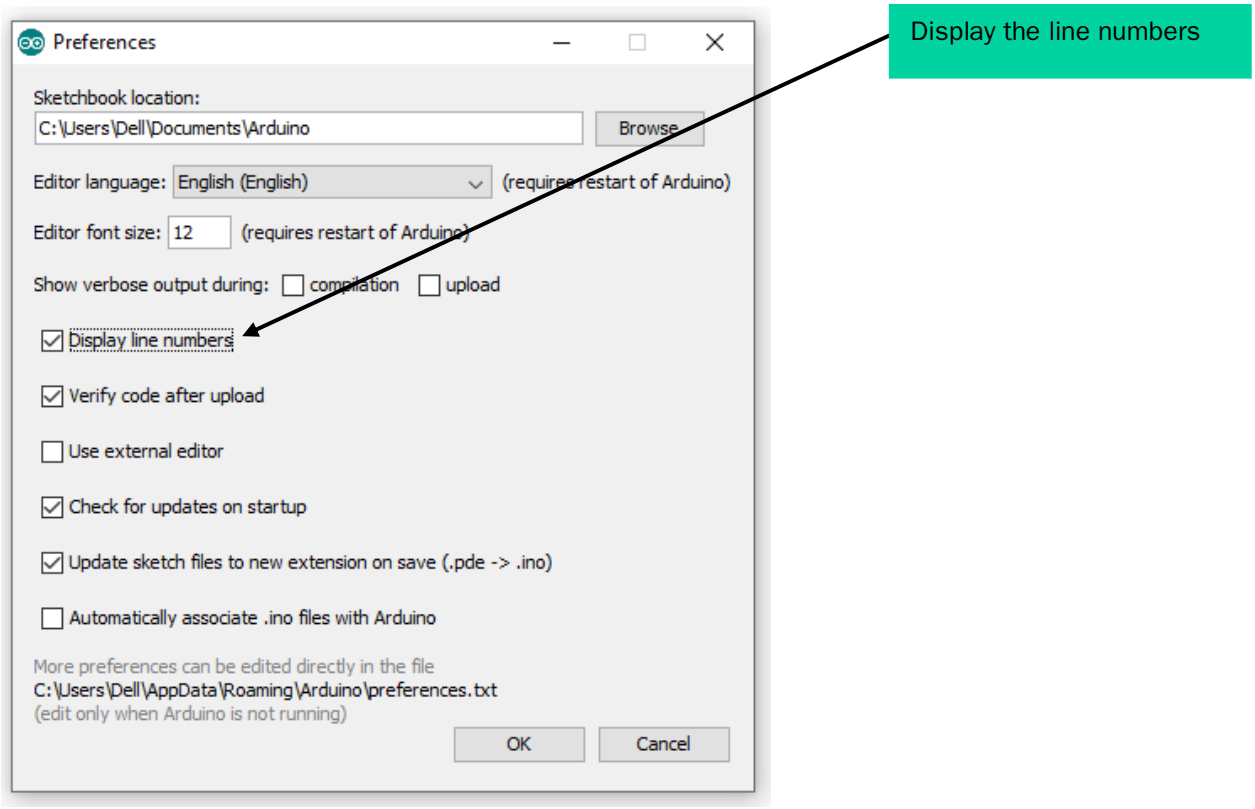


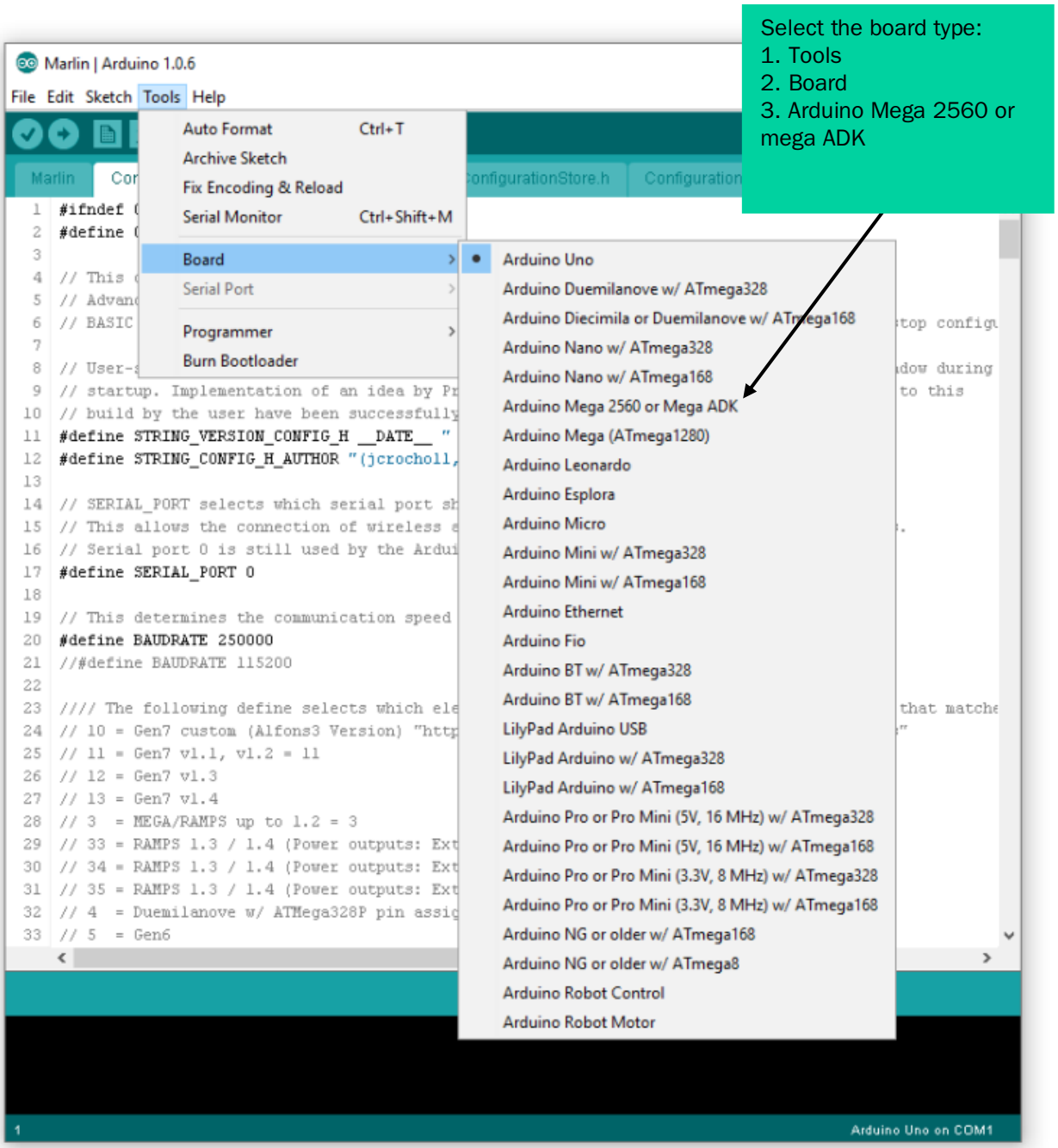

Close

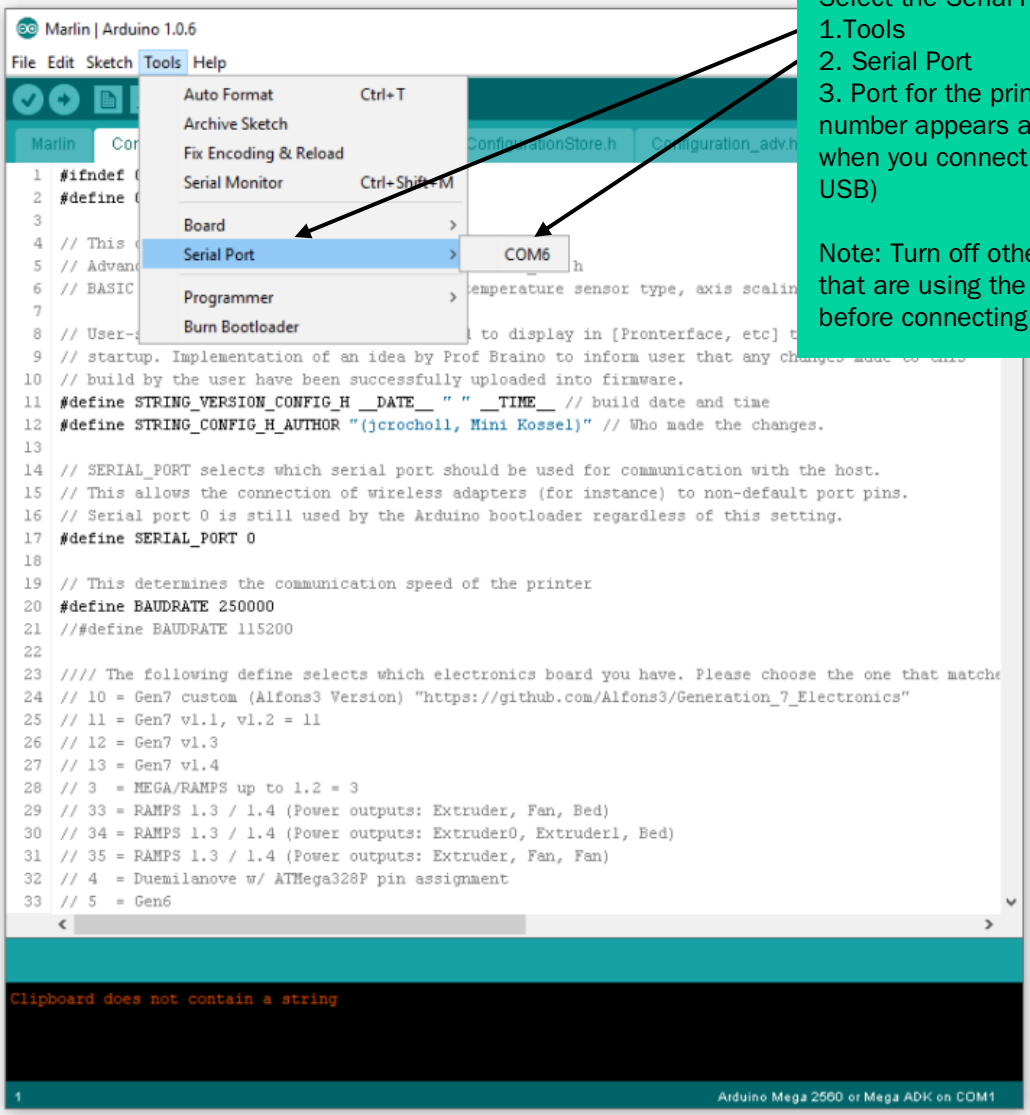

Open the installed Arduino and navigate to the WASP 2040 printer code folder.
1. File
2. Open
sketch_aug06b | Arduino 1.0.6
File Edit Sketch Tools Help
New Ctrl+N
Open... Ctrl+O
Sketchbook
Examples
Close Ctrl+W
Save Ctrl+S
Save As... Ctrl+Shift+S
Upload Ctrl+U
Upload Using Programmer Ctrl+Shift+U
Page Setup Ctrl+Shift+P
