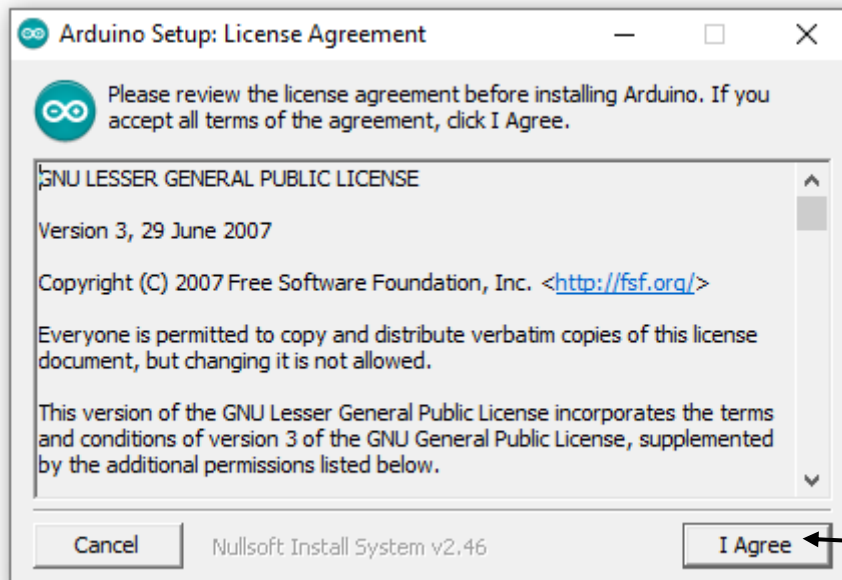
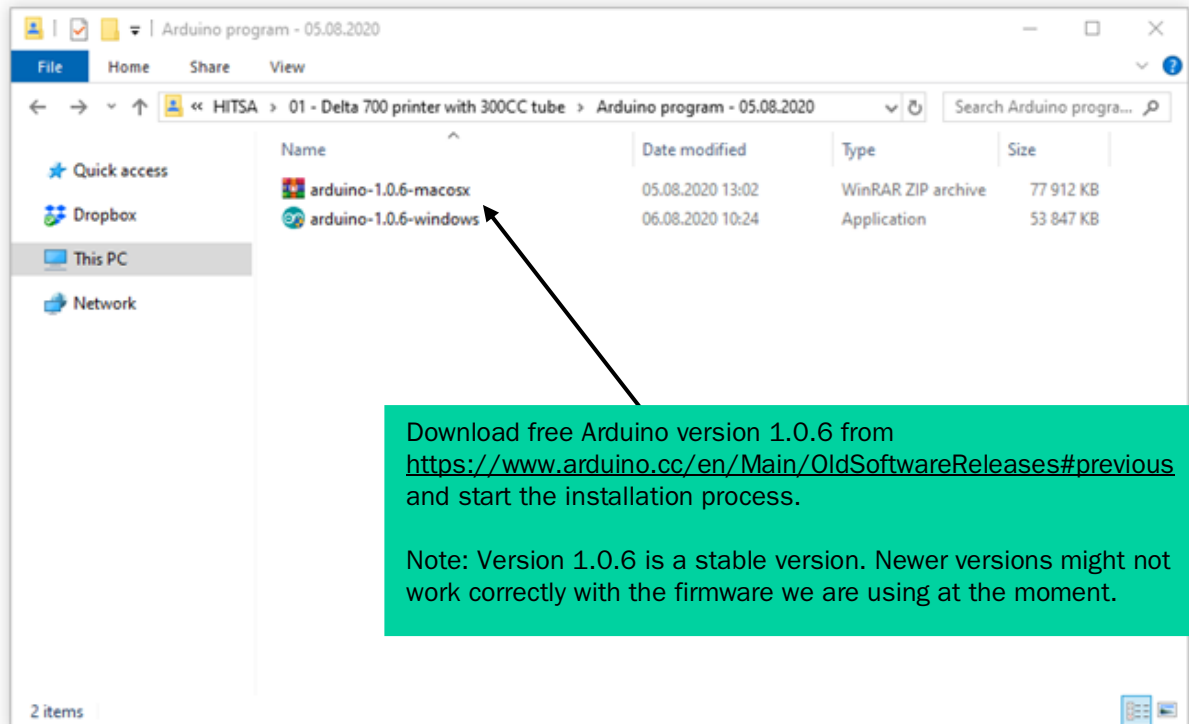


