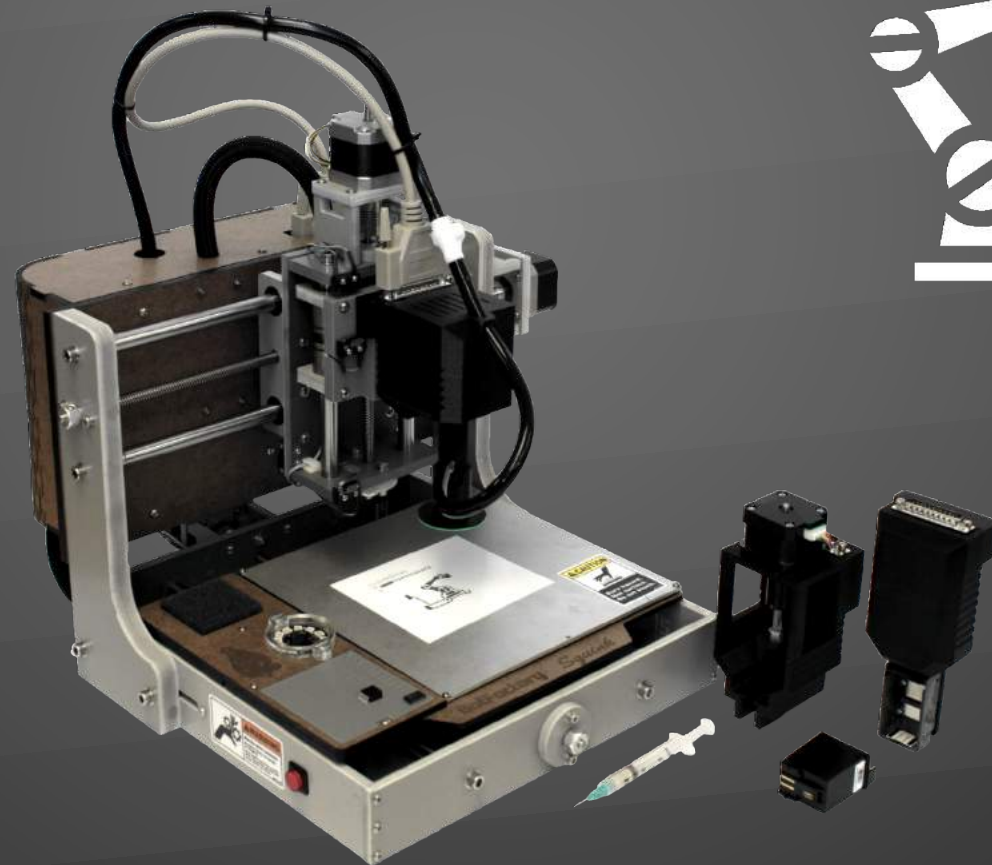




BotFactory



BotFactory Squink Software User Manual

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www.botfactory.co

NYC, Sept 2017
V1.0.5




BOTFACTORY SQUINK PCB PRINTER



- We created a machine to print and assemble PCB on rigid or flex circuits for rapid prototyping of electronics and make the World an easier place for students, educators, researchers and companies involved in Hardware.
- We follow the rule of 'Software-as-a-manual', designing the interface to be like a 'Wizard', leading the user through each step of the process
- For live demonstrations and webinars, [subscribe to our newsletter on our website](#) and [our YouTube Channel](#)
- If you have any questions, contact us at contact@botfactory.co


HOW DO YOU CONNECT TO SQUINK


- Browser-based Interface – need a network or direct-ethernet connection. No USB connection, nor any downloading needed. Software on-board
- Use ethernet cable or WiFi to connect machine to router (with your computer connected to Router), or...
- Use ethernet cable to connect directly to Squink
- Open browser and type in <http://squink/> or <http://squink.local> and begin printing!
- For more information and help on connection, take a look at [our support page](#)


BotFactory



Power 

 Shutdown  Reboot

 Cancel


Temperature 

 Measured: 23.75° C


 Target:  25° C

Start New Print

Start printing and assembling a new circuit





Admin



Setup user info, networks settings, and more!

[Version 1.0.5 is available!](#)



 Click here to start

Support

View some of our online tutorials, demos, or instructions.

Or send an email to support@botfactory.co



Suggestions


Have ideas on how to improve the printer? Let us know. Send an email to suggestions@botfactory.co



Supplies

Buy 'em here.

We've got ink, glue and everything else for your circuit printing needs



BotFactory

Power

Shutdown Reboot

Cancel

Temperature

Measured: 23.75° C

Target: 25° C

Template Options

2 Layer

Single Layer

Upload Files

Outline

Bottom

output-2

Name	Date Modified
LarsonSacanner.drl	Aug 7, 20
LarsonSacanner-B.Cu.gbr	Aug 7, 20
LarsonSacanner-Edge.Cuts.gm1	Aug 7, 20
LarsonSacanner-F.Cu.gtl	Aug 7, 20
LarsonSacanner-F.Mask.gts	Aug 7, 20
LarsonSacanner-F.Paste.gtp	Aug 7, 20
LarsonSacanner-F.Silks.gro	Aug 7, 20
LarsonSacanner-all.pcb	Jul 19, 20
LarsonSacanner.csv	Oct 13, 21

Format: All Files

Options Cancel Open

calculate the size of your design.

has the traces of your design.

Insulating Layer ✓
LarsonSacanner.drl
Change Delete [? Help](#)

Top Copper
No File
Upload Delete [? Help](#)

Glue
No File
Upload Delete [? Help](#)

Pick and Place
The centroid file is a comma (or tab) separated value file that

i

Upload Files – Gerber, Image files and .csv files are fine for printing and assembly

Back

WARNING: Moving Parts ⚙️

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next



Power

Shutdown Reboot

Cancel

Temperature

Measured: 23.75° C

Target: 25° C

Confirmation ✓

To be done:

- ✓ Doing multilayer print
- ✓ Applying glue/paste
- ✓ Doing pick and place

Supplies:

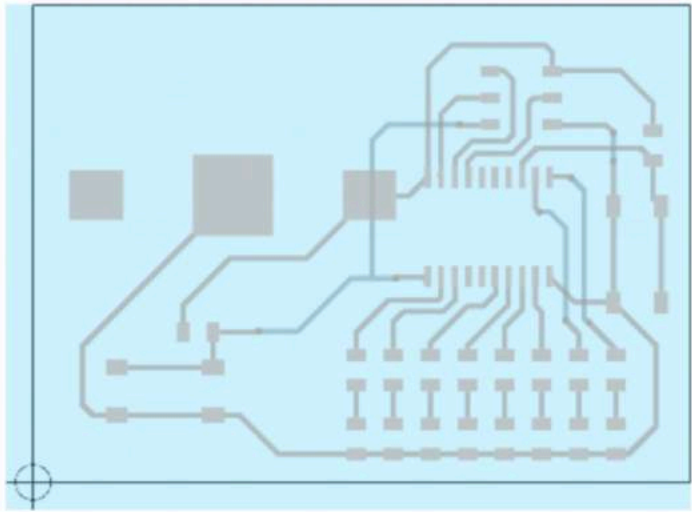
- o [Multilayering Supplies](#)
 - o [Advanced Ink](#)
 - o [Insulating Ink](#)
 - o A substrate like [Kapton](#) or [FR-4](#)
- o [Conductive Glue](#)
- o and all your components

No multilayering? [Get the multilayer upgrade!](#)

