Firmware Flashing for INVENT3D Printers

Revision r1

This document describes how to flash firmware on INVENT3D printers. These directions only apply to Windows operating systems and refers to Windows 7 and Windows 10 directly. Other operating systems may require deviations from the listed instructions.

Here is what you need:

- USB printer cable (USB A-B type, refer to photo on right)
- Windows Vista or newer Windows OS
- Administrative rights (you will add a device to Windows, you will run a downloaded program)
- INVENT3D printer connected to AC power
- Firmware file downloaded from our website (will cover what to download in Section 1 and 2)

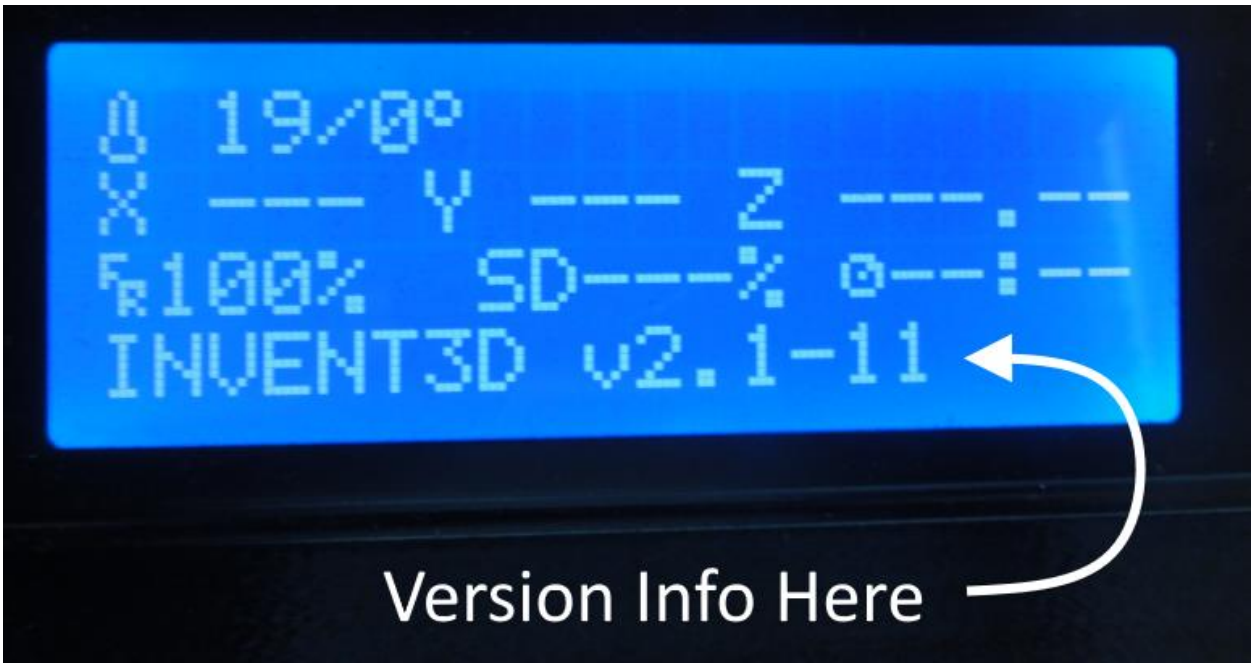
If you require assistance with these directions, please contact us by using http://support.inventorcloud.net/

Image from https://commons.wikimedia.org/wiki/File:Cable_USB.jpg

Section 1 – Determine what printer you have

You must determine what printer you have before you download the firmware in order to ensure that you download the correct firmware. Downloading the wrong firmware will lead to your printer behaving erratically.

You can figure out your Firmware version by reading the LCD screen immediately after connecting your printer to AC power. The firmware version is listed at the bottom of the display; refer to the graphic below.



The line always starts with the word INVENT3D followed by numbers. You need to refer to the number and letter (if present) after the – mark. This number will be any number in the list below. If you have a single number as your type (or a single number and an H) then your printer type is 11 (or 11H if the H is present) and you should use 11 (or 11H) when appropriate.

Printer Types						
1	11	12	21	22	31	32
1H	11H	12H	21H	22H	31H	32H

Be sure to write down what your printer type is. You must flash identical type firmware to your printer unless otherwise instructed. If you don't know what type of firmware to flash, contact support!

If you need assistance determine what type of printer you have (if the above mechanism does not work), refer to Appendix A.

Section 2 – Download firmware

Download firmware from our website that matches the type of printer that you have (the type number must match). Flashing directions are identical for all printers, the only difference is the firmware that you download.

If you download and flash the wrong firmware then you will need to identify your printer manually via Appendix A to correct that problem.

Windows 7 users must also download the Rambo driver listed on our website, it will be used in Section 4 – Installing Driver Files.

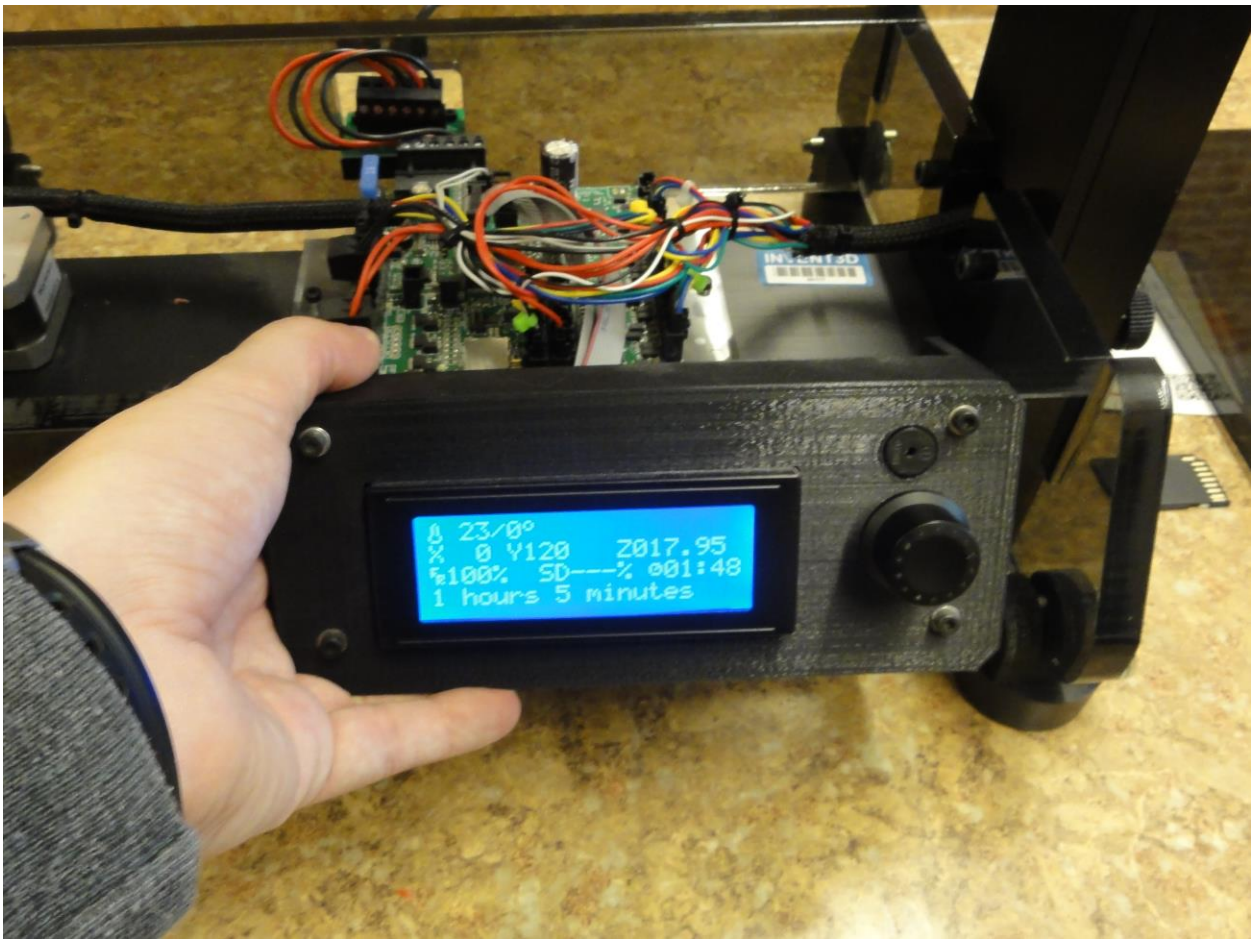
Section 3 – Connecting the USB cable

You need to remove various parts of your printer to access the USB port on it. Have your USB printer cable ready. Follow the disassembly directions below to access the USB port.

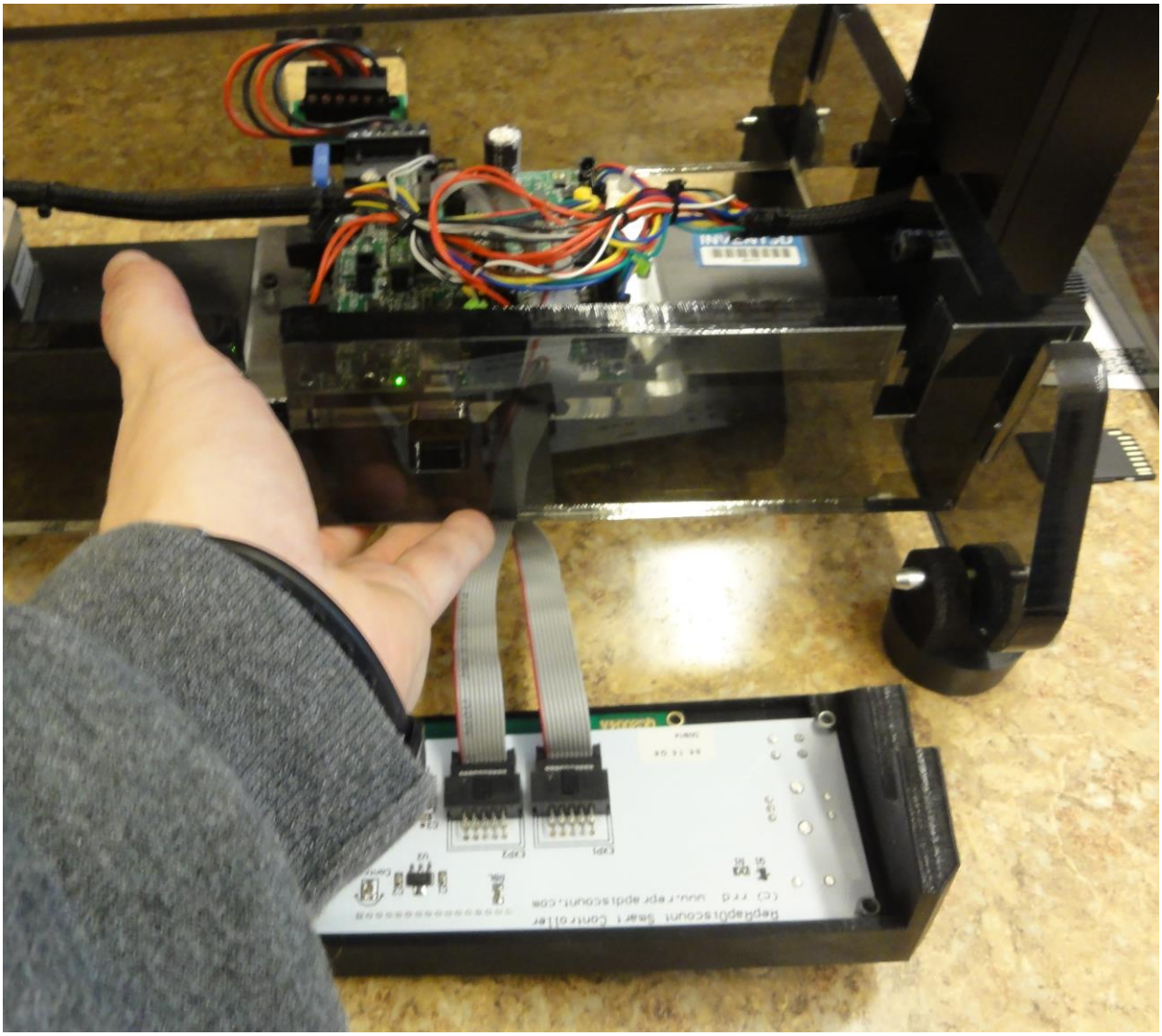
Be careful! The parts you are handling are fragile and can break if dropped to the floor.