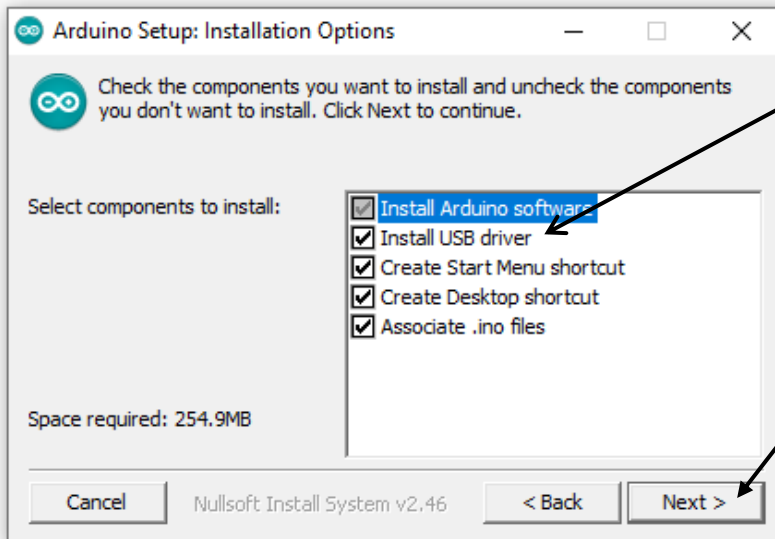
**Delta 900 3D printer firmware user guide  
for Arduino IDE and Marlin**

## **In this document:**

- 1.** Installing and configuring Arduino Integrated Development Environment (IDE) for the **Delta 900 viscous materials 3D printer** with **ram (mechanical) extruder**.
- 2.** Configuring and flashing firmware for the **Delta 900 viscous materials 3D printer** controller.

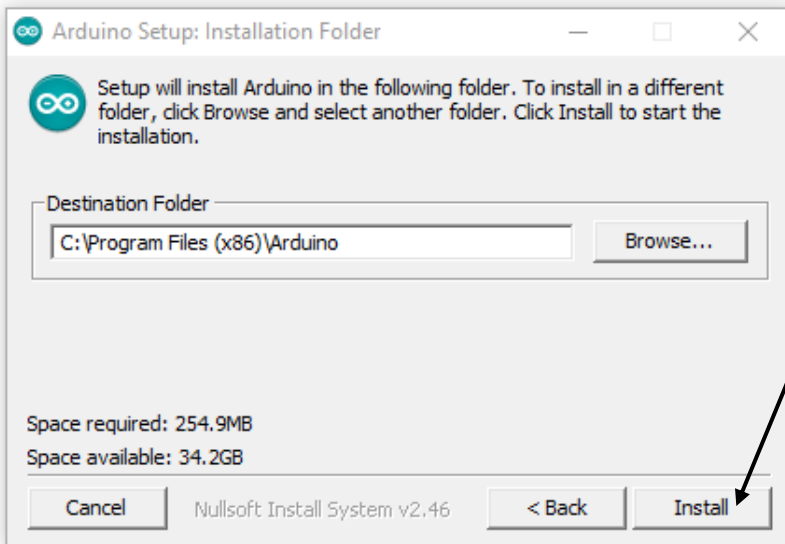
# 1. Installing and configuring the Arduino Integrated Development Environment (IDE) for Delta 900 viscous materials 3D printer with ram extruder