Print Ctrl+P
Preferences Ctrl+Comma
Quit Ctrl+Q
1
Arduino Mega 2560 or Mega ADK on COM1


Navigate to the WASP 2040 printer code folder.
Open file labeled ‘Marlin’.
Open an Arduino sketch...
Look in: Marlin
Quick access
Desktop
Libraries
This PC
Network
Name
Date modified
Type
dogm_font_data_marlin 11.05.2014 14:34 H File
dogm_lcd_implementation 11.05.2014 14:34 H File
DOGMbitmaps 11.05.2014 14:34 H File 7 KB
fastio 11.05.2014 14:34 H File 70 KB
language 11.11.2013 20:04 H File 66 KB
LiquidCrystalRus 11.05.2014 14:34 CPP File 11 KB
LiquidCrystalRus 11.05.2014 14:34 H File 4 KB
Marlin 11.05.2014 14:34 H File 7 KB
Marlin 11.05.2014 14:34 Arduino file 2 KB
Marlin_main 11.05.2014 14:34 CPP File 95 KB
MarlinSerial 11.05.2014 14:34 CPP File 8 KB
MarlinSerial 11.05.2014 14:34 H File 6 KB
motion_control 11.05.2014 14:34 CPP File 7 KB
File name: Marlin
Files of type: All Files (*.*)
Open
Cancel