- Outline
- Bottom Copper
- Insulating Layer
- Top Copper
- Glue

Hand icon

Search icon



i

Check to see if files match original design

Back

Outline

Next

BotFactory

Power

Shutdown Reboot

Cancel

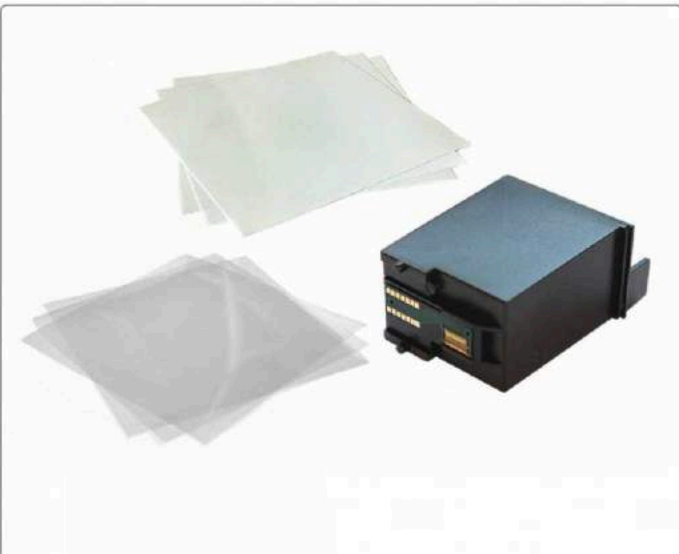
Temperature

Measured: 23.75° C

Target: 80° C

i
For Multilayer prints, Advanced Ink is needed.

Select Your Ink



Standard Ink

Prints on:

- Photopaper
- Transparent Sheets



Advanced Ink

Prints on:

- Kapton
- FR-4

Back



WARNING: Moving Parts

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next

BotFactory

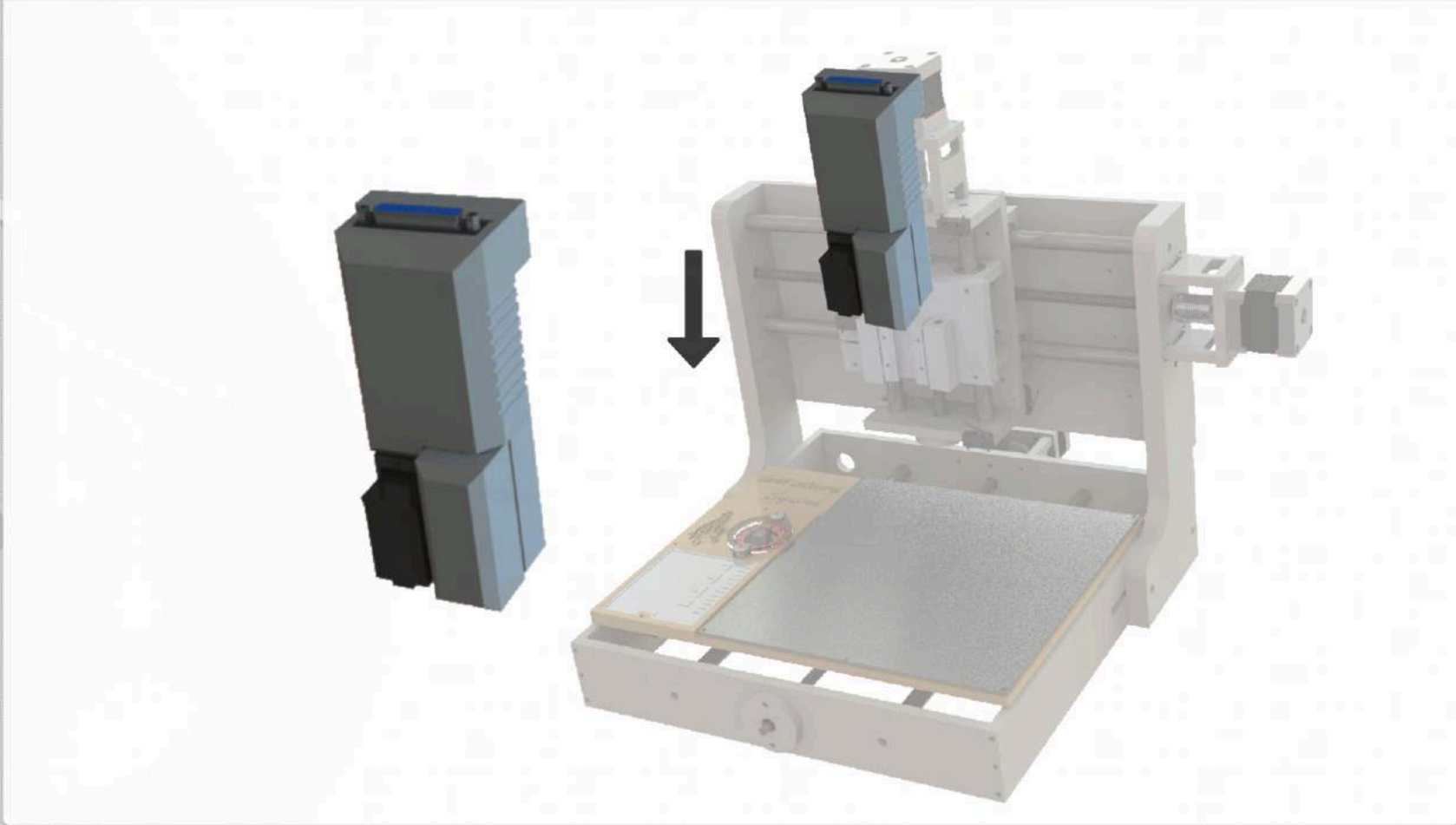
Power

Temperature

Measured: 23.75° C

Target: 80° C

Please Attach the Inkjet Head




Back



WARNING: Moving Parts

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next 

BotFactory

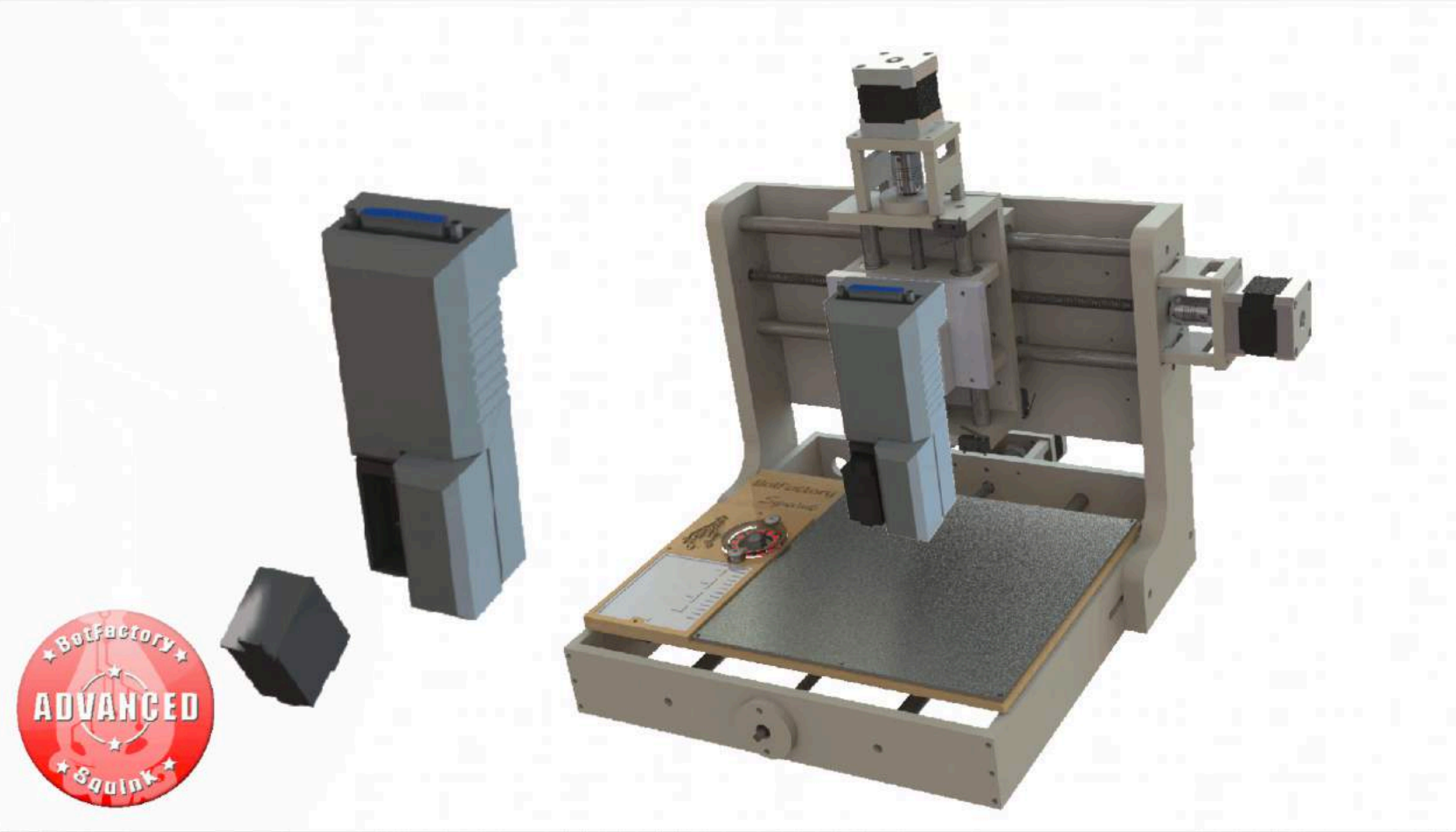
Power

Temperature

Measured: 23.75° C

Target: 80° C

Insert the Conductive Ink



Back





WARNING: Moving Parts ⚙️


The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next >

BotFactory

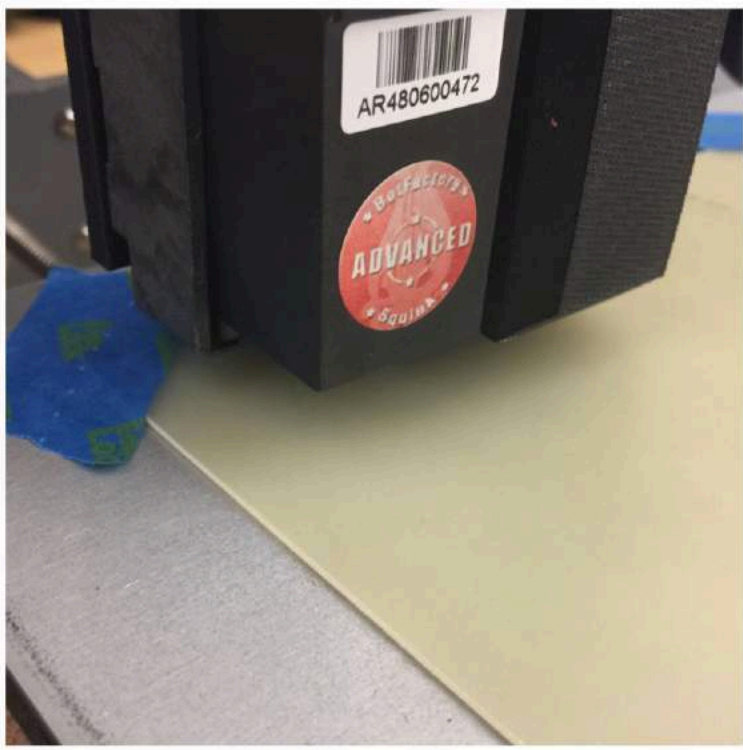
Power 


Temperature 

 Measured: 23.75° C


Target: 80° C

Align the Inkjet Head



 Click to move to where you want to print

You can print anywhere on your substrate. We suggest moving the inkjet head so the cartridge nozzles are located at the top-left corner of your printing material.

 Back

 **WARNING: Moving Parts** 
The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next 



Power

Shutdown Reboot

Cancel

Temperature

Measured: 23.75° C

Target: 80° C

Align the Inkjet Head

W BACK

R UP

A LEFT

S FRONT

D RIGHT

F DOWN

Save location

Use the controls on the left to move the print head where you want the top-left corner of your circuit.

You can print anywhere on your substrate. We suggest moving the inkjet head so the cartridge nozzles are located at the top-left corner of your printing material.

Back

WARNING: Moving Parts ⚙️

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next



Power ⌵

⏻ Shutdown ↺ Reboot

⌫ Cancel

Temperature ⌵

🌡 Measured: 23.75° C

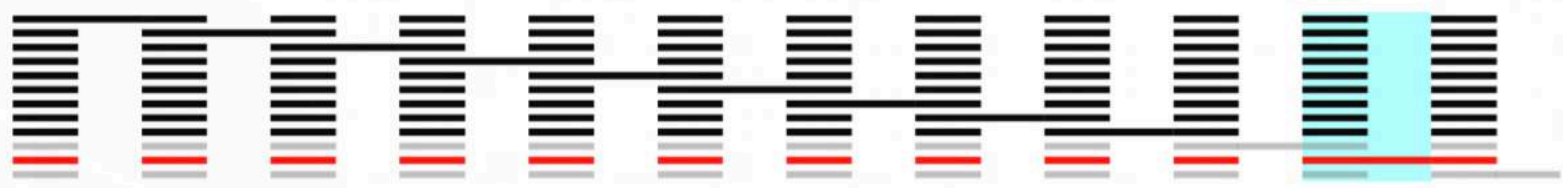
✅ Target: 80° C

Check the Nozzles

The printing nozzles can clog or be dirty. You can run a test to see which nozzles are working by clicking 'Print Nozzle Test'.

⚙ Print Nozzle Test ⚙ Flush Nozzles ℹ

Adjust the image below so that it matches the printed test pattern. Click the columns to turn a nozzle **on/off**.