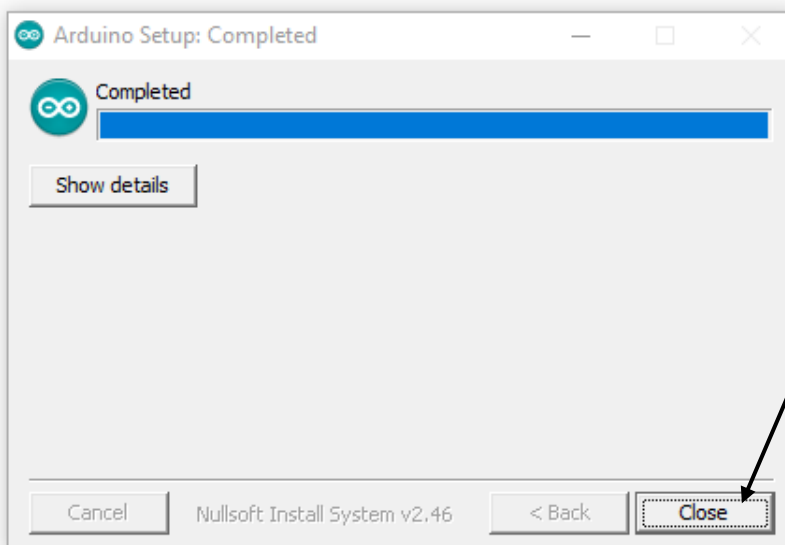


Arduino USB driver is needed to connect the printer with the computer