Step 1 – As shown above, you need to remove the top plate. With the print board positioned near the top of the printer, lift the right side of the top plate up and then swing the right side of the top plate

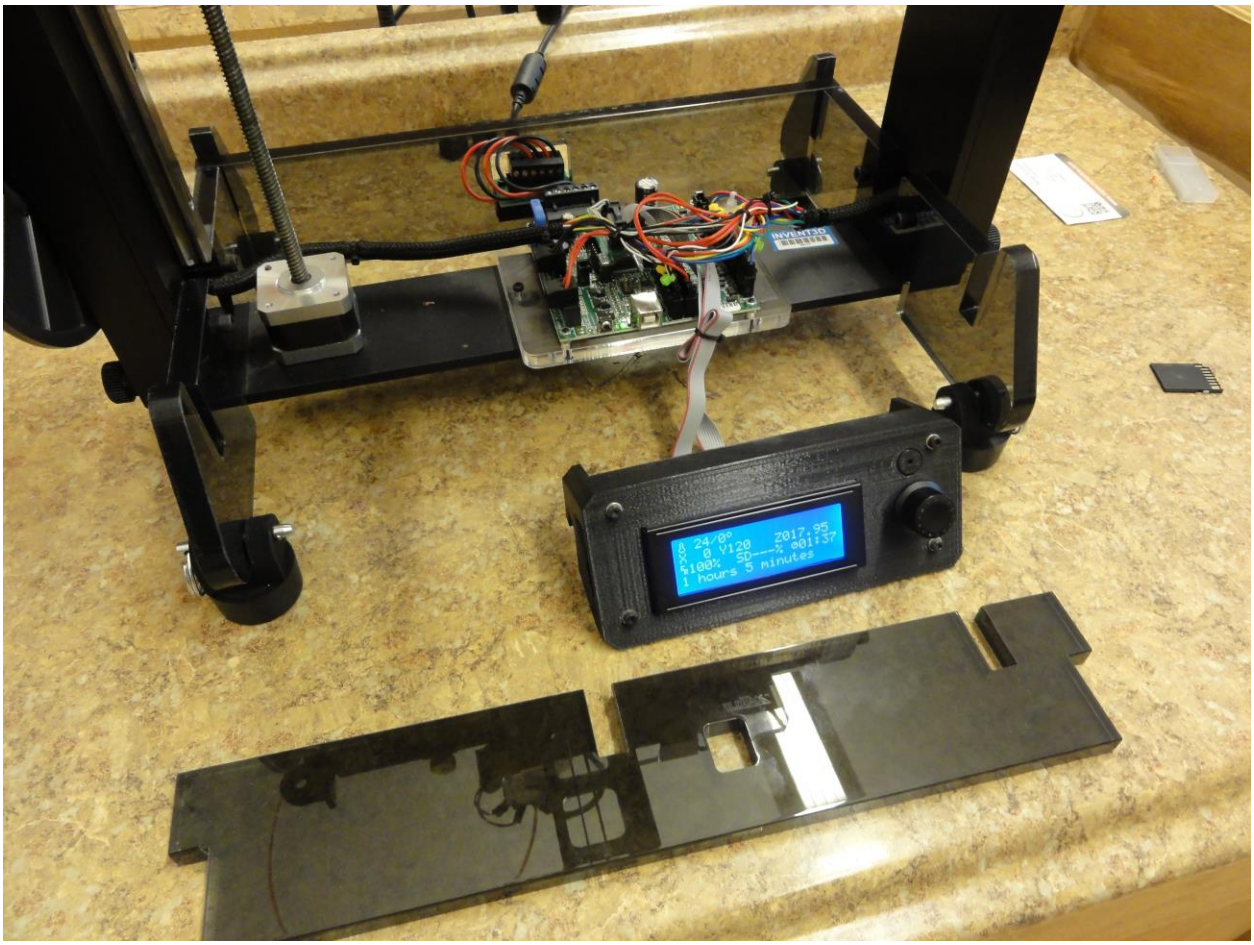
towards you in order to clear the right side of the printer. Now you can remove the top plate by lifting it up and to the right. Set the top plate aside in a safe location.



Step 2 – Grab the LCD display and lift it up and out of the front plate. After doing so, set the LCD face down on the table.



Step 3 – Grab the front plate and lift it up out of the printer. Set the front plate aside in a safe location.



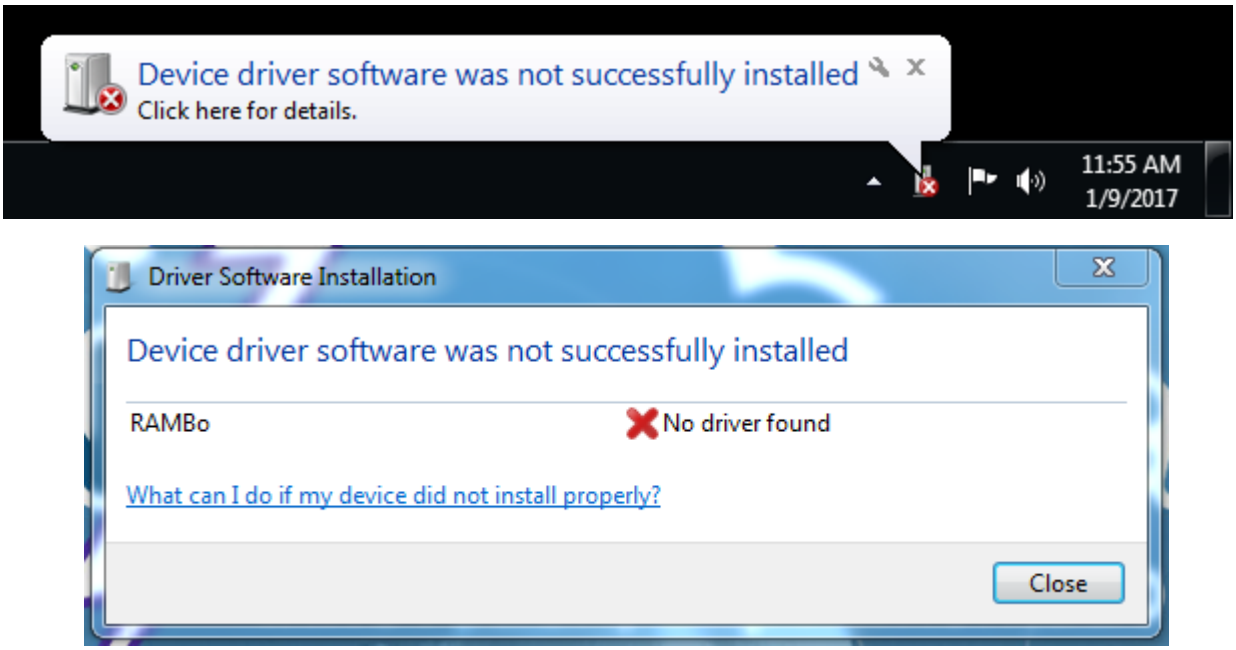
Step 4 – You can place the LCD in a normal orientation on the table (refer to photo above). You can now access the USB port on the main circuit board. Connect your USB printer cable to this circuit board and to your PC.

Section 4 – Installing Driver Files

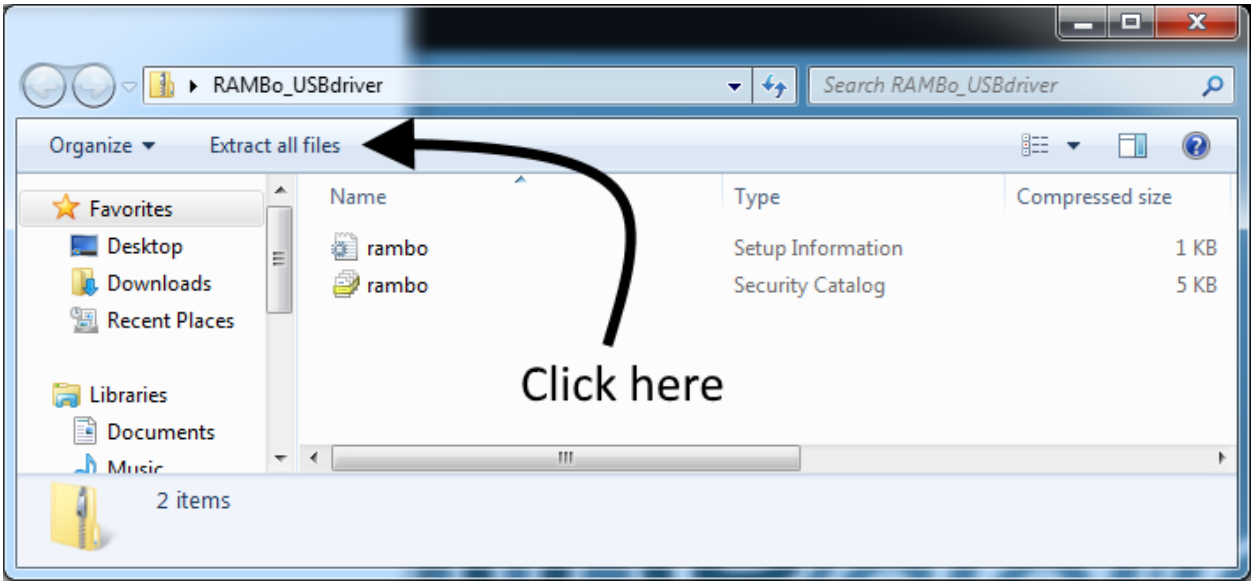
Windows 8.1 and earlier cannot connect to your printer without having a driver. You have to install this driver manually. This requires administrative privileges and is an operation that IT staff typically carries out.

The following steps should guide you in installing the necessary drivers on Windows 7. Windows 8.1 uses similar but not identical directions; seek assistance if necessary for adapting these directions. If you run into difficulties, you can seek assistance from your IT staff or contact our company for further assistance.

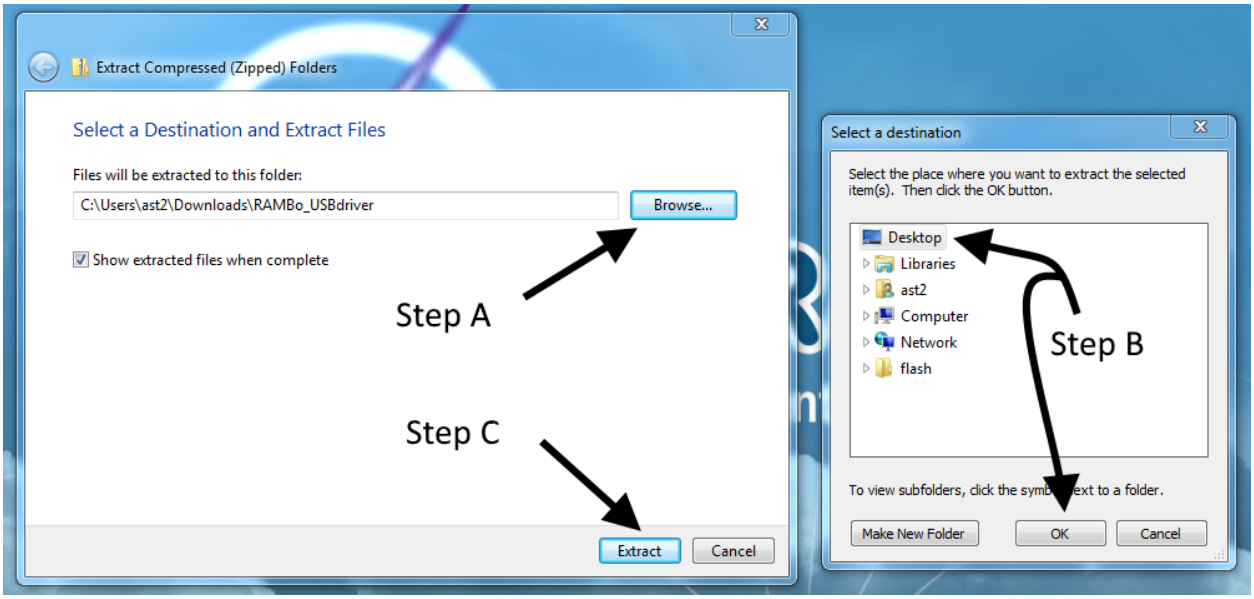
Step 1 – If you have not connected your 3d printer to your computer using a USB printer cable then power on your 3d printer (by plugging it into AC power) and then connect the printer to your computer (refer to Section 3 if necessary).