Enabled Nozzles (all): 1, 2, 3, 4, 5, 6, 7, 8, 9

Disabled Nozzles (none): 10, 11, 12

ℹ **Print Repetitions:** 5.00

i

Control the number of print passes and nozzles

⬅ Back

WARNING: Moving Parts ⚙

⚠ The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next ➡

BotFactory

Power

Temperature

Measured: **23.75° C**

Target: 80° C

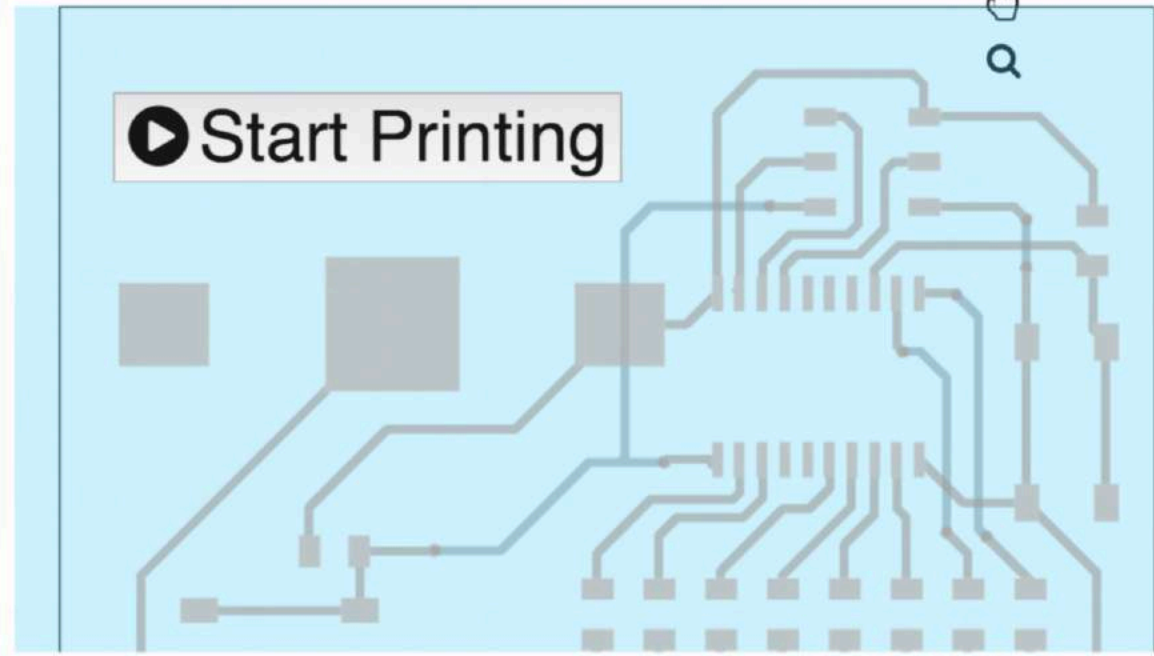
Running Status: **0.00%**

Time Left: -h -m -s

Time Elapsed: 0h 0m 0s

Build: Bottom Copper

- Outline
- Bottom Copper
- Insulating Layer
- Top Copper
- Glue



← Back

WARNING: Moving Parts ⚙️

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next →

BotFactory

Power

Shutdown Reboot

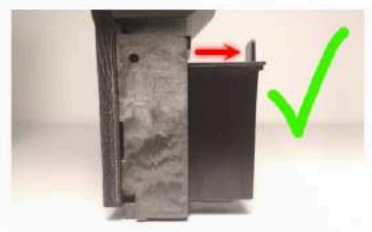
Cancel

Temperature

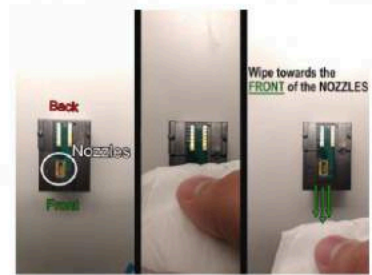
Measured: 23.75° C

Target: 80° C

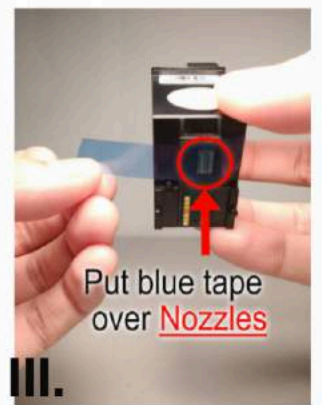
After-Print Care and Storage



I.



II.



III.



IV.

After finishing a print, it is recommended that both Advanced and Standard Inks must be wiped, treated with a drop of water, taped and stored.

😊 Please follow these steps:

- I. Remove cartridge
- II. Clean nozzles
- III. Tape nozzles
- IV. Store in a refrigerator (for advanced ink)


i This is crucial – cartridge care means longer shelf-life



← Back


WARNING: Moving Parts ⚙️
The print head will be moving in the upcoming steps. Please keep your hands away from the printer.