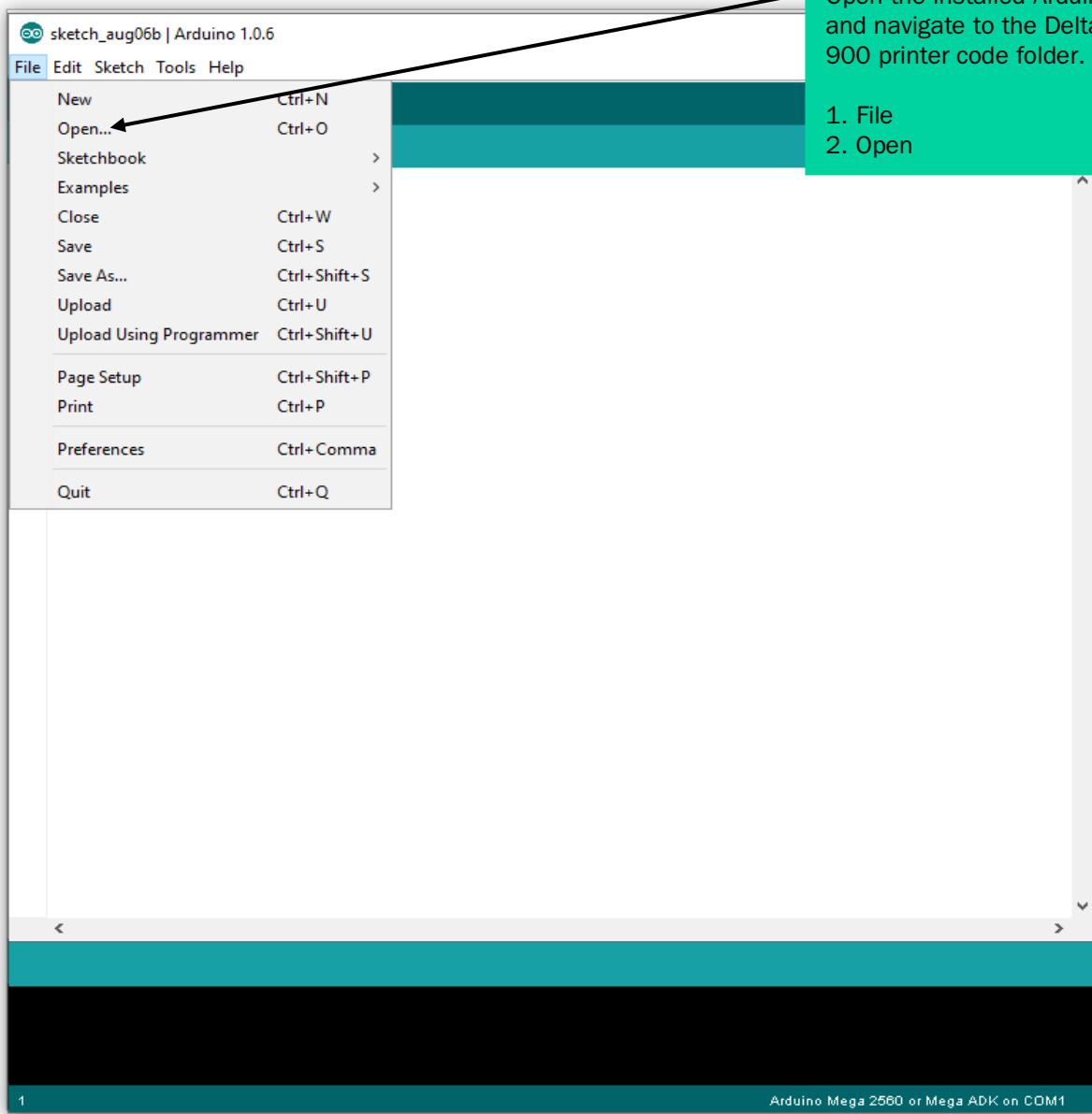
Next



Install

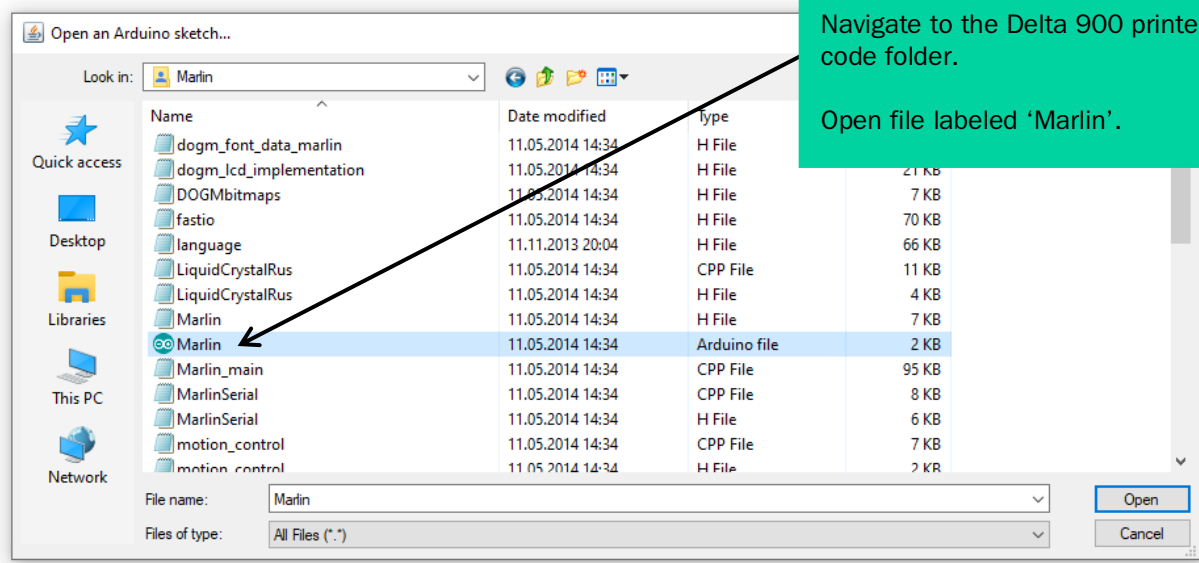


Close



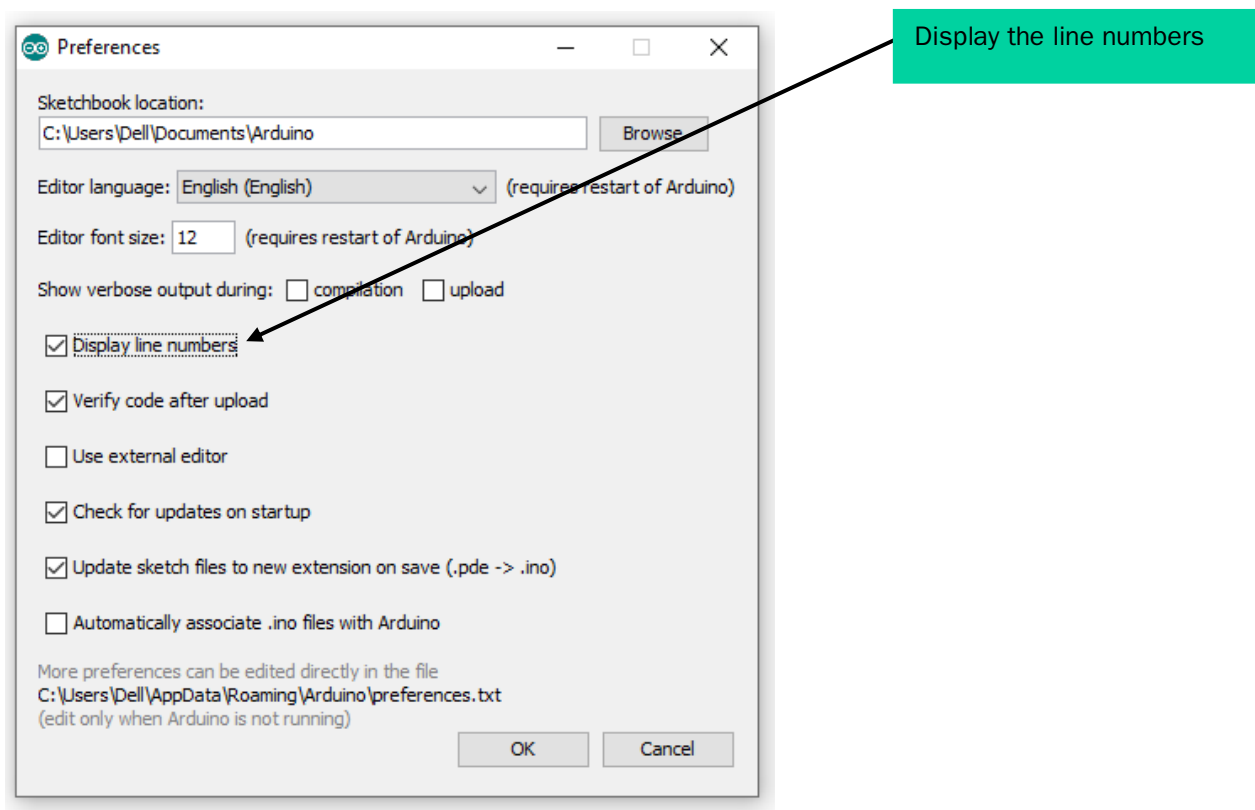