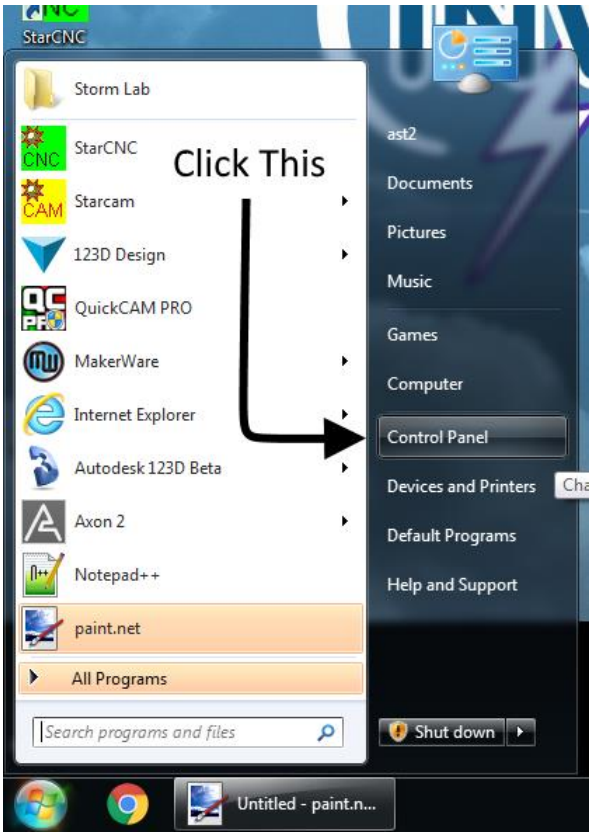
Step 2 – In Windows 7, you will receive an error saying that the device drivers could not be installed (examples shown above). Dismiss any error messages.



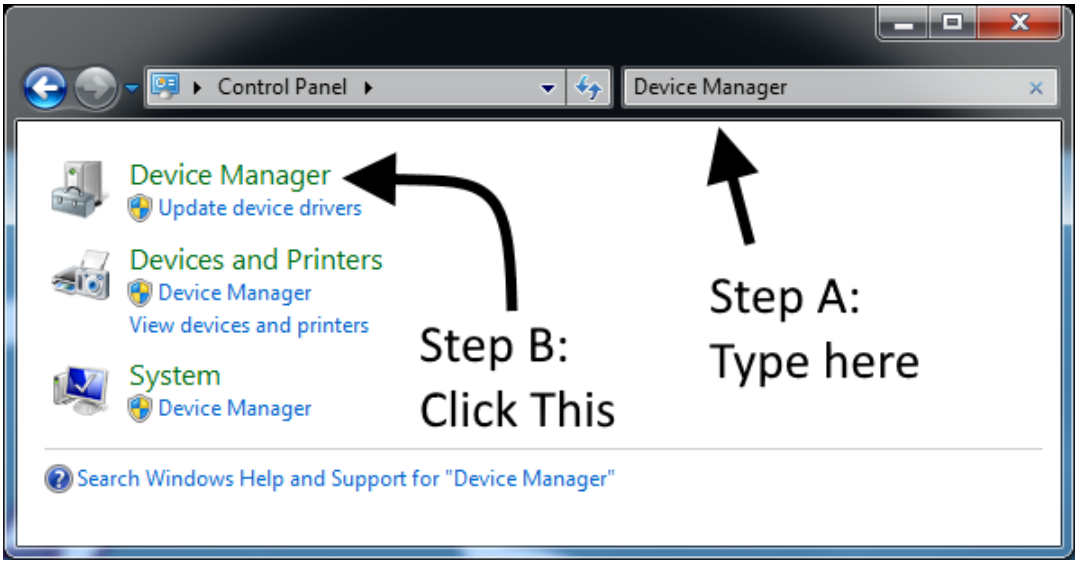
Step 3 – If you have not done so already, download the RAMBo_USBdriver.zip file from our website (we recommend you save all files to your Desktop). Unzip that file by opening it (for instance by double clicking on the file icon) and then clicking on Extract all files in the command bar.



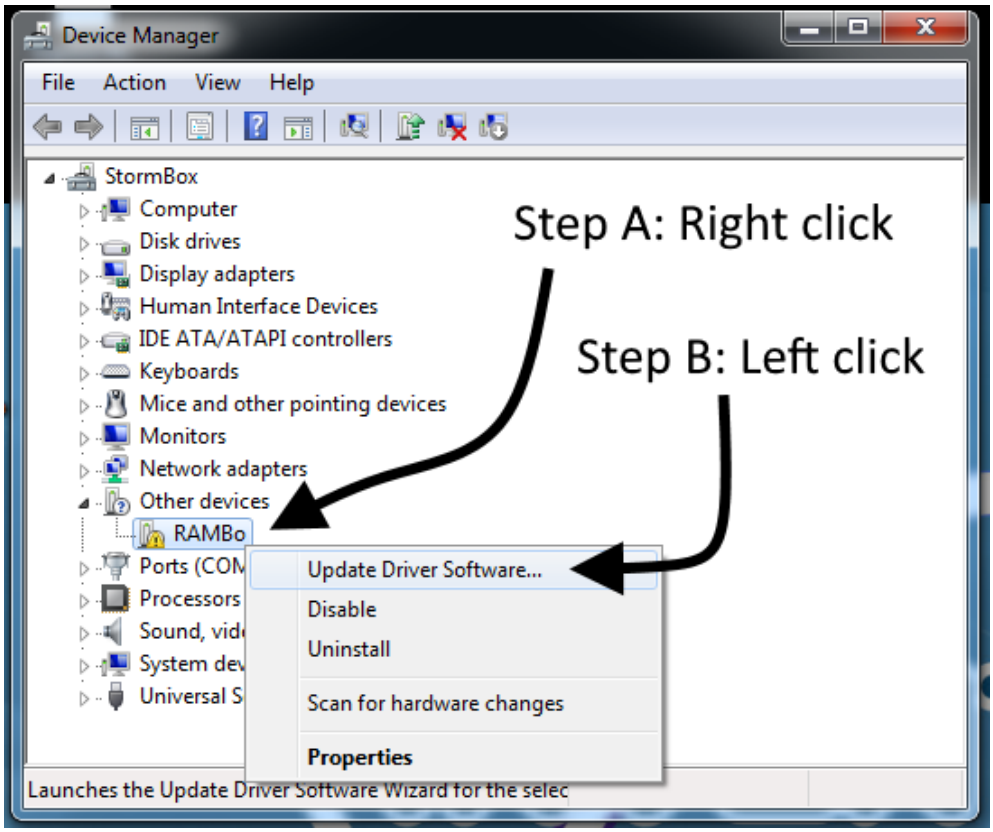
Step 4 – In the dialog box that appears, click on Browse… (Step A) and then select where you want the files to be placed (we recommend the Desktop) and then click OK (Step B). Next, click Extract (Step C). Close any windows that now appear. Your drivers will appear in the location you selected and will be in the RAMBo_USBdriver folder.



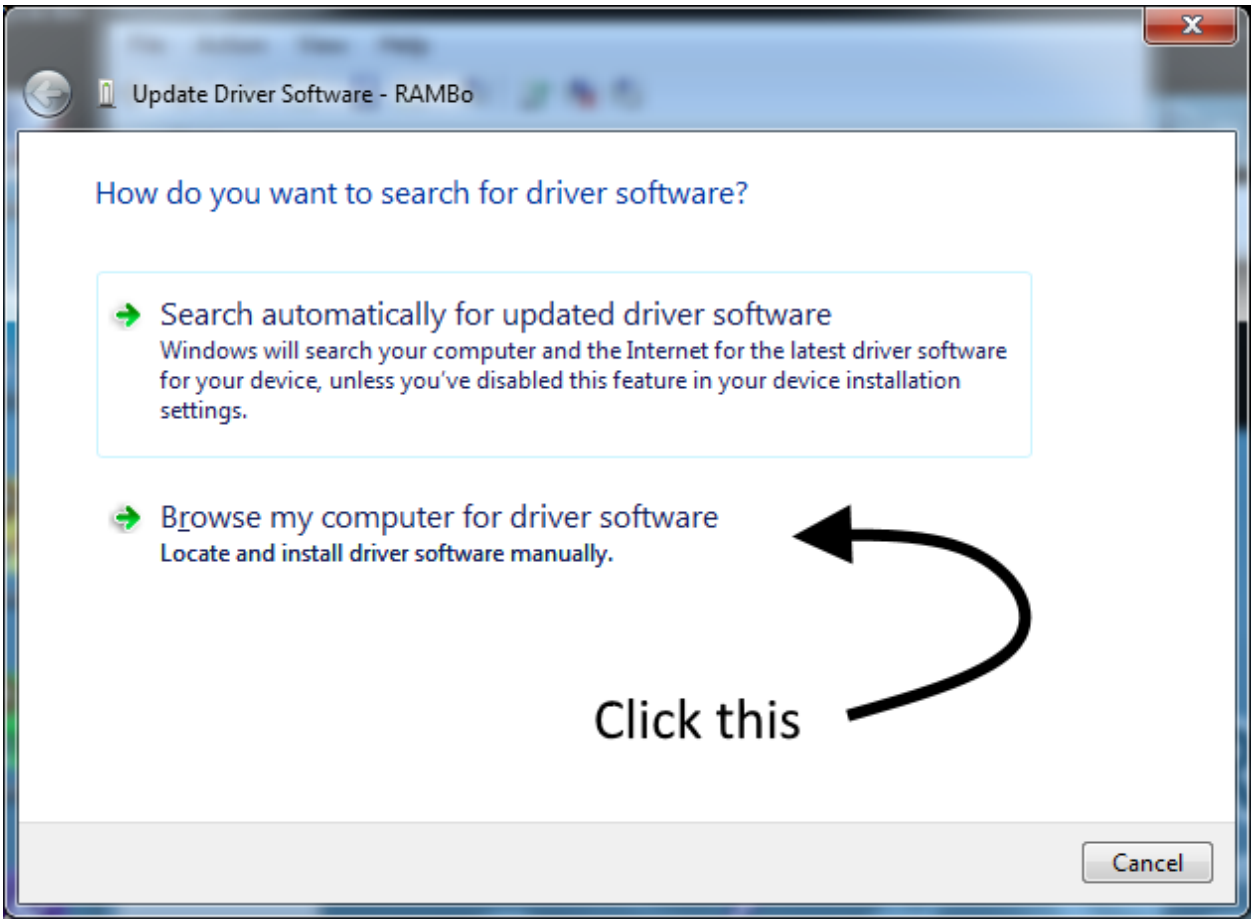
Step 5 – Go to the Windows Control Panel using the Start menu.