Next →


BotFactory


Power 

 Shutdown  Reboot

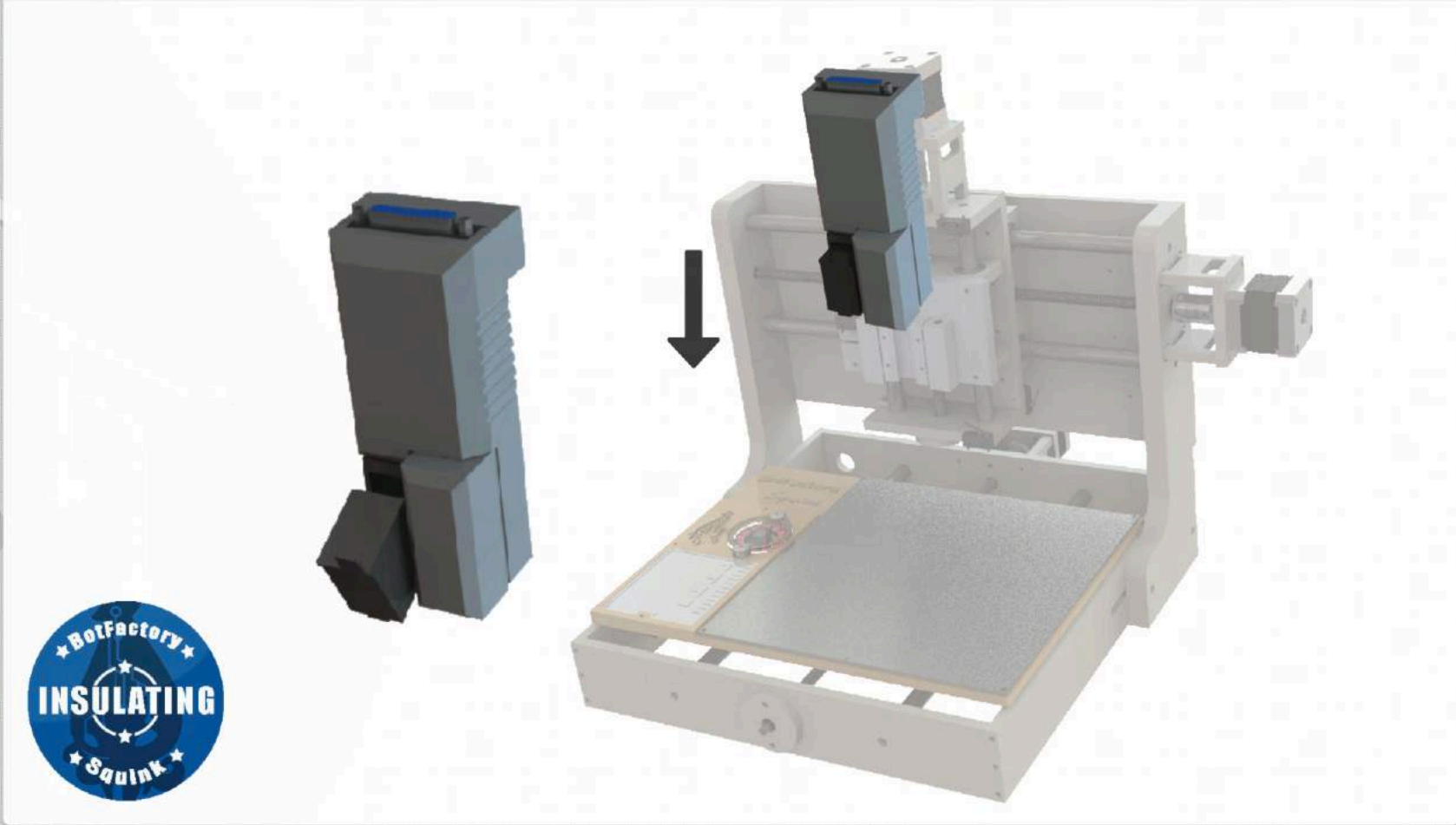
 Cancel

Temperature 

 Measured: 23.5° C

 Target: 50° C

Insert the Insulating Ink



i Swap the cartridges so you can print an insulating layer

Back



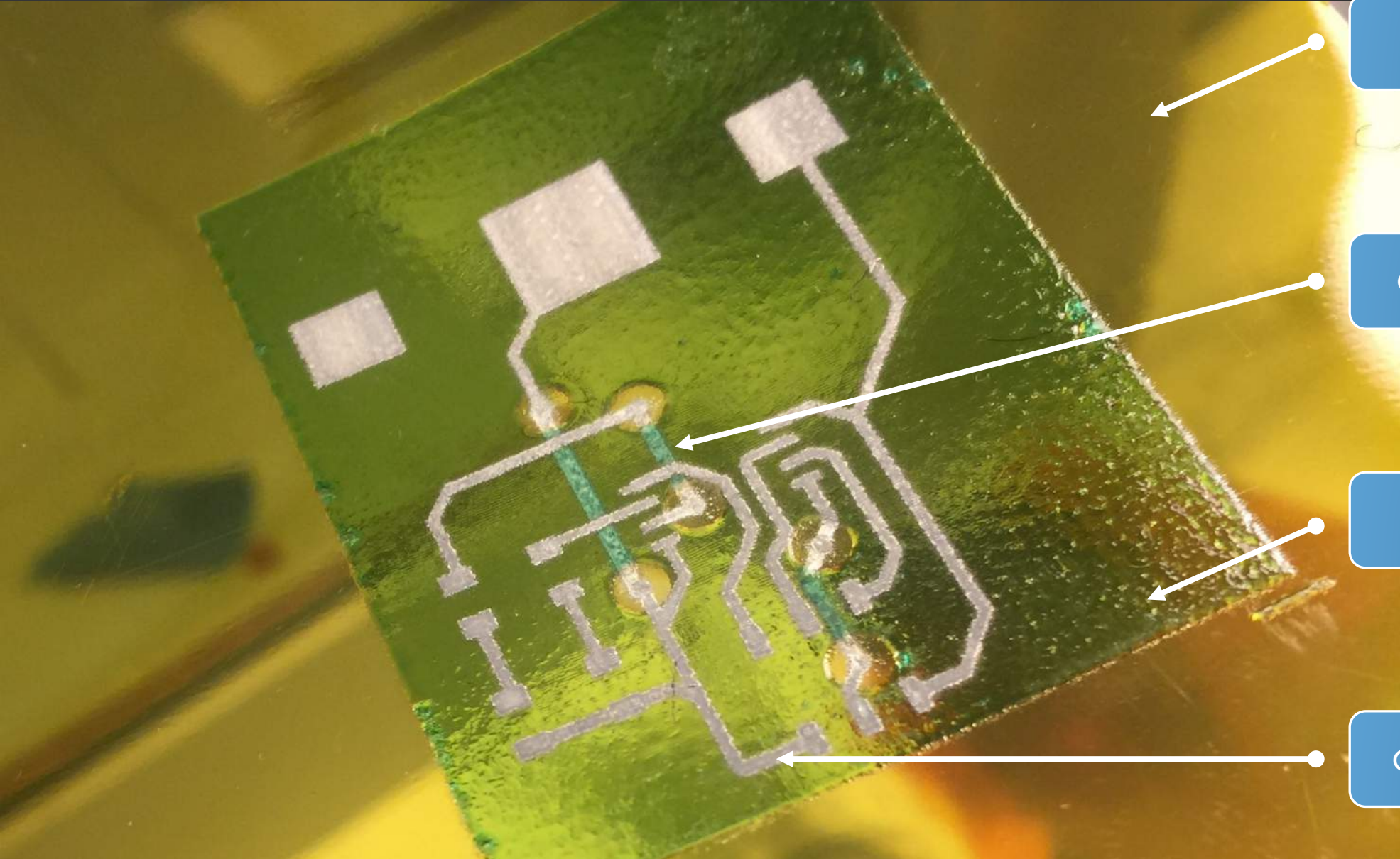
WARNING: Moving Parts

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next 

REPEAT PRINTING PROCESS FOR INSULATING AND
CONDUCTIVE TOP LAYER

PRINTING PROCESS: RESULT



Substrate: Kapton/FR4

Conductive Ink: 1st layer

Insulating Ink

Conductive Ink: 2nd layer

BotFactory

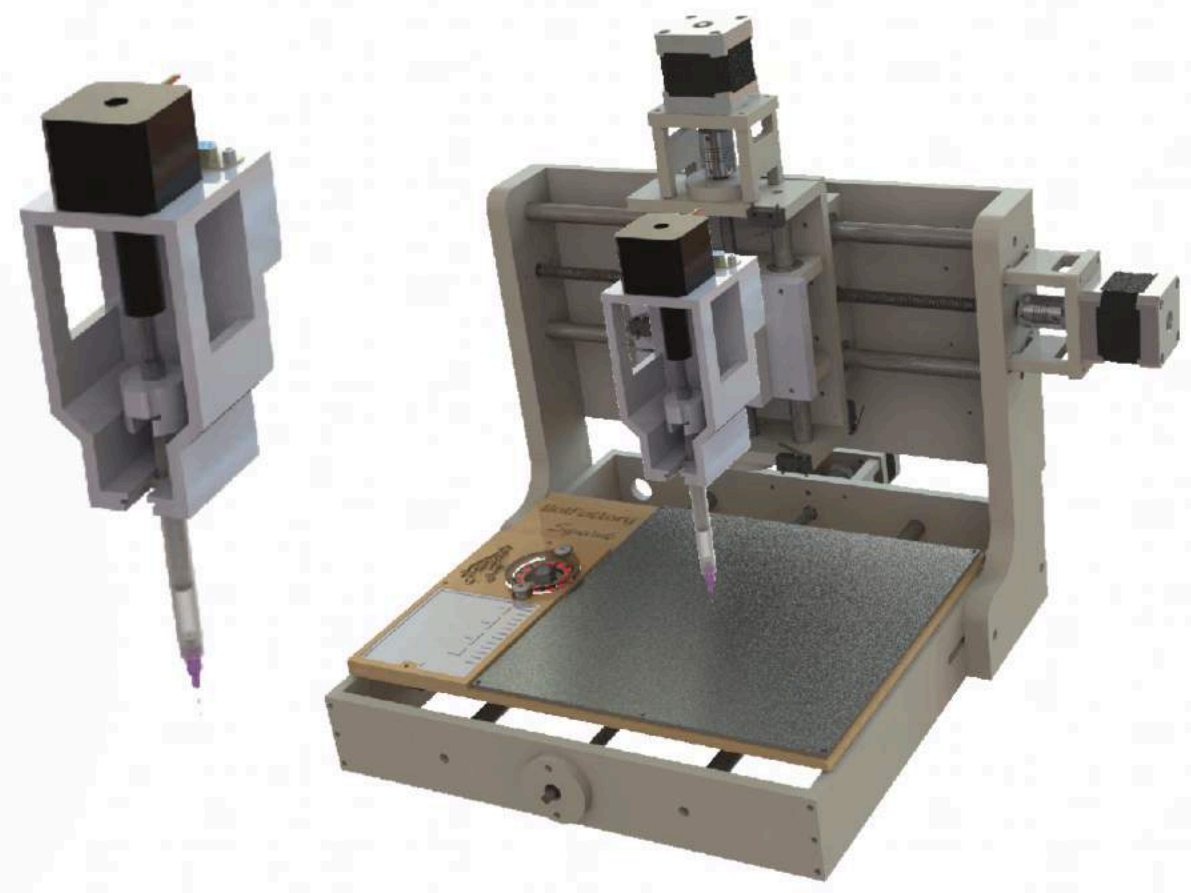
Power

Temperature

Measured: 23.25° C

Target: 50° C

Please Attach the Glue Head



i Squink has three different heads for each process

Back



WARNING: Moving Parts ⚙️

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next >

BotFactory

Power

Shutdown Reboot

Cancel

Temperature

Measured: 23.25° C

Target: 50° C

Insert the Syringe

Adjust the height of the glue head so it matches the height of the syringe using the arrows below:

Movement Amount: 1

1 100 200 300 400 500

Then slide the syringe all the way into the holder.
Finally, twist the syringe to lock it in place.



i

We suggest a conductive glue, but other pastes can be utilized!