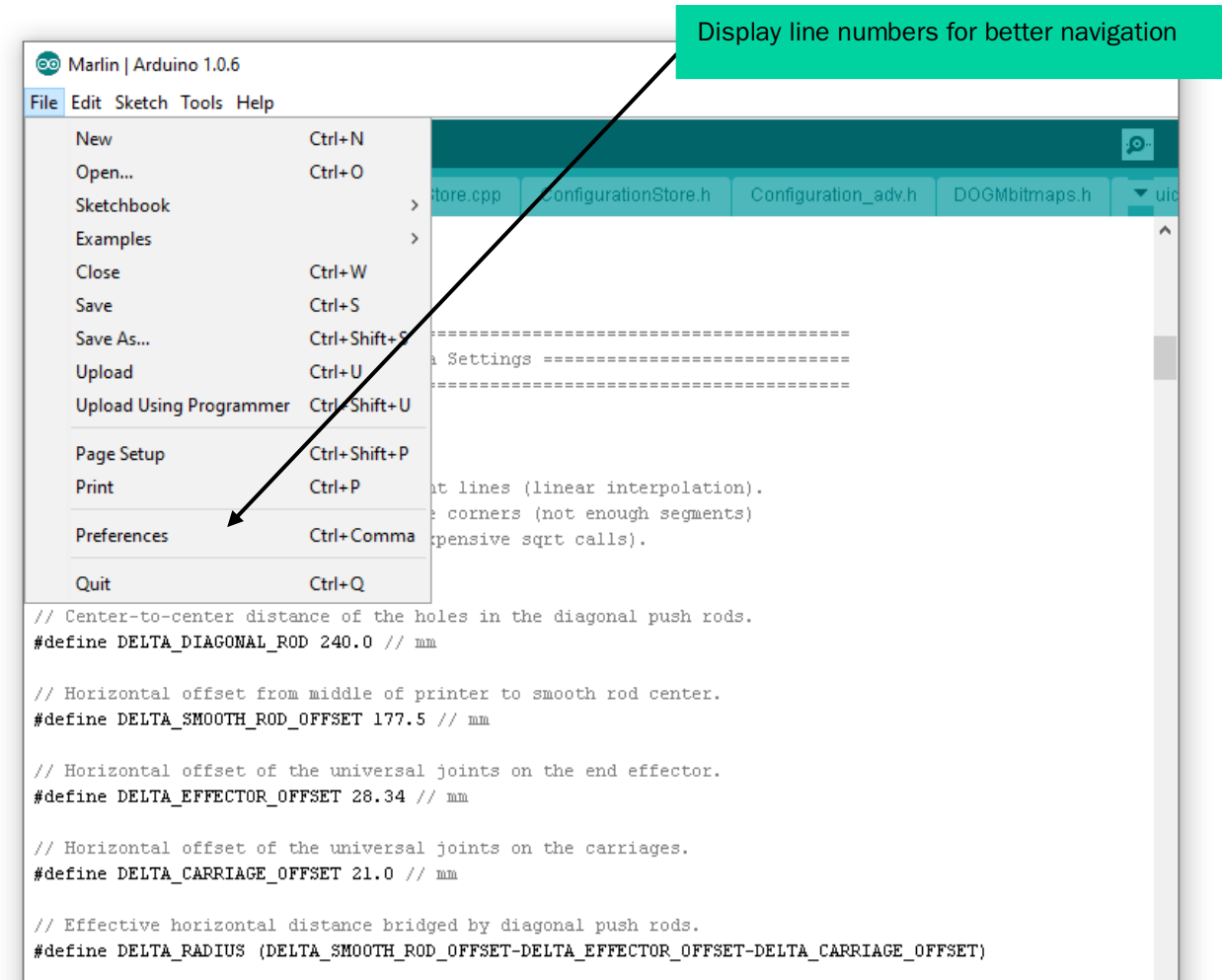
Open the installed Arduino and navigate to the Delta 900 printer code folder.