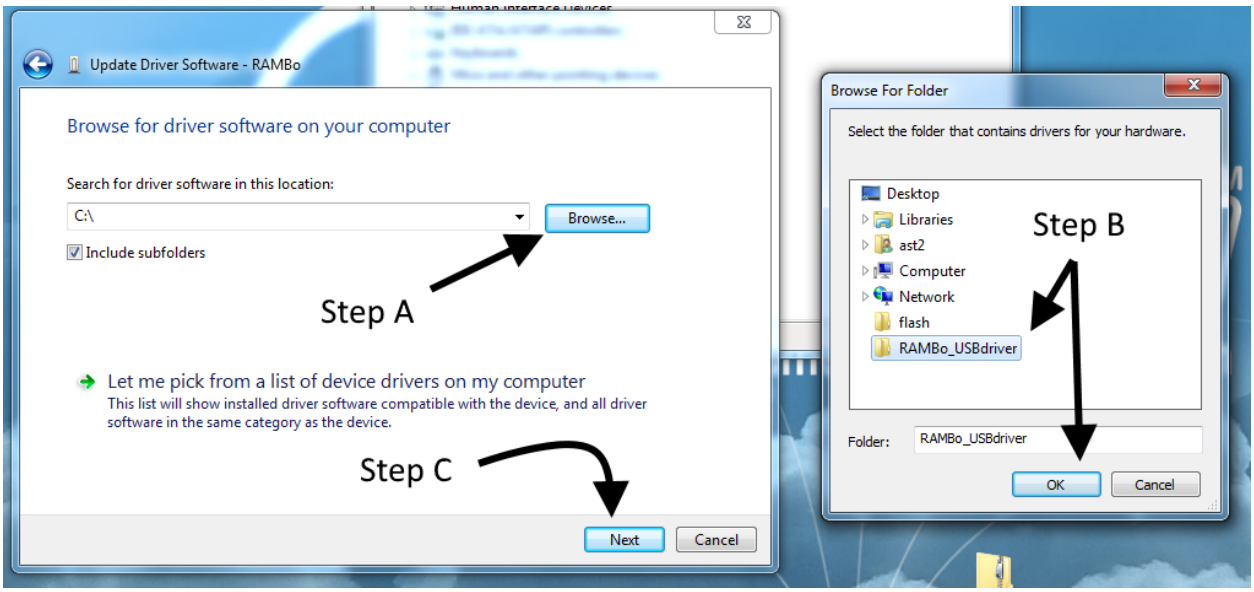
Step 6 – Type “Device Manager” in the search field at the top right (Step A) then click on the Device Manager link that appears (Step B).



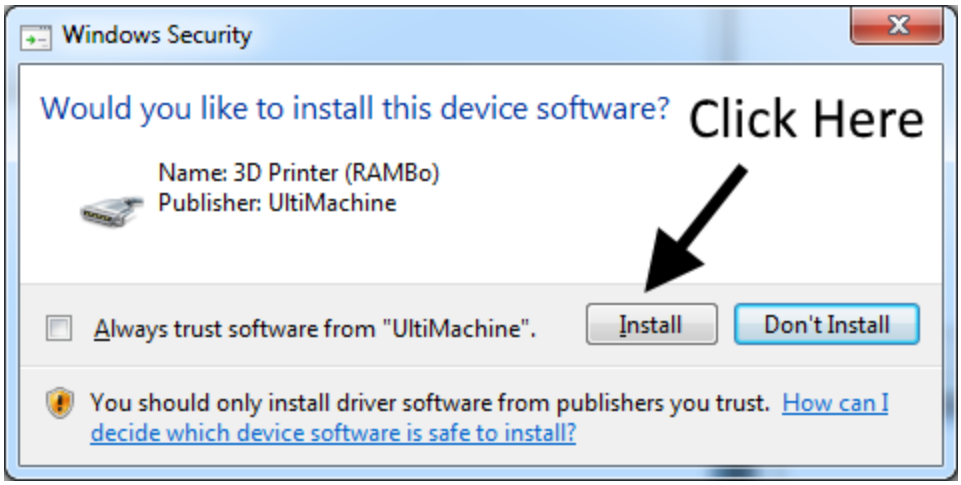
Step 7 – Find the RAMBo device in Other Devices and right click on it (Step A). In the menu, left click on Update Driver Software… (Step B).



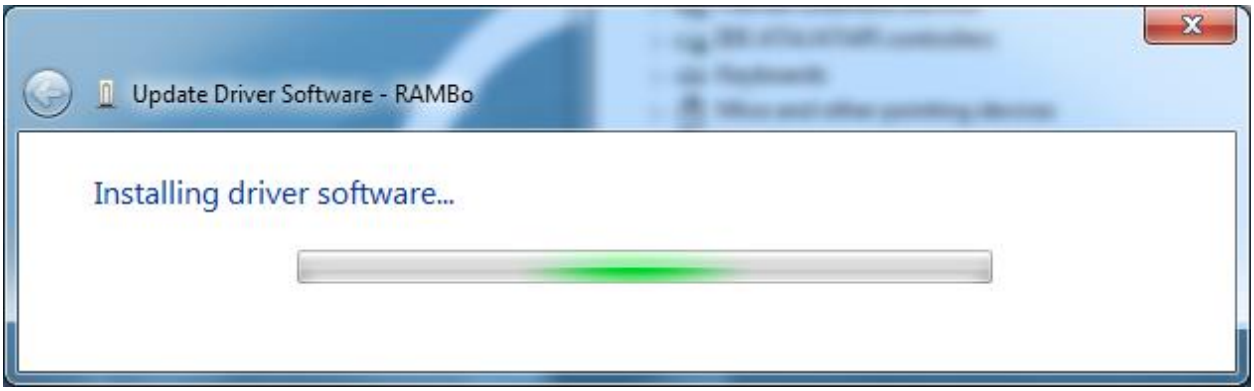
Step 8 – In the new window, click on the "Browse my computer for driver software" option.



Step 9 – Click Browse… next to the location field (Step A). Now locate the driver folder that you extracted in Step 4 and 5, select it, and click OK (Step B). After doing that, click Next in the dialog box (Step C).

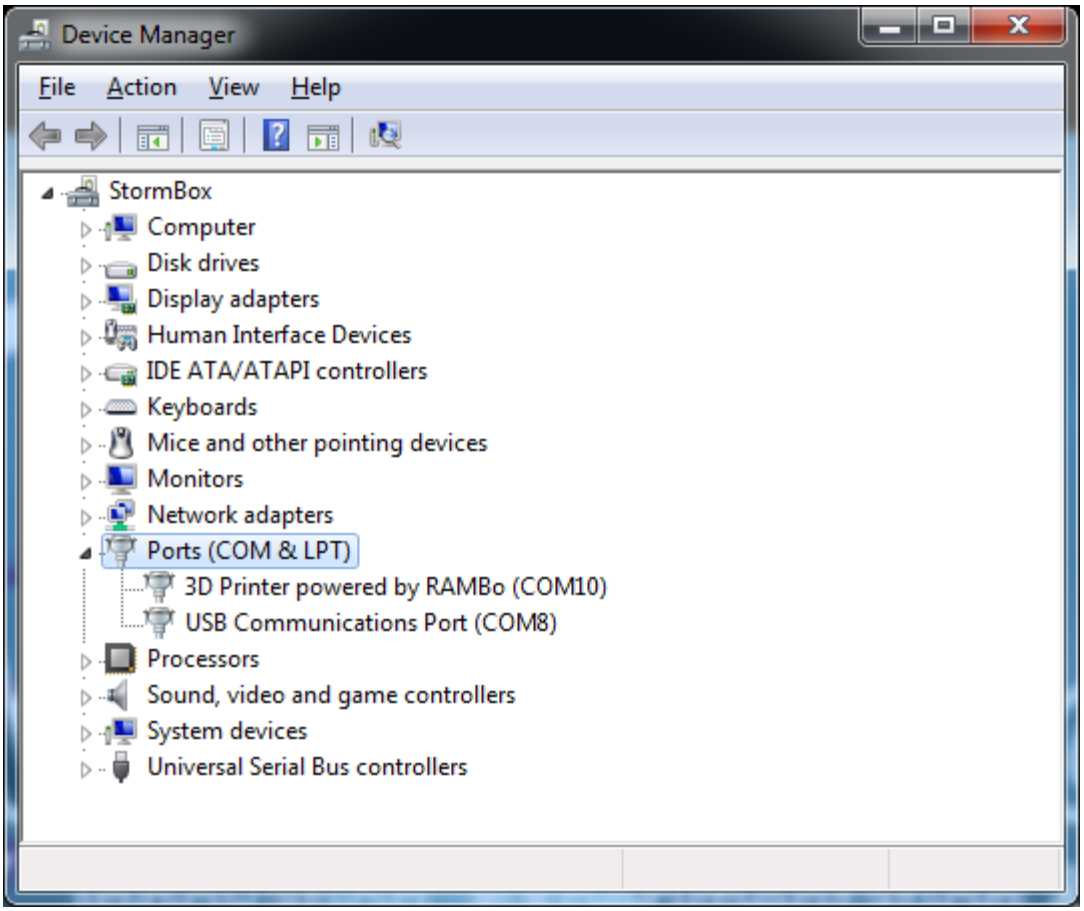


Step 10 – In the dialog box that appears, click on Install.



Step 11 – Wait for the driver to install.

Step 12 – When finished, you will be notified of the driver's successful installation. Click Close to close this dialog box.

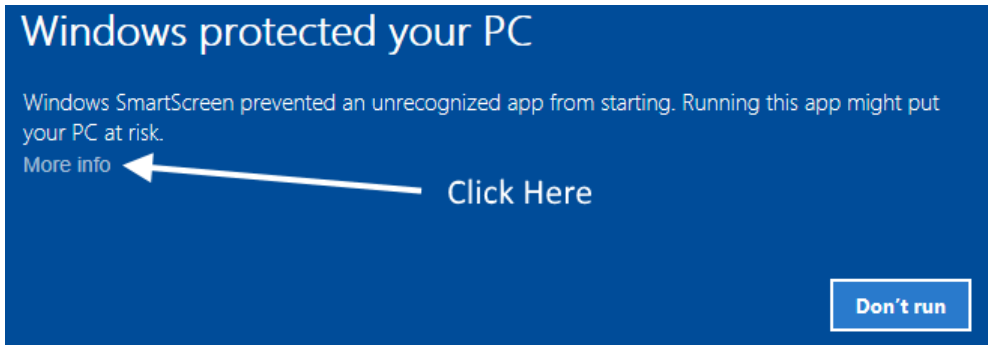


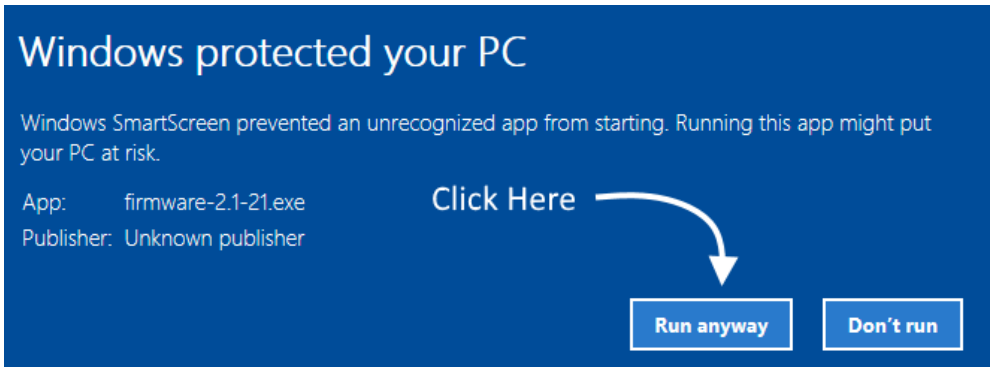
Step 13 – You will notice that the RAMBo option has changed to say 3D Printer powered by RAMBo. This indicates that the printer's driver has successfully installed and you are ready to flash.