Back

WARNING: Moving Parts

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next

BotFactory

Power

Shutdown Reboot

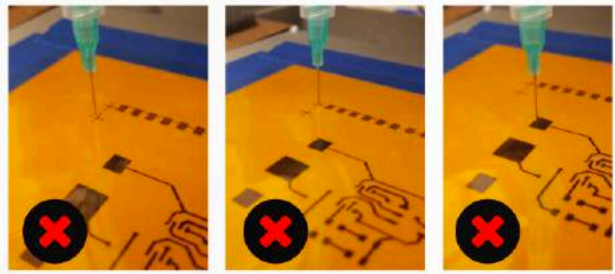
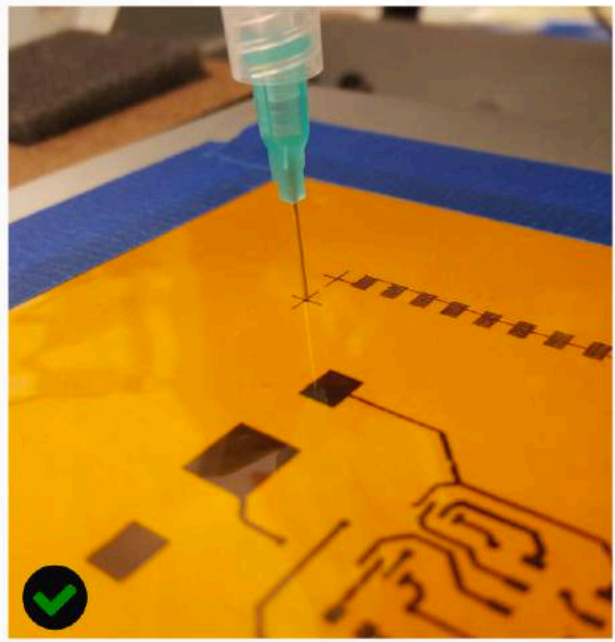
Cancel

Temperature

Measured: 23.5° C

Target: 50° C

Align the Gluing Head



Move to target marker

Do I need to align the glue head?

If you have never applied glue or solder paste before, please click "Move to target marker" and align the glue head. Use the images on the left as a guide.

Back

WARNING: Moving Parts
The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next



Gluing Head Setting

Power

Shutdown Reboot

Cancel

Temperature

Measured: 23.5° C

Target: 50° C

Load Amount: 5



Drop Size: 2



Test Parameters Clean Tip

Use the control below to move the syringe plunger up and down.

Movement Amount: 1



Adjust the levels to find the dispensing pattern that works best for your design and material