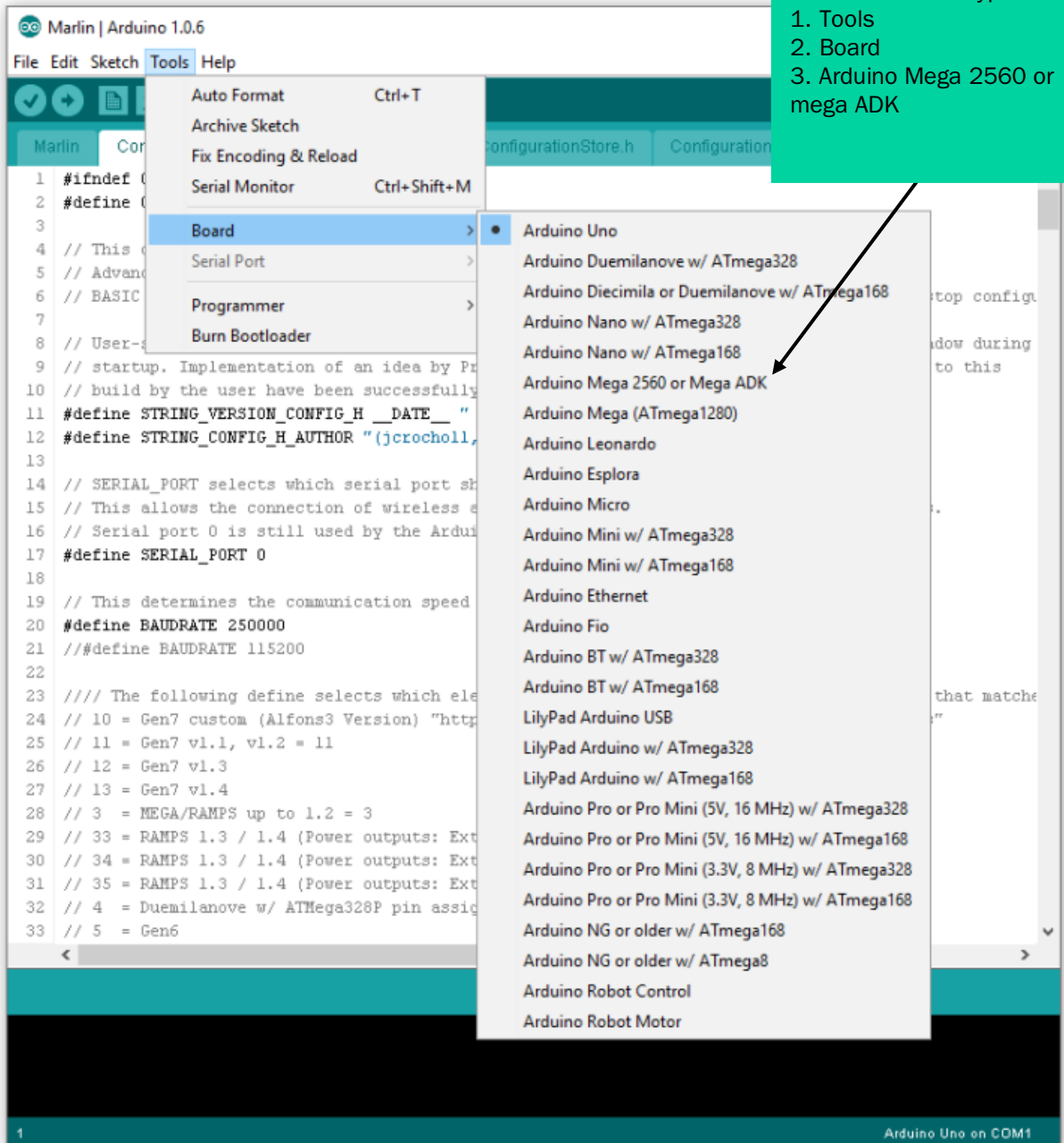
1. File
2. Open

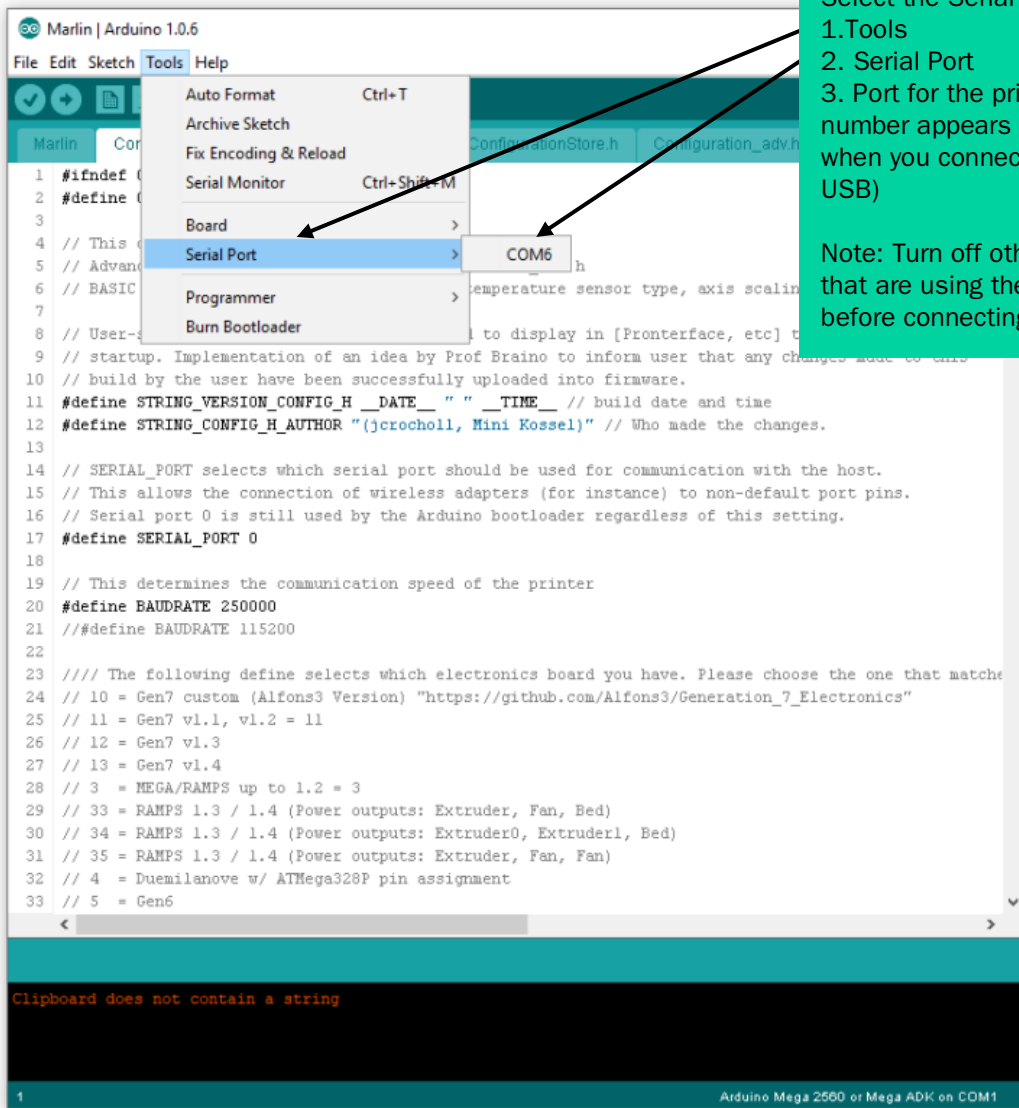


Navigate to the Delta 900 printer code folder.

Open file labeled 'Marlin'.