Display line numbers for better navigation
Marlin | Arduino 1.0.6
File Edit Sketch Tools Help
New Ctrl+N
Open... Ctrl+O
Sketchbook
Examples
Close Ctrl+W
Save Ctrl+S
Save As... Ctrl+Shift+S
Upload Ctrl+U
Upload Using Programmer Ctrl+Shift+U
Page Setup Ctrl+Shift+P
Print Ctrl+P
Preferences Ctrl+Comma
Quit Ctrl+Q
ConfigurationStore.h
Configuration_adv.h
DOGMbitmaps.h
// Center-to-center distance of the holes in the diagonal push rods.
#define DELTA_DIAGONAL_ROD 240.0 // mm
// Horizontal offset from middle of printer to smooth rod center.
#define DELTA_SMOOTH_ROD_OFFSET 177.5 // mm
// Horizontal offset of the universal joints on the end effector.
#define DELTA_EFFECTOR_OFFSET 28.34 // mm
// Horizontal offset of the universal joints on the carriages.
#define DELTA_CARRIAGE_OFFSET 21.0 // mm
// Effective horizontal distance bridged by diagonal push rods.
#define DELTA_RADIUS (DELTA_SMOOTH_ROD_OFFSET-DELTA_EFFECTOR_OFFSET-DELTA_CARRIAGE_OFFSET)


Display the line numbers
Preferences
Sketchbook location:
C:\Users\Dell\Documents\Arduino
Browse
Editor language: English (English) (requires restart of Arduino)
Editor font size: 12 (requires restart of Arduino)
Show verbose output during: compilation upload
Display line numbers
Verify code after upload
Use external editor
Check for updates on startup
Update sketch files to new extension on save (.pde -> .ino)
Automatically associate .ino files with Arduino
More preferences can be edited directly in the file
C:\Users\Dell\AppData\Roaming\Arduino\preferences.txt
(edit only when Arduino is not running)
OK
Cancel