Section 5 – Flashing firmware

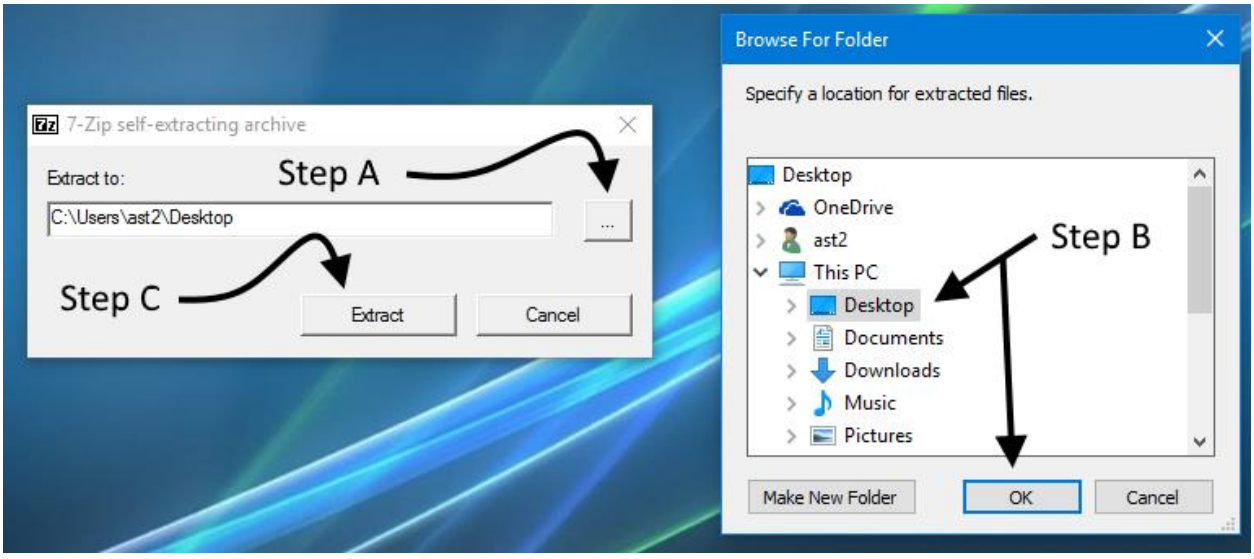
If all prior sections were appropriately carried out, you shouldn't run into any problems in this section. If you do run into difficulties, seek technical assistance.

Step 1 – Download the appropriate firmware for your printer from our website. After the download has finished, run the file.

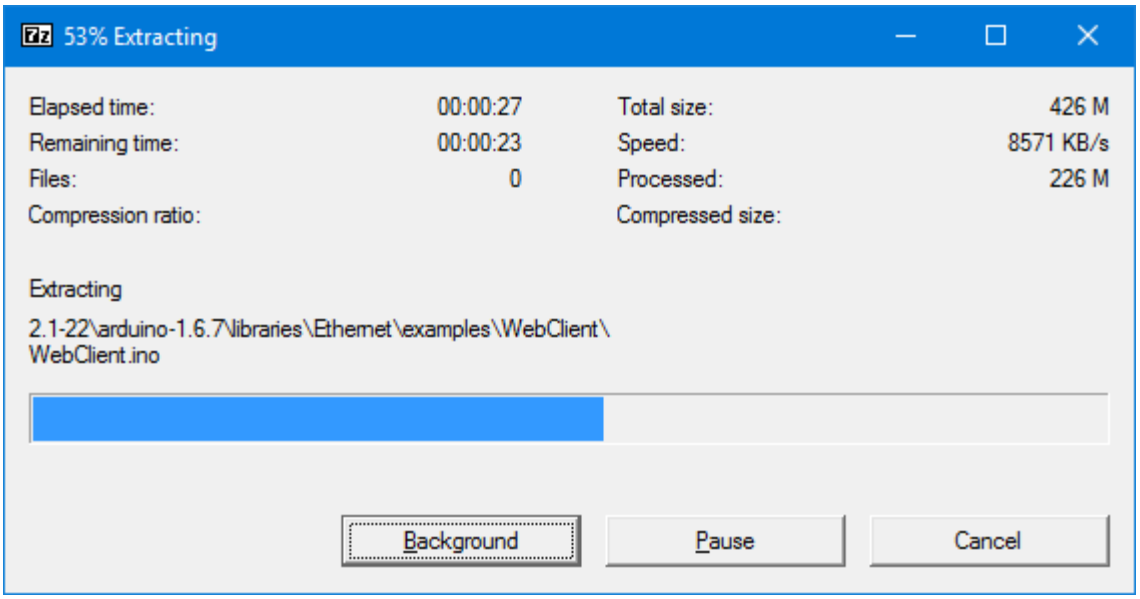




Step 2 – If a dialog box appears saying an unrecognized app was prevented from running, answer the dialog box choosing to run the program anyway (refer to top 2 photos for a Windows 10 version of that dialog box).

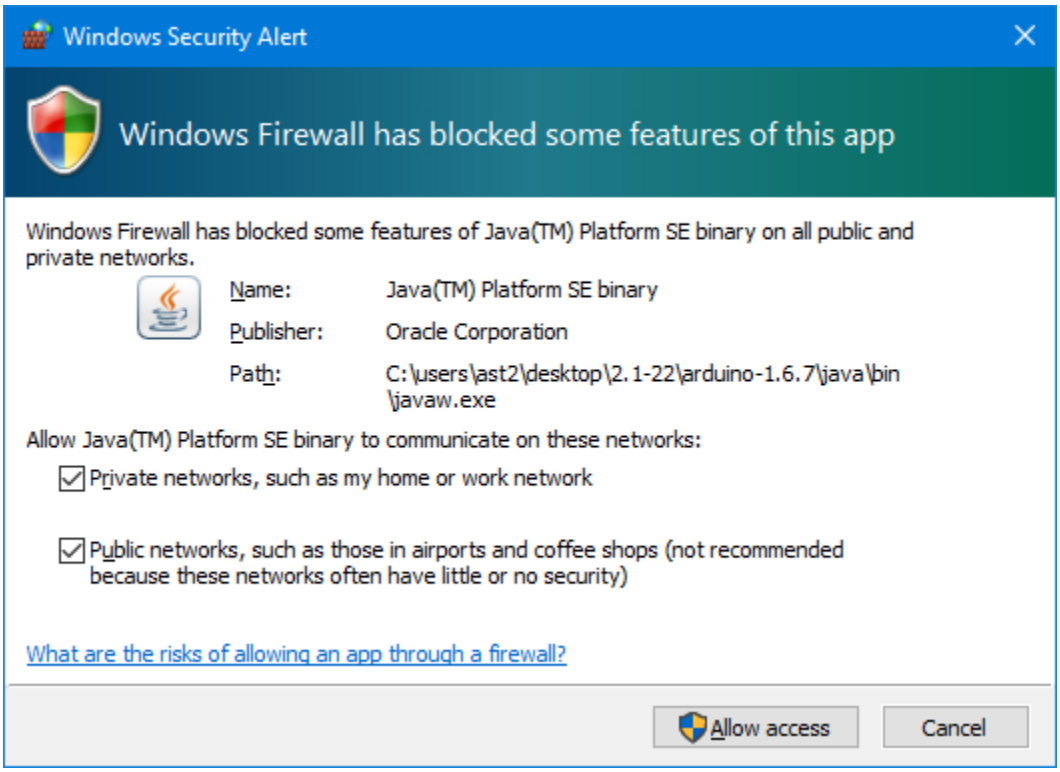


Step 3 – Click on the … button to the right of the Extract to: location (Step A), select a location to extract the files to (we recommend the Desktop) and then click OK (Step B), then click Extract to extract the files to that location (Step C).

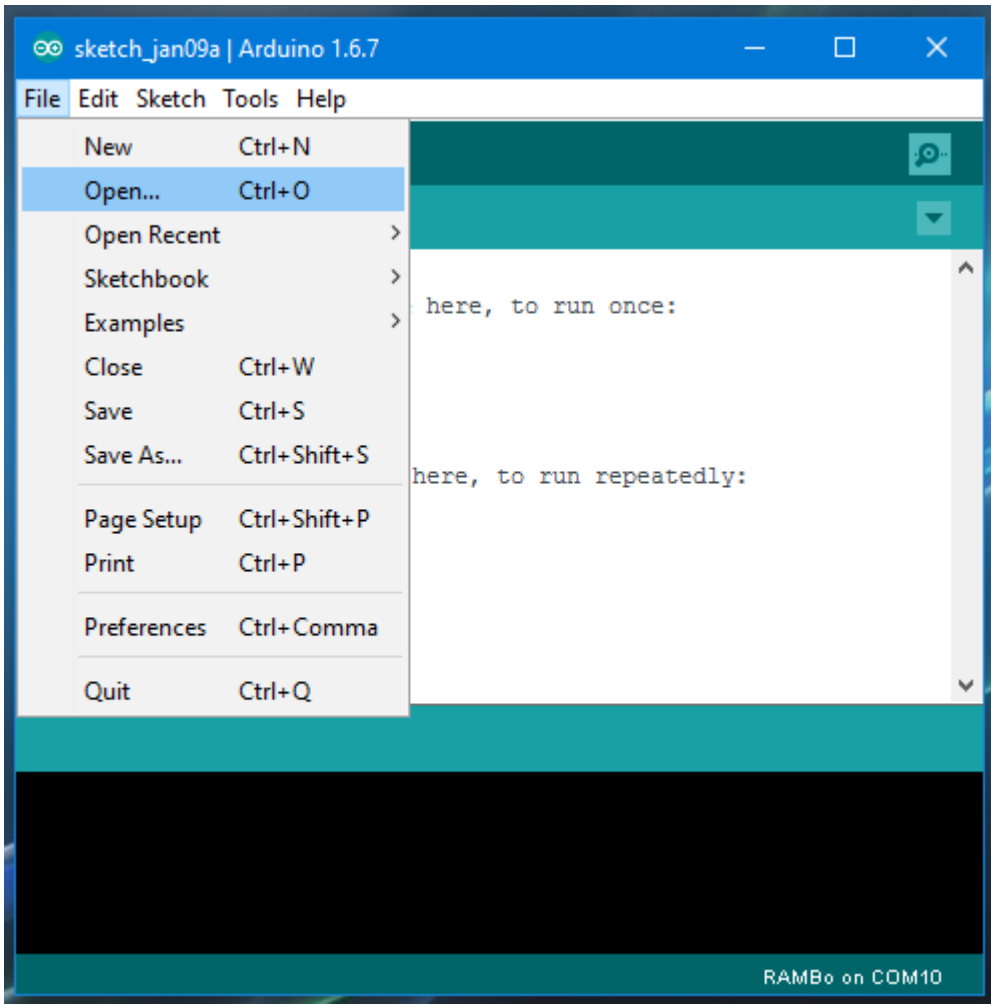


Step 4 – A dialog box will appear showing the extraction progress. When the progress finishes, the dialog box will disappear. A folder will appear in that location that uses numbers and letters (similar to 2.1-22).