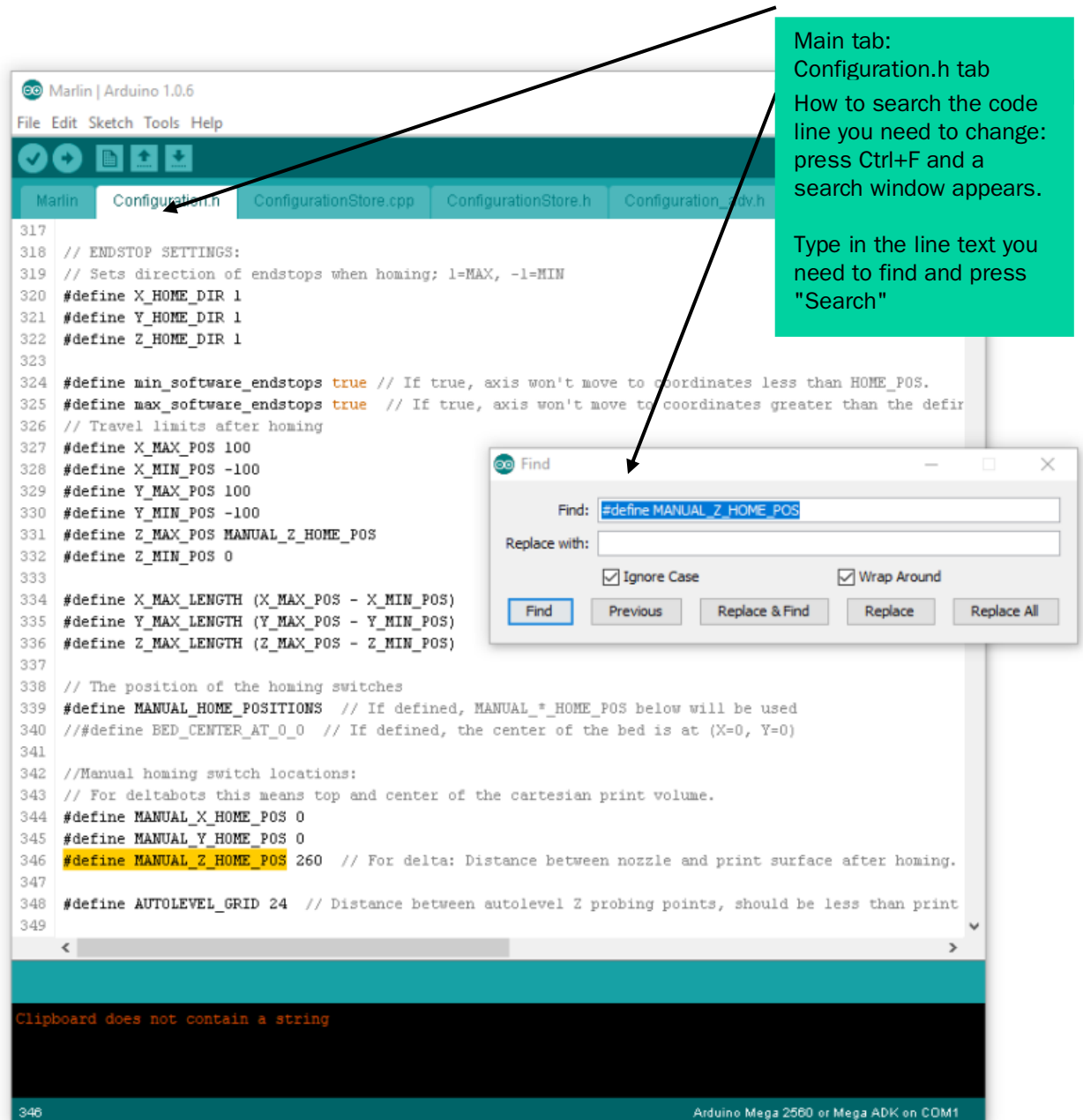
Select the Serial Port:

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 Delta 900 viscous materials 3D printer controller.



Main tab:  
Configuration.h tab

How to search the code line you need to change: press Ctrl+F and a search window appears.

Type in the line text you need to find and press "Search"

```
317
318 // ENDSTOP SETTINGS:
319 // Sets direction of endstops when homing; 1=MAX, -1=MIN
320 #define X_HOME_DIR 1
321 #define Y_HOME_DIR 1
322 #define Z_HOME_DIR 1
323
324 #define min_software_endstops true // If true, axis won't move to coordinates less than HOME_POS.
325 #define max_software_endstops true // If true, axis won't move to coordinates greater than the defin
326 // Travel limits after homing
327 #define X_MAX_POS 100
328 #define X_MIN_POS -100
329 #define Y_MAX_POS 100
330 #define Y_MIN_POS -100
331 #define Z_MAX_POS MANUAL_Z_HOME_POS
332 #define Z_MIN_POS 0
333
334 #define X_MAX_LENGTH (X_MAX_POS - X_MIN_POS)
335 #define Y_MAX_LENGTH (Y_MAX_POS - Y_MIN_POS)
336 #define Z_MAX_LENGTH (Z_MAX_POS - Z_MIN_POS)
337
338 // The position of the homing switches
339 #define MANUAL_HOME_POSITIONS // If defined, MANUAL*_HOME_POS below will be used
340 //#define BED_CENTER_AT_0_0 // If defined, the center of the bed is at (X=0, Y=0)
341
342 //Manual homing switch locations:
343 // For deltabots this means top and center of the cartesian print volume.
344 #define MANUAL_X_HOME_POS 0
345 #define MANUAL_Y_HOME_POS 0
346 #define MANUAL_Z_HOME_POS 260 // For delta: Distance between nozzle and print surface after homing.
347
348 #define AUTOLEVEL_GRID 24 // Distance between autolevel Z probing points, should be less than print
349
```