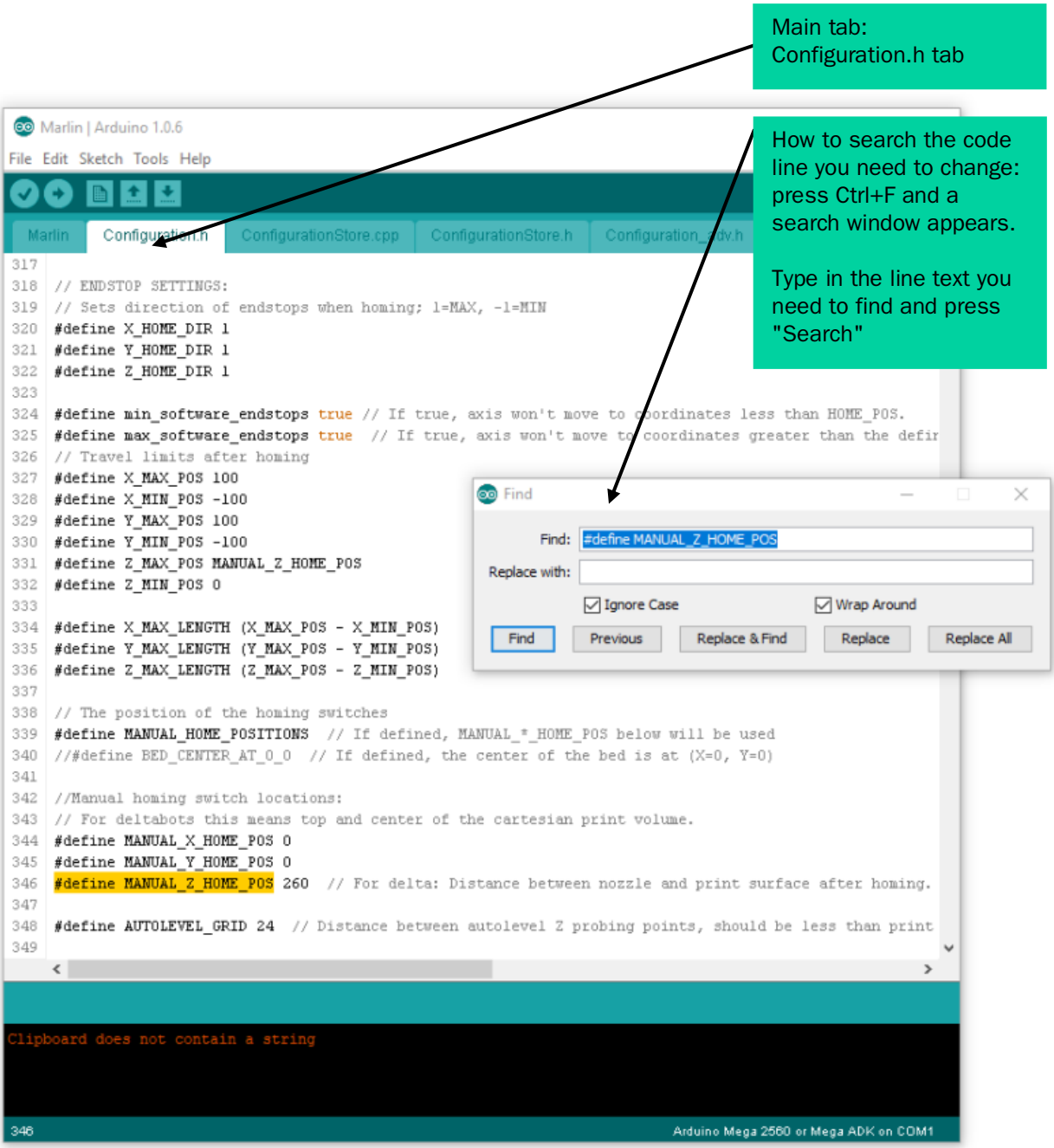

Select the board type:
1. Tools
2. Board
3. Arduino Mega 2560 or mega ADK
Marlin | Arduino 1.0.6
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Serial Monitor Ctrl+Shift+M
Board
Serial Port
Programmer
Burn Bootloader
Arduino Uno
Arduino Duemilanove w/ ATmega328
Arduino Diecimila or Duemilanove w/ ATmega168
Arduino Nano w/ ATmega328
Arduino Nano w/ ATmega168
Arduino Mega 2560 or Mega ADK
Arduino Mega (ATmega1280)
Arduino Leonardo
Arduino Esplora
Arduino Micro
Arduino Mini w/ ATmega328
Arduino Mini w/ ATmega168
Arduino Ethernet
Arduino Fio
Arduino BT w/ ATmega328
Arduino BT w/ ATmega168
LilyPad Arduino USB
LilyPad Arduino w/ ATmega328
LilyPad Arduino w/ ATmega168
Arduino Pro or Pro Mini (5V, 16 MHz) w/ ATmega328
Arduino Pro or Pro Mini (5V, 16 MHz) w/ ATmega168
Arduino Pro or Pro Mini (3.3V, 8 MHz) w/ ATmega328
Arduino Pro or Pro Mini (3.3V, 8 MHz) w/ ATmega168
Arduino NG or older w/ ATmega168
Arduino NG or older w/ ATmega8
Arduino Robot Control
Arduino Robot Motor
Arduino Uno on COM1