Back

WARNING: Moving Parts

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next

BotFactory

Power

Temperature

Measured: **23.25° C**

Target: 50° C

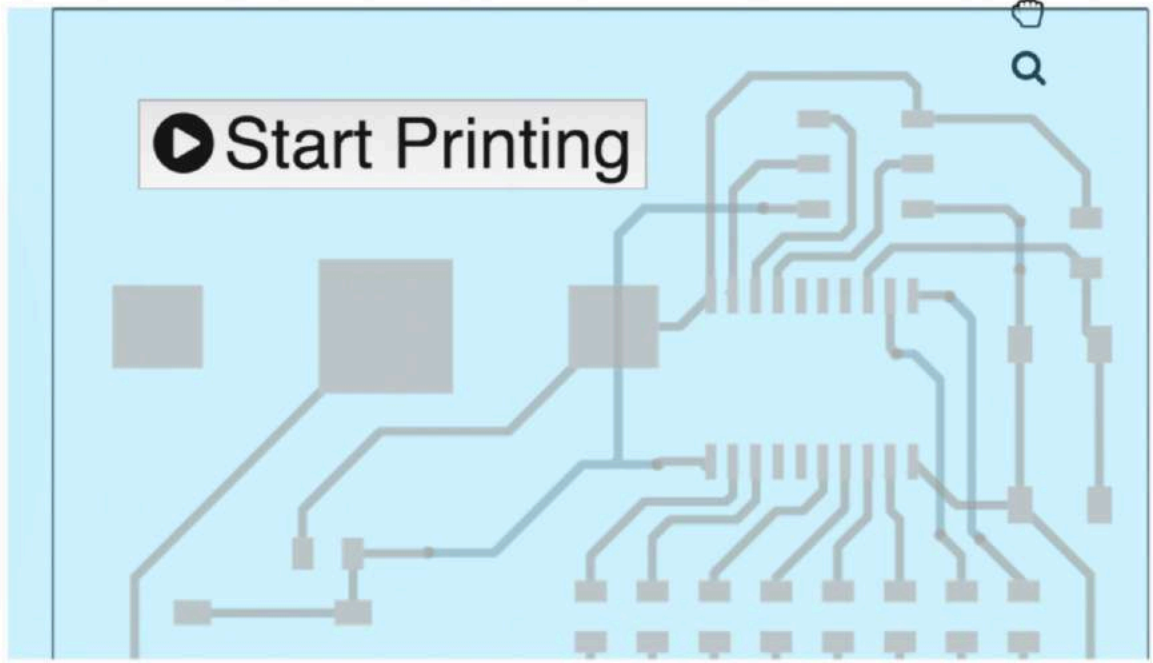
Running Status: **0.00%**

Time Left: -h -m -s


Time Elapsed: 0h 0m 0s

Build

- Outline
- Bottom Copper
- Insulating Layer
- Top Copper
- Glue



WARNING: Moving Parts ⚙️

 The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

BotFactory

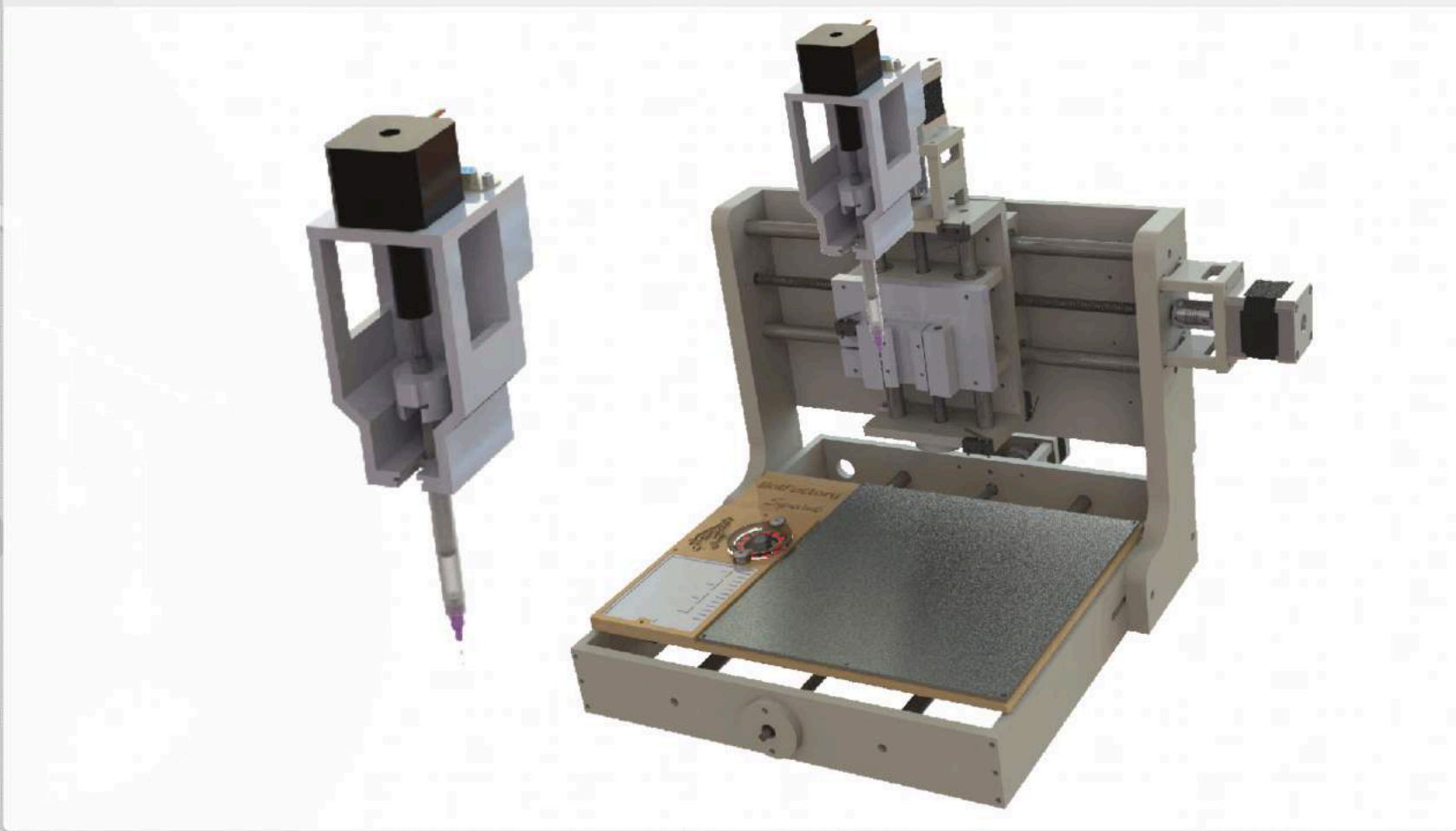
Power

Temperature

Measured: **23.25° C**

Target: 50° C

Detach the Glue Head



WARNING: Moving Parts ⚙️

 The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

BotFactory

Power

Shutdown Reboot

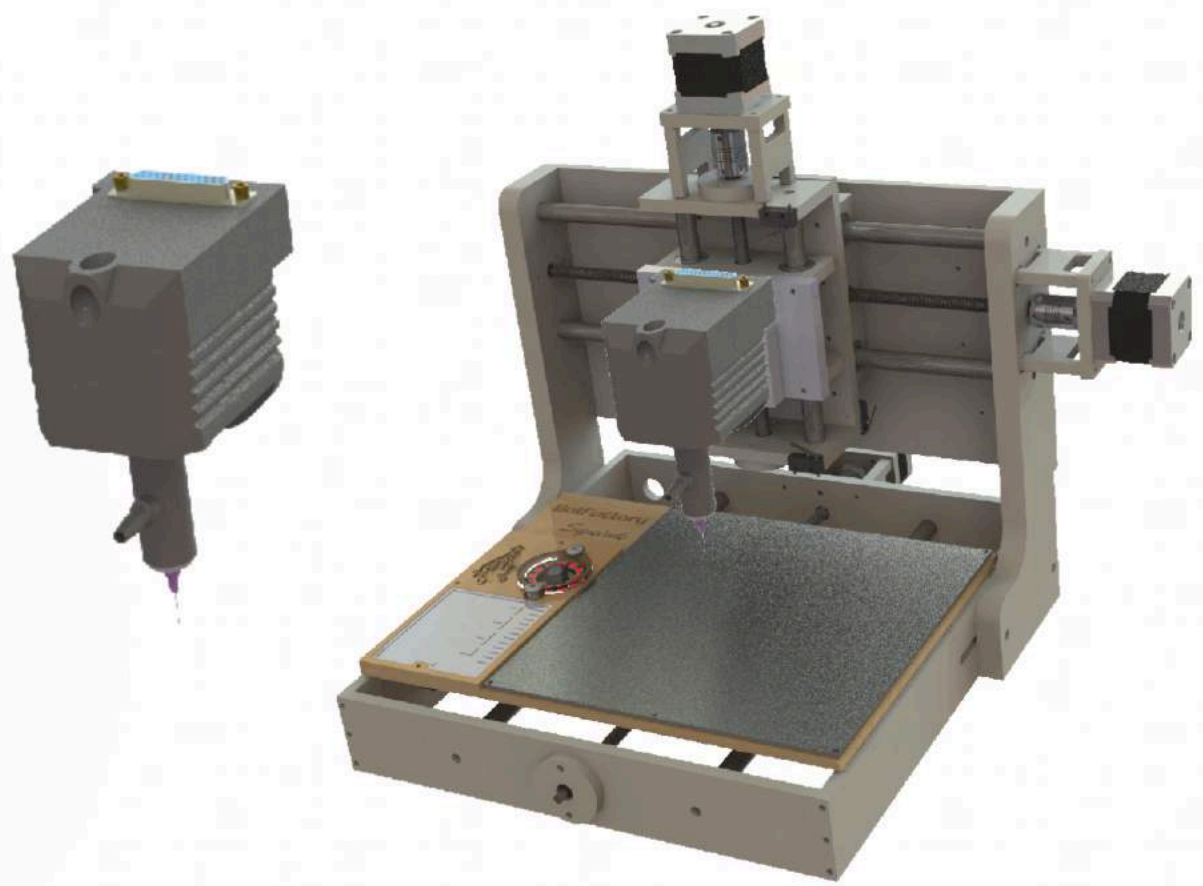
Cancel

Temperature

Measured: 23.25° C

Target: 50° C

Please attach the pick and place head



i We have here a head with a motor for rotation of parts and suction for picking them up

Back



WARNING: Moving Parts ⚙️

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next >

BotFactory

Power

Shutdown Reboot

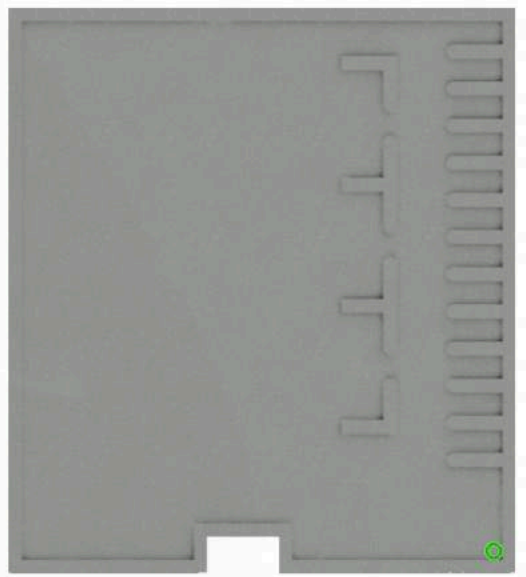
Cancel

Temperature

Measured: 23.25° C

Target: 50° C

Component Tray



The tray may not be aligned perfectly. Check the alignment by clicking Check Tray Alignment button. The tip should touch each of the blue regions as shown. Ideally the tip will touch the bottom-right corner of each slot.