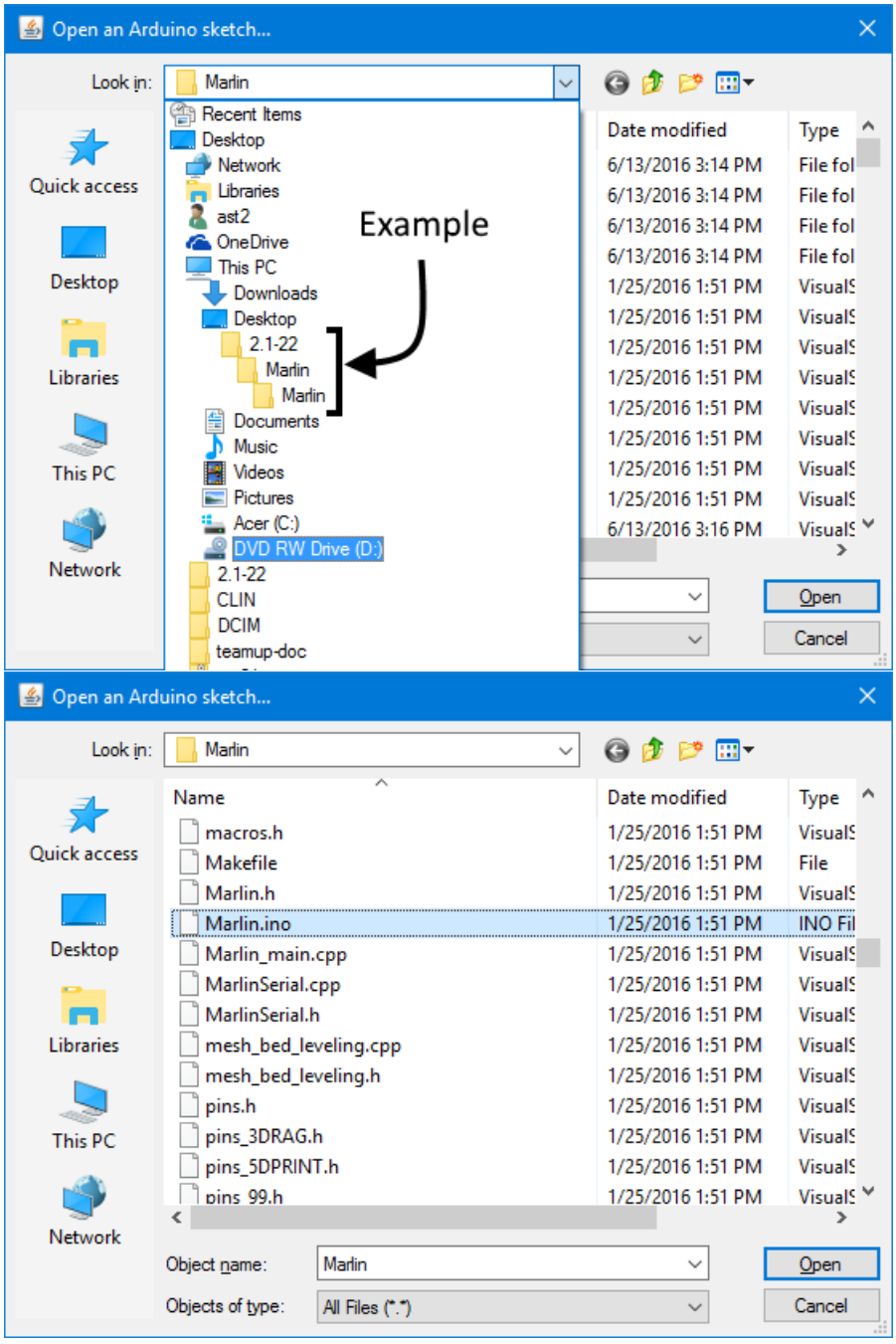
Step 5 – Find the folder extracted in Step 3 and open it. Inside that folder, open the Arduino folder (similar to arduino-1.6.7) and then run the Arduino program in that folder.



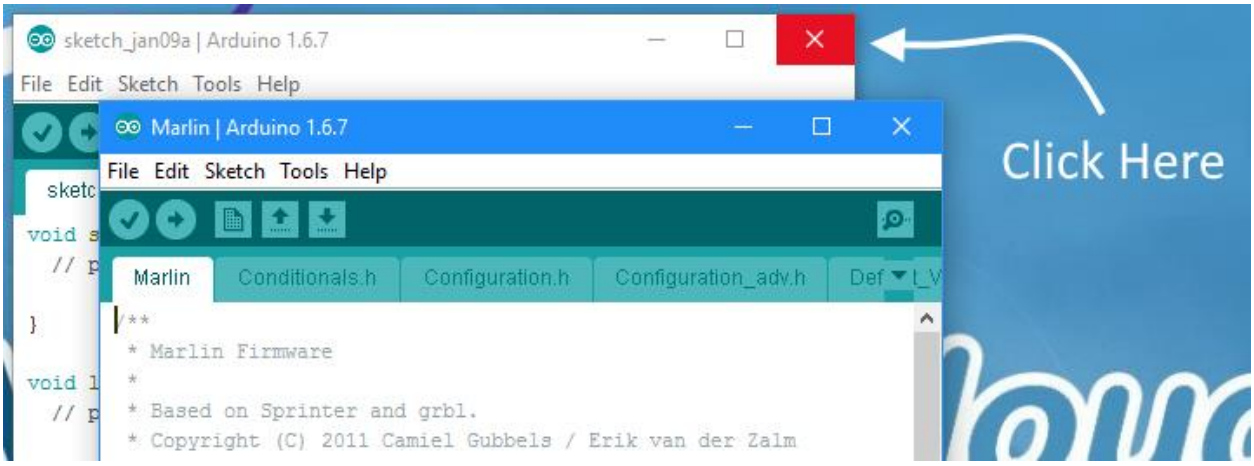
Step 6 – You may receive a dialog box similar to the one above. If you do not then proceed to the next step. If you do, first check both check boxes then click on Allow access.



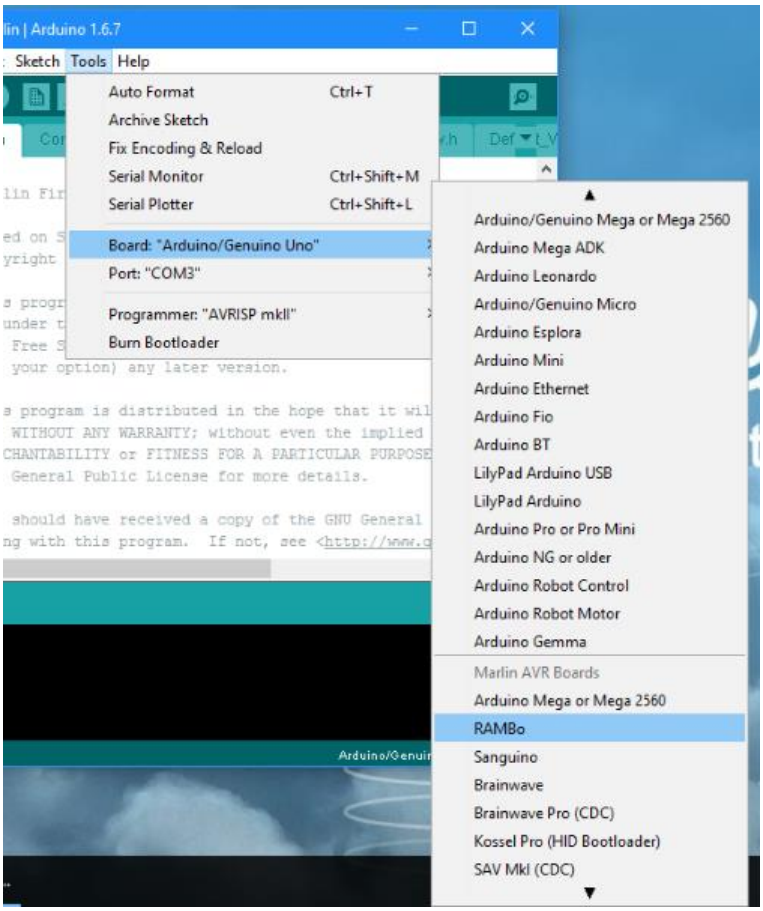
Step 7 – Click on the File menu then the Open command.



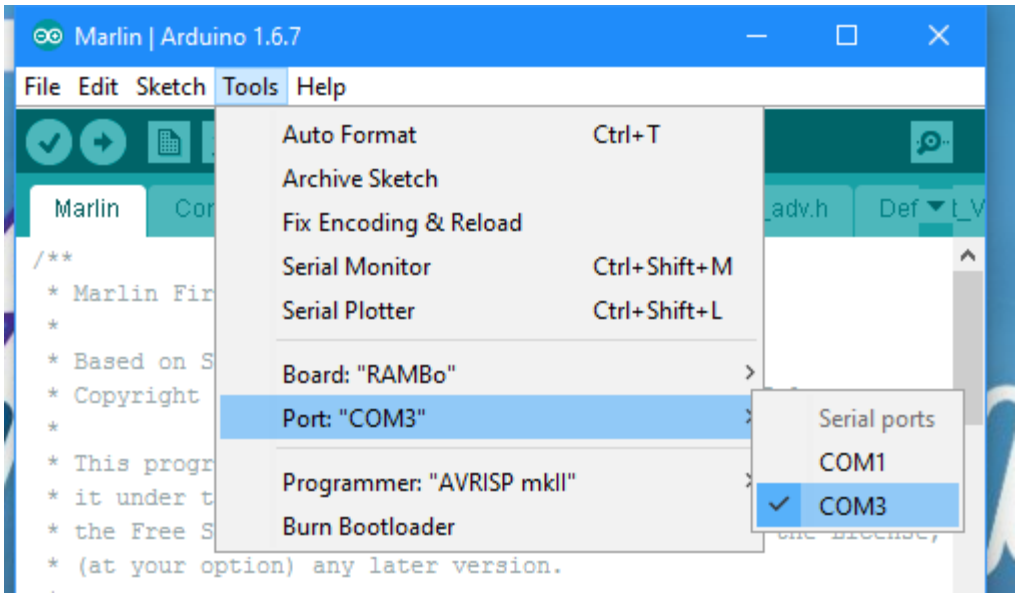
Step 8 – Navigate into the folder that was previously extracted (similar to 2.1-22) then the Marlin folder then the Marlin folder again (shown in top photo). Open the Marlin.ino file (shown in bottom photo) by left clicking on it once then clicking on Open.



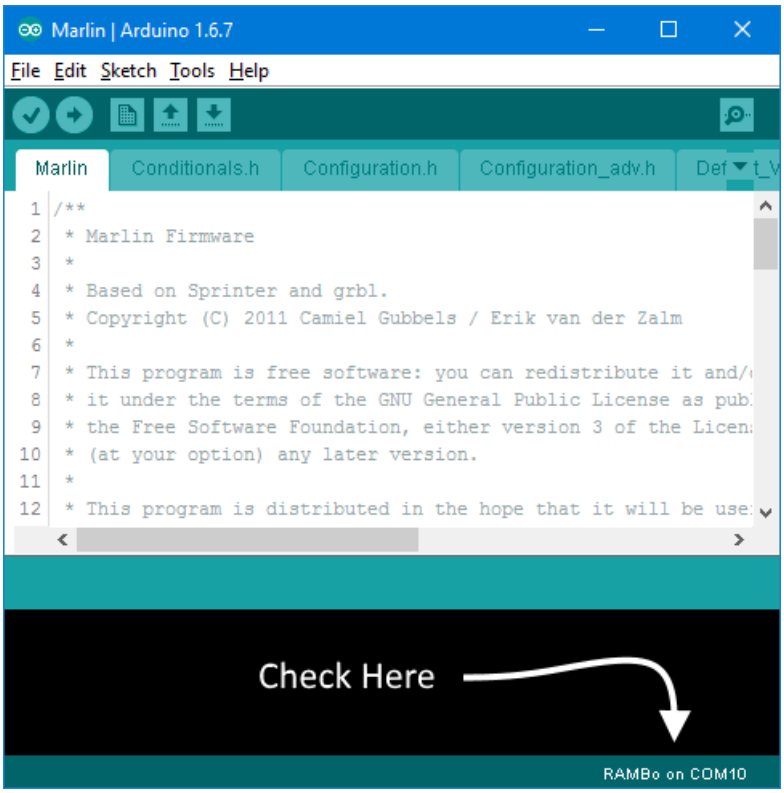
Step 9 – Another Arduino window appears in front of the prior one. You can close the prior one by clicking on its' program close X icon.