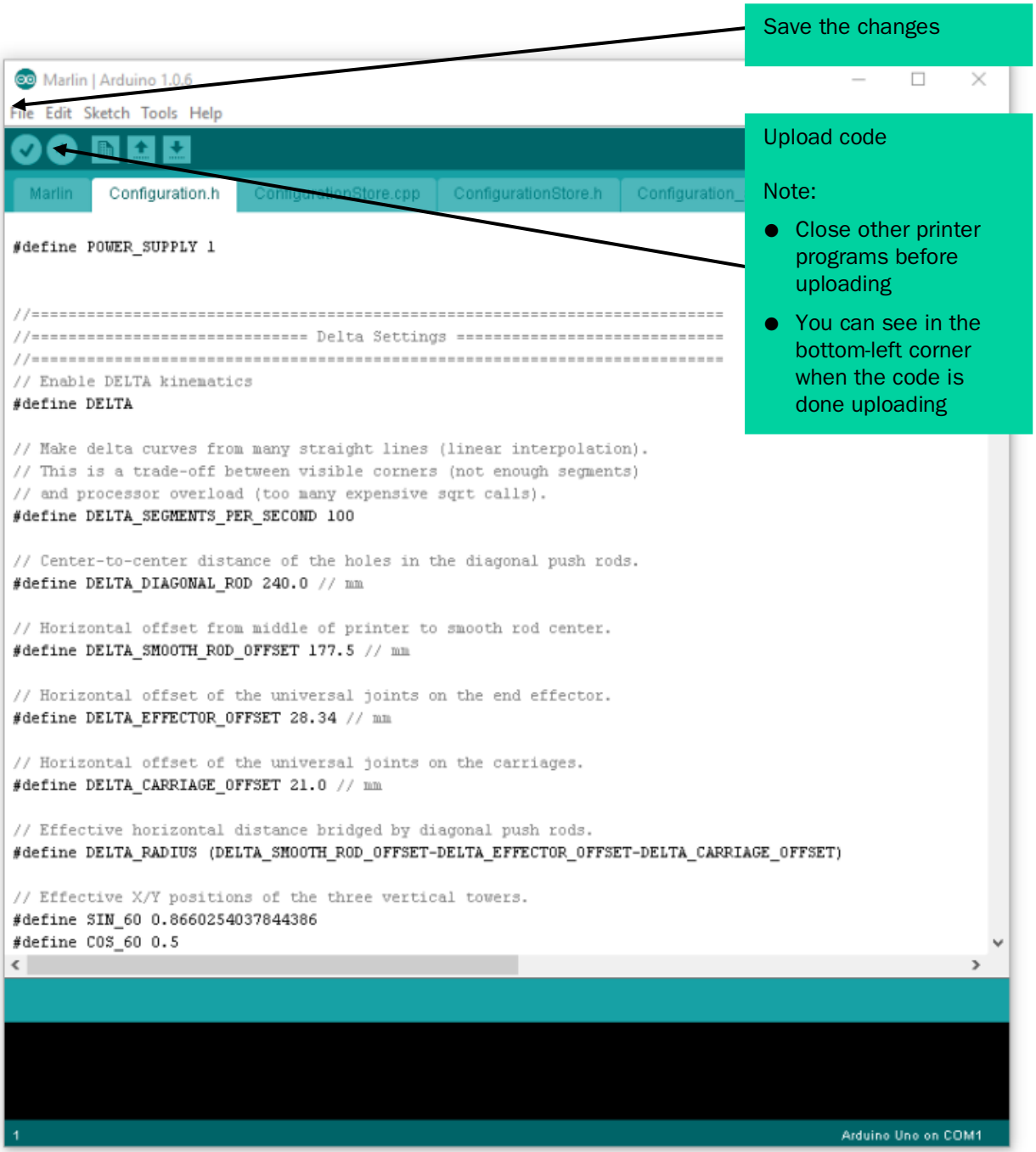

Select the Serial Port:
1.Tools
2. Serial Port
3. Port for the printer (port number appears automatically when you connect the printer USB)

Note: Turn off other programs that are using the printer before connecting to the port