Clipboard does not contain a string

348 Arduino Mega 2560 or Mega ADK on COM1

### Delta 900 Marlin settings from Configuration.h tab:

20	#define BAUDRATE 250000
58	#define MOTHERBOARD 33
78	#define DELTA
86	#define DELTA_DIAGONAL_ROD 240.0
89	#define DELTA_SMOOTH_ROD_OFFSET 177.5
92	#define DELTA_EFFECTOR_OFFSET 28.34
95	#define DELTA_CARRIAGE_OFFSET 21.0
98	#define DELTA_RADIUS (DELTA_SMOOTH_ROD_OFFSET-DELTA_EFFECTOR_OFFSET-DELTA_CARRIAGE_OFFSET)
285	const bool X_MIN_ENDSTOP_INVERTING = false;
286	const bool Y_MIN_ENDSTOP_INVERTING = false;
287	const bool Z_MIN_ENDSTOP_INVERTING = false;
288	const bool X_MAX_ENDSTOP_INVERTING = false;
289	const bool Y_MAX_ENDSTOP_INVERTING = false;
290	const bool Z_MAX_ENDSTOP_INVERTING = false;
311	#define INVERT_X_DIR false
312	#define INVERT_Y_DIR false
313	#define INVERT_Z_DIR false
314	#define INVERT_E0_DIR false
315	#define INVERT_E1_DIR false
316	#define INVERT_E2_DIR false
346	#define MANUAL_Z_HOME_POS 260 // For delta: Distance between nozzle and print surface after homing.
352	#define HOMING_FEEDRATE {150*30, 150*30, 150*30, 0}
358	#define DEFAULT_AXIS_STEPS_PER_UNIT {80, 80, 80, 60} // X, Y, Z, E (For some printers the value is: 160, 160, 160, 60)
359	#define DEFAULT_MAX_FEEDRATE {900, 900, 900, 900} // (mm/sec)
360	#define DEFAULT_MAX_ACCELERATION {9000,9000,9000,9000} // X, Y, Z, E maximum start speed for accelerated moves.

### Delta 900 Marlin settings from the Configuration\_adv.h tab:

213	#define DEFAULT_STEPPER_DEACTIVE_TIME 600 // ms
-----	---

## Uploading the firmware code to the printer

Save the changes

Upload code

Note:

- Close other printer programs before uploading
- You can see in the bottom-left corner when the code is done uploading

```
Merlin | Arduino 1.0.6
File Edit Sketch Tools Help
Marlin Configuration.h ConfigurationStore.cpp ConfigurationStore.h Configuration_

#define POWER_SUPPLY 1

//=====
//----- Delta Settings -----
//=====
// Enable DELTA kinematics
#define DELTA

// Make delta curves from many straight lines (linear interpolation).
// This is a trade-off between visible corners (not enough segments)
// and processor overload (too many expensive sqrt calls).
#define DELTA_SEGMENTS_PER_SECOND 100

// 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)

// Effective X/Y positions of the three vertical towers.
#define SIN_60 0.8660254037844386
#define COS_60 0.5

1 Arduino Uno on COM1
```

## 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	<b>M302: Cold Extrude</b>
G10: Retract	M100: Free Memory	M303: PID autotune
G11: Recover	M104: Set Hotend Temperature	M304: Set Bed PID
G12: Clean the Nozzle	<b>M105: Report Temperatures</b>	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	<b>M112: Emergency Stop</b>	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	<b>M119: Endstop States</b>	M404: Set Filament Diameter
G42: Move to mesh coordinate	<b>M120: Enable Endstops</b>	M405: Filament Width Sensor On
G90: Absolute Positioning	<b>M121: Disable Endstops</b>	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	<b>M500: Save Settings</b>
M17: Enable Steppers	<b>M140: Set Bed Temperature</b>	<b>M501: Restore Settings</b>
M18-M84: Disable steppers	M145: Set Material Preset	<b>M502: Factory Reset</b>
M20: List SD Card	<b>M149: Set Temperature Units</b>	<b>M503: Report Settings</b>
M21: Init SD card	M150: Set RGB(W) Color	M504: Validate EEPROM contents
M22: Release SD card	<b>M155: Temperature Auto-Report</b>	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 Trimptop Pins
M43: Debug Pins	<b>M211: Software Endstops</b>	M909: DAC Print Values
M43 T: Toggle Details (Debug Pins)	M218: Set Hotend Offset	M910: Commit DAC to EEPROM
M48: Probe Accuracy Test	<b>M220: Set Feedrate Percentage</b>	M911: TMC OT Pre-Warn Condition
M73: Set Print Progress	<b>M221: Set Flow Percentage</b>	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