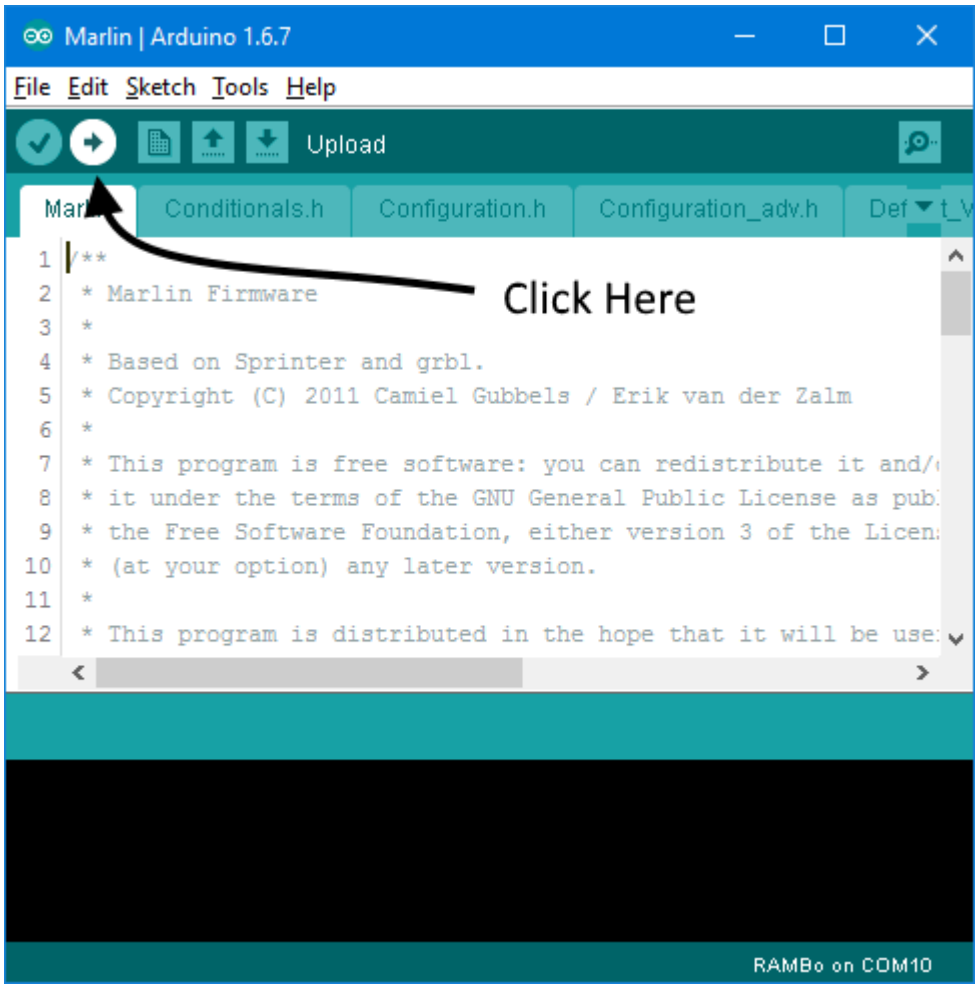
Step 10 – Go to the Tools menu and then click on the Board option (highlighted in blue). In the menu that appears, there is a large listing of possible board types. Move your mouse cursor over the black down arrow to scroll the list down. In the list, find the RAMBo option and then left click on that.



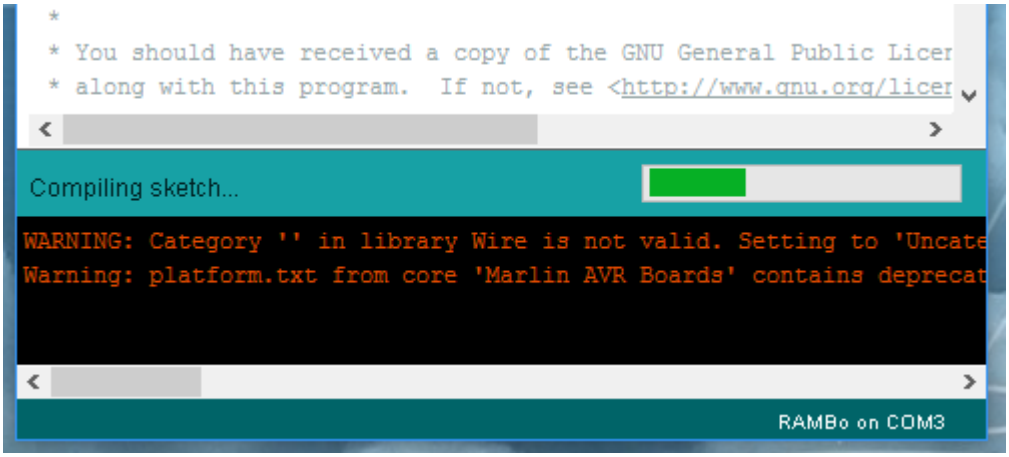
Step 11 – Go to the Tools menu and then left click on the Port option (highlighted in blue). A list of COM ports are shown on the screen, in most cases there is only one choice you can make. If you have multiple choices, the bottom choice is usually the correct choice (if things don't work later on then repeat this step and select a different choice). Select the COM port for your printer by left clicking on it.



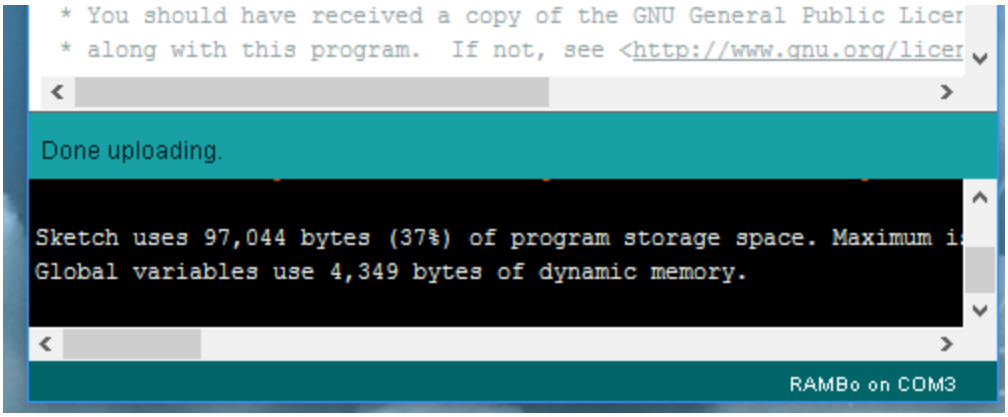
Step 10 – Verify that the correct board (RAMBo) and correct COM port is selected in the main interface, these options should match what you selected in the prior 2 steps.



Step 11 – Click on the Upload icon which is the icon with a right arrow (refer to above photo).



Step 12 – A progress bar will appear and informational messages will appear in the interface. Wait for the operations to complete.



Step 13 – When finished, the interface will state "Done Uploading." If there were any problems with the uploading procedure, a message will appear in the black area informing you of what is wrong. If any problems were encountered, you can try uploading again after selecting a different COM port in Step 11 or you can contact support.

Step 14 – You may unplug the USB cable from the computer and remove the USB cable from the 3d printer.

Step 15 – Using the LCD display, enter the menu and click Control then click Restore failsafe, it will appear like nothing happened on the printer. Next, click on Store memory, it will appear like nothing happened on the printer.

Step 16 – You may now disconnect AC power from the printer. Reassemble the printer doing the opposite of what you did in Section 2.

Appendix A – Printer Identification

As mentioned in Section 1, downloading the wrong firmware will lead to your printer behaving erratically. The firmware initially flashed on your printer is correct for your hardware configuration but you may have to visually identify your hardware features if firmware was flashed incorrectly (therefore the type code is wrong) or if you want to verify that your firmware type is correct.

The printer firmware files are named similar to the following.

INVENT3D v2.3-11

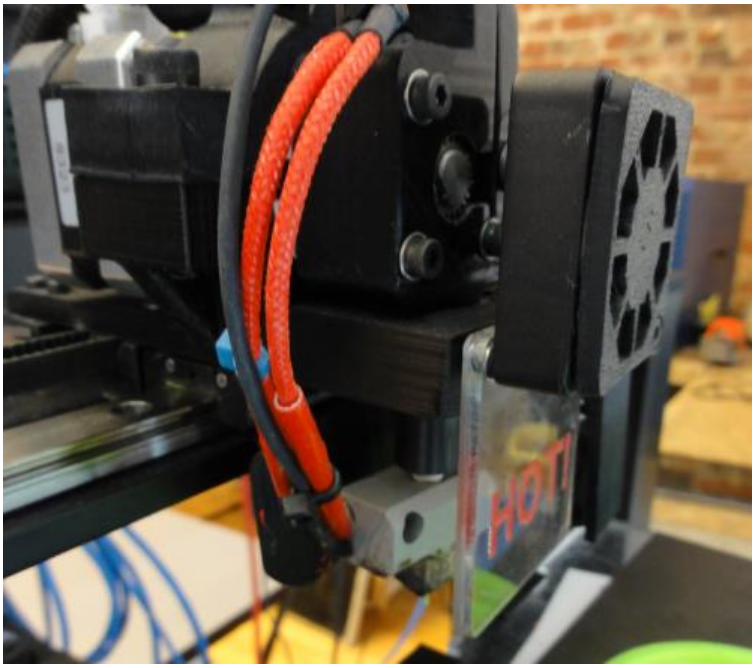
The beginning of the name is the name of the printer, INVENT3D. The number at the end is a compilation of the firmware version and printer type. The firmware version above is 2.3 and is located after the v and before the – mark. The printer type is after the – mark. A table of current types is listed below along with identification details.

INVENT3D standard printers				
Ver 1 hot end		**Ver 2 hot end**	**Ver 3 hot end**	
1	11	21	31	**Full sized Rambo**
	12	22	32	**Mini Rambo**

INVENT3D heated bed printers				
Ver 1 hot end		**Ver 2 hot end**	**Ver 3 hot end**	
1H	11H	21H	31H	**Full sized Rambo**
	12H	22H	32H	**Mini Rambo**

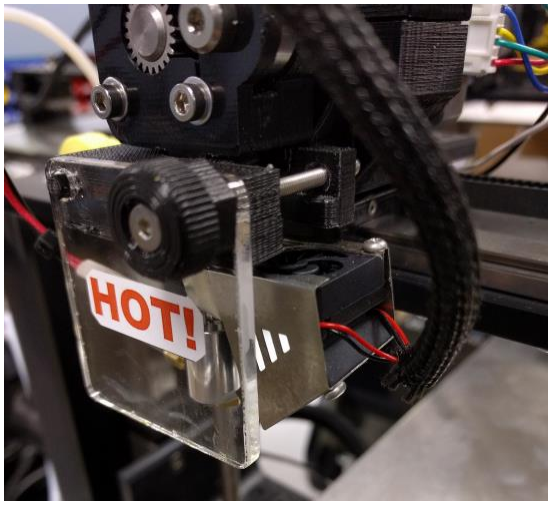
Our printers shipped with various heads over time with each newer head being a newer version number. The printer hot end version is the first number in the type. The second number in the type refers to the type of Rambo board (the full Rambo board is the older type, the mini Rambo is the newer type). Letters after the type designation refers to modifiers to type, the notable letter is H which means a heated bed type printer.

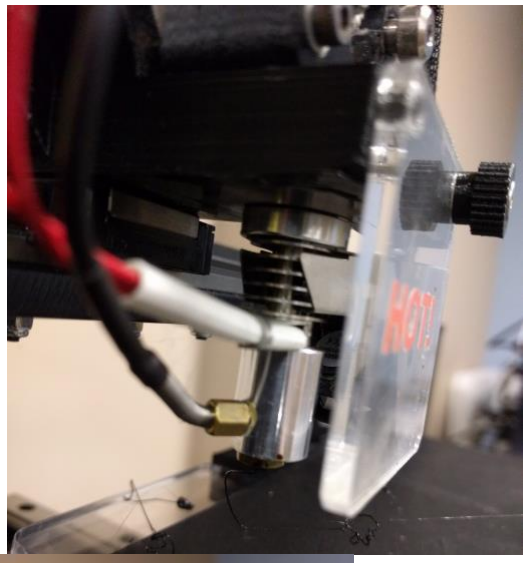
You would need to visually identify the type of head you have, the type of Rambo you have, and the type of printer board that you have. From that information, refer to the table above to figure out the printer version.