# 2. Configuring and flashing firmware for the Wasp 2040 3D printer controller.



## Uploading the firmware code to the printer



## Printer test codes (Source: marlinfw.org):

| | | |
|---|---|---|
| G0-G1: Linear Move | M82: E Absolute | M290: Babystep |
| G2-G3: Controlled Arc Move | M83: E Relative | M300: Play Tone |
| G4: Dwell | M85: Inactivity Shutdown | M301: Set Hotend PID |
| G5: Bézier cubic spline | M92: Set Axis Steps-per-unit | **M302: Cold Extrude** |
| G10: Retract | M100: Free Memory | M303: PID autotune |
| G11: Recover | M104: Set Hotend Temperature | M304: Set Bed PID |
| G12: Clean the Nozzle | **M105: Report Temperatures** | M350: Set micro-stepping |
| G20: Inch Units | M106: Set Fan Speed | M351: Set Microstep Pins |
| G21: Millimeter Units | M107: Fan Off | M355: Case Light Control |
| G26: Mesh Validation Pattern | M108: Break and Continue | M360: SCARA Theta A |
| G27: Park the nozzle | M109: Wait for Hotend Temperature | M361: SCARA Theta-B |
| G28: Auto Home | M110: Set Line Number | M362: SCARA Psi-A |
| G29: Mesh Bed Leveling | M111: Debug Level | M363: SCARA Psi-B |
| G29: Automatic Bed Leveling | **M112: Emergency Stop** | M364: SCARA Psi-C |
| G29: Unified Bed Leveling | M113: Host Keepalive | M380: Activate Solenoid |
| G30: Single Z-Probe | M114: Get Current Position | M381: Deactivate Solenoids |
| G31: Dock Sled | M115: Firmware Info | M400: Finish Moves |
| G32: Undock Sled | M117: Set LCD Message | M401: Deploy Probe |
| G33: Delta Auto Calibration | M118: Serial print | M402: Stow Probe |
| G38.2-G38.3: Probe target | **M119: Endstop States** | M404: Set Filament Diameter |
| G42: Move to mesh coordinate | **M120: Enable Endstops** | M405: Filament Width Sensor On |
| G90: Absolute Positioning | **M121: Disable Endstops** | M406: Filament Width Sensor Off |
| G91: Relative Positioning | M122: TMC Debugging | M407: Filament Width |
| G92: Set Position | M125: Park Head | M410: Quickstop |
| M0-M1: Unconditional stop | M126: Baricuda 1 Open | M420: Bed Leveling State |
| M3: Spindle CW / Laser On | M127: Baricuda 1 Close | M421: Set Mesh Value |
| M4: Spindle CCW / Laser On | M128: Baricuda 2 Open | M428: Home Offsets Here |
| M5: Spindle / Laser Off | M129: Baricuda 2 Close | **M500: Save Settings** |
| M17: Enable Steppers | **M140: Set Bed Temperature** | **M501: Restore Settings** |
| M18-M84: Disable steppers | M145: Set Material Preset | **M502: Factory Reset** |
| M20: List SD Card | **M149: Set Temperature Units** | **M503: Report Settings** |
| M21: Init SD card | M150: Set RGB(W) Color | M504: Validate EEPROM contents |
| M22: Release SD card | **M155: Temperature Auto-Report** | M540: Endstops Abort SD |
| M23: Select SD file | M163: Set Mix Factor | M600: Filament Change |
| M24: Start or Resume SD print | M164: Save Mix | M603: Configure Filament Change |
| M25: Pause SD print | M165: Set Mix | M605: Dual Nozzle Mode |
| M26: Set SD position | M190: Wait for Bed Temperature | M665: Delta Configuration |
| M27: Report SD print status | M200: Set Filament Diameter | M665: SCARA Configuration |
| M28: Start SD write | M201: Set Print Max Acceleration | M666: Set Delta endstop adjustments |
| M29: Stop SD write | M203: Set Max Feedrate | M666: Set dual endstop offsets |
| M30: Delete SD file | M204: Set Starting Acceleration | M851: Z Probe Offset |
| M31: Print time | M205: Set Advanced Settings | M852: Bed Skew Compensation |
| M32: Select and Start | M206: Set Home Offsets | M900: Linear Advance Factor |
| M33: Get Long Path | M207: Set Firmware Retraction | M906: TMC Motor Current |
| M34: SDCard Sorting | M208: Set Firmware Recovery | M907: Set Motor Current |
| M42: Set Pin State | M209: Set Auto Retract | M908: Set Trimpot Pins |
| M43: Debug Pins | **M211: Software Endstops** | M909: DAC Print Values |
| M43 T: Toggle Details (Debug Pins) | M218: Set Hotend Offset | M910: Commit DAC to EEPROM |
| M48: Probe Accuracy Test | **M220: Set Feedrate Percentage** | M911: TMC OT Pre-Warn Condition |
| M73: Set Print Progress | **M221: Set Flow Percentage** | M912: Clear TMC OT Pre-Warn |
| M75: Start Print Job | M226: Wait for Pin State | M913: Set Hybrid Threshold Speed |
| M76: Pause Print Job | M240: Trigger Camera | M914: TMC Bump Sensitivity |
| M77: Stop Print Job | M250: LCD Contrast | M915: TMC Z axis calibration |
| M78: Print Job Stats | M260: I2C Send | M928: Start SD Logging |
| M80: Power On | M261: I2C Request | M999: STOP Restart |
| M81: Power Off | M280: Servo Position | |

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Compiled by **Madis Kaasik and Lauri Kilusk, Estonian Academy of Arts**, January 2021