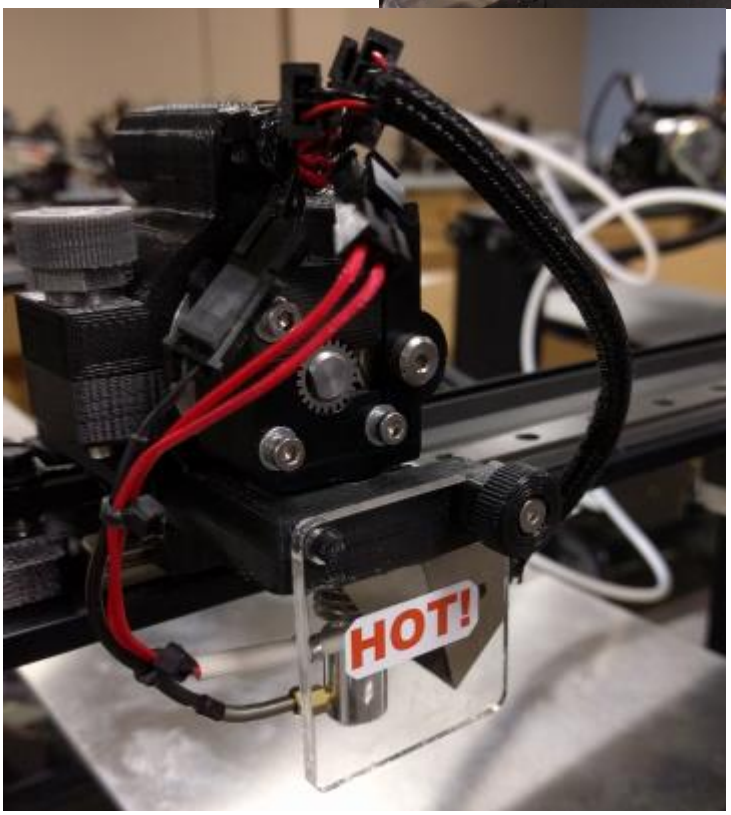


Version 1 hot end

This hot end has a gray block at the bottom which screws into a black feed chamber. These hot ends feature one prominent fan above the HOT! sign and may feature one fan to the right hand side. The brass nozzle at the bottom is of a significant size.

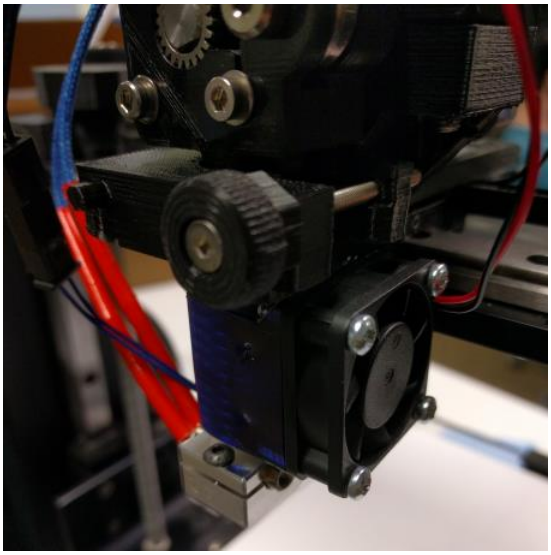


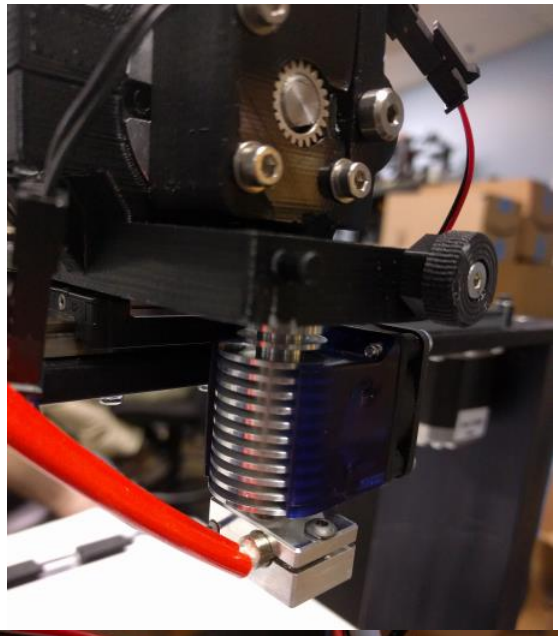


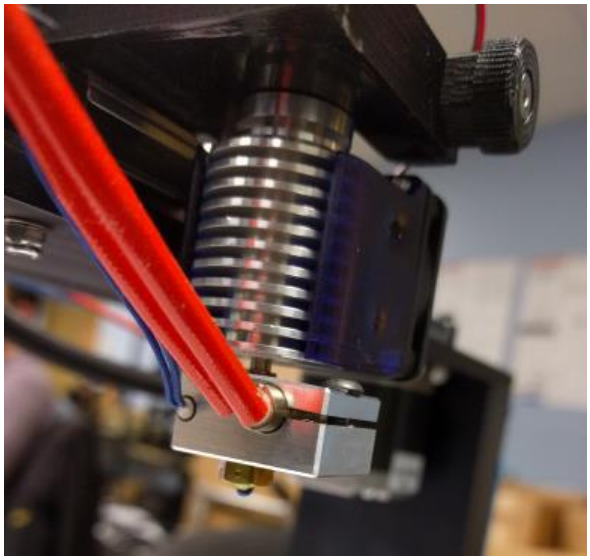


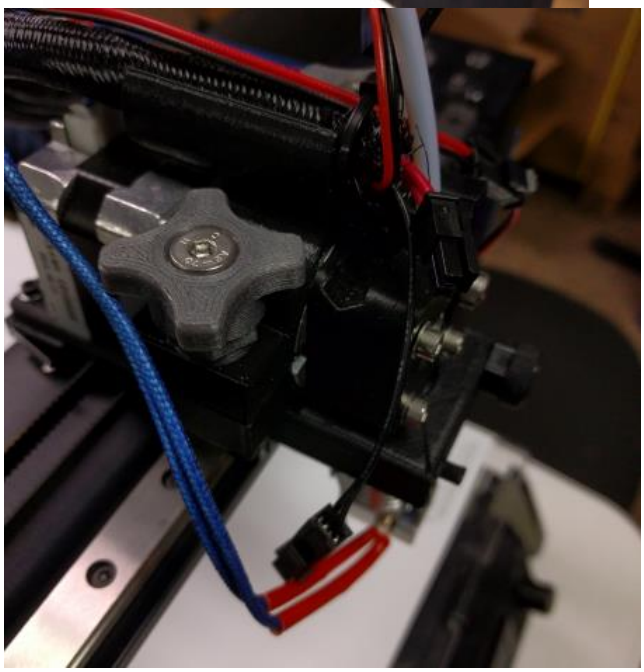
Version 2 hot end

This hot end features two fans to the right of the hot end that is attached to the hot end. The hot end is entirely silver and is directly screwed into a small brass tip. There is no square block above the brass tip. This hot end is under recall due to a fragile thermistor design and should be replaced by a version 3 hot end.



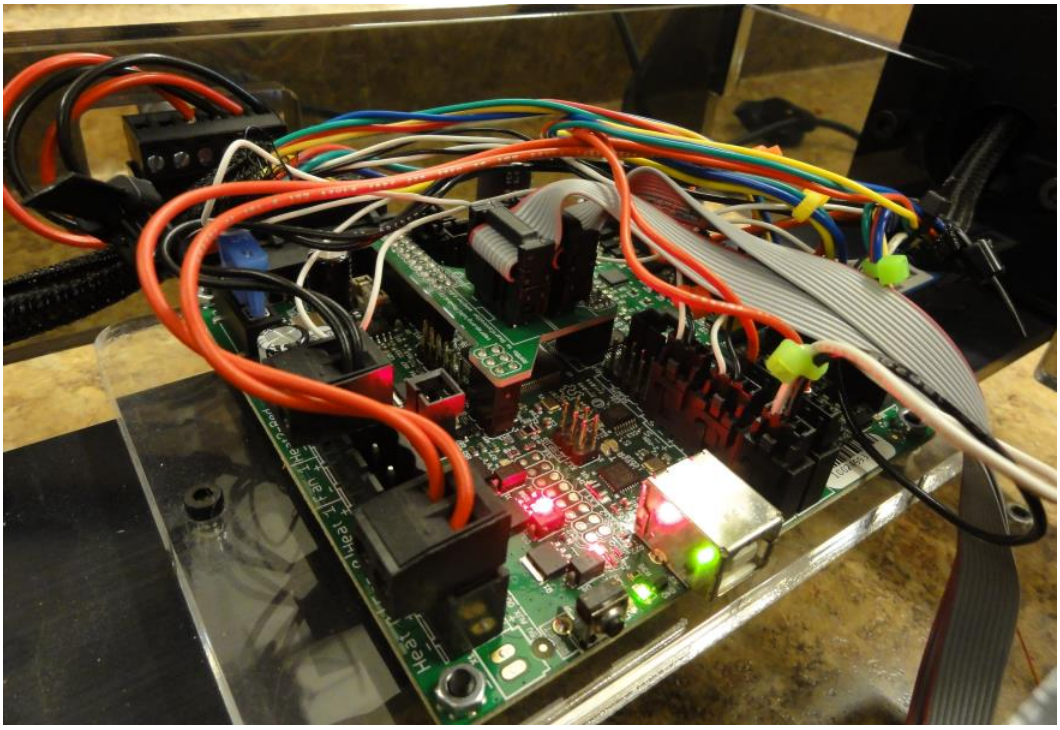






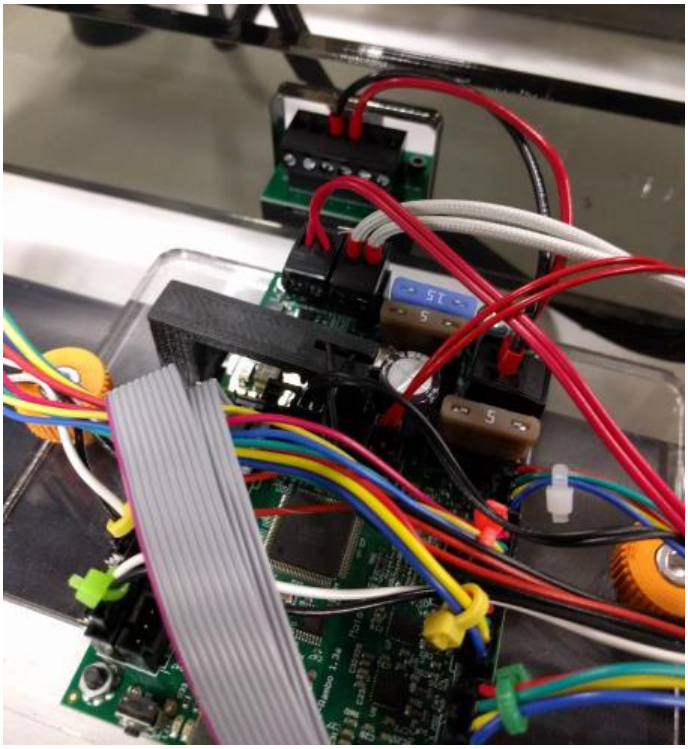
Version 3 hot end

This hot end features a single cooling fan that is attached to the hot end (this fan will likely be on the right side). This hot end has a silver block below the cooling fins area and attached to that block is a small brass tip. This hot end also features blue braided wires that come out of the printer (that may or may not be visible).



Full Rambo board

This board features another circuit board that is physically attached to the top of it. This board has large block connectors on the left side of the board (shown prominently in the photo). This board only features one automotive style fuse (a blue fuse on the left hand side).



Mini Rambo board

This board (shown to left) is a clean design with no other circuit board attached to it. The board has large block connectors at the rear and rear right of the board. A notable difference, this board has three automotive style fuses (one blue 15 amp and two brown 5 amp fuses).