Check Tray Alignment

Use the controls on the right to move the head so it is aligned in the last slot. The entire tip should be within the slot and it should be touching both the bottom and right edge.

Back



WARNING: Moving Parts

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next

BotFactory

Power

Shutdown Reboot

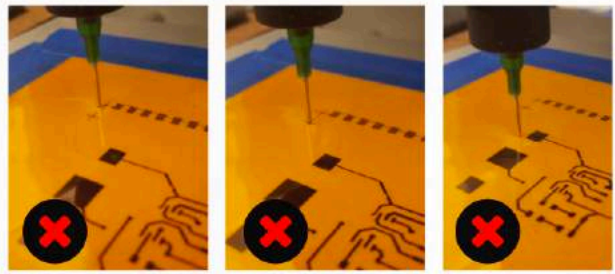
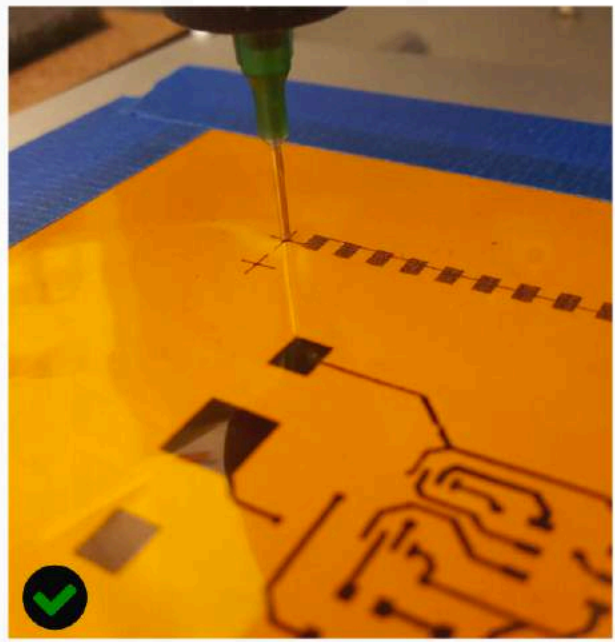
Cancel

Temperature

Measured: 23.25° C

Target: 50° C

Pick and Place Head Alignment



Move to target marker

Do I need to align the pick and place head?

If you have never picked or placed some components before, please click "Move to target marker" and align the pick and place head. Use the images on the left as a guide.

Back

WARNING: Moving Parts
The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next

BotFactory

Power

Shutdown Reboot

Cancel

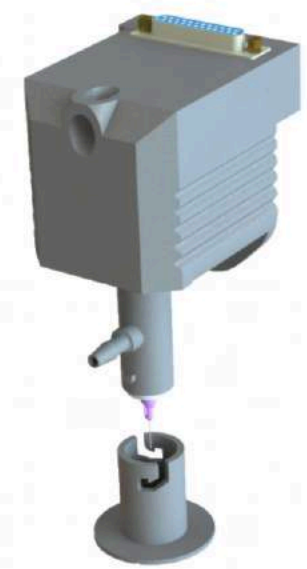
Temperature

Measured: 23.5° C

Target: 50° C

Pick and Place attach the shield

Slide the image shield onto to head by aligning the slot of the shield with the bump on the head. Then slide and rotate the cap so it locks into place.




i This shield is used to provide a 'green screen' to help the upwards-facing camera find the edges of the part


Back


WARNING: Moving Parts ⚙️
The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next >

BotFactory

Power 

Temperature 

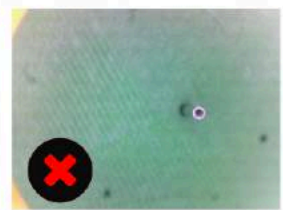
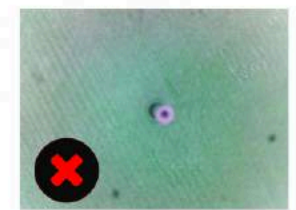
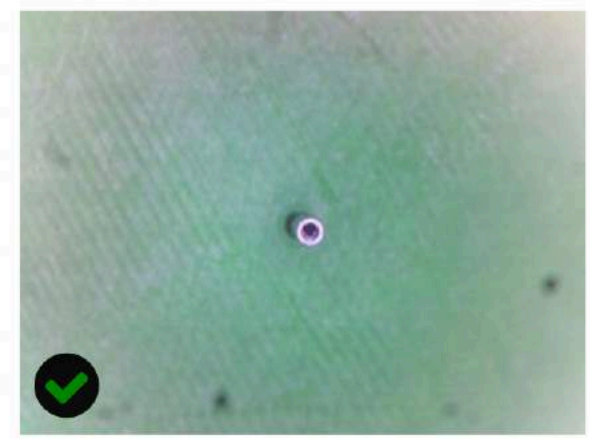
 Measured: 23.25° C



Target: 50° C

Pick and Place Calibrate Camera

Using the arrows, move the pick and place tip so it looks centered in the frame then click "Tip Looks good" to calibrate.

Find and Center the Tip



 **WARNING: Moving Parts** 

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Define the columns in your centroid file

Original	Heading	Sample Data
Ref	Designator	BATT1, D1, D2, D3, D4, D5, D6, D7, D8, P1
Val	Comment	COIN_BATTERY_HOLDER, LED_RED, LED_RED, LED_RED, LED_RED, LED_RED, LED_RED, LED_RED, LED_RED, CONN_3X
Package	Footprint	20MM_COIN_BATT_HOLD, LED-1206, LED-1206, LED-1206, LED-1206, LED-1206, LED-1206, LED-1206, LED-1206,
PosX	X	18.8500, 51.4500, 54.9500, 47.9500, 44.4500, 40.9500, 37.4500, 33.9500, 30.4500, 46.0000
PosY	Y	27.0500, 10.6000, 10.6000, 10.6000, 10.6000, 10.6000, 10.6000, 10.6000, 10.6000, 36.2500
Rot	Rotation	90.0000, 270.0000, 270.0000, 270.0000, 270.0000, 270.0000, 270.0000, 270.0000, 270.0000, 270.0000,
Side	Comment	top, top, top, top, top, top, top, top, top, top

Power

Shutdown Reboot

Cancel

Temperature

Measured: 23.25° C

Target: 50° C

i Squink needs to be sure that the headers in the table created by your CAD tool for Assembly are the right ones

Back

WARNING: Moving Parts ⚙️

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next

BotFactory

Power

Shutdown Reboot

Cancel

Temperature

Measured: 23.25° C

Target: 50° C

Confirmation

- Outline
- Bottom Copper
- Insulating Layer
- Top Copper
- Glue

Missing Components

We do not know all of the footprint. The unknowns are show in red. Click on one to define its dimensions. Once everything is known you can continue to pick and place.

Ok

Back

Outline

Next

BotFactory

Power

Shutdown Reboot

Cancel

Temperature

Measured: 23.25° C

Target: 50° C

Confirmation

Name: U1; Angle: 0; Footprint: SOIC-20

Outline
Bottom Copper
Insulating Layer
Top Copper
Glue

Name 20MM_COIN_BATT_HC --
Length -1 mm
Width -1 mm

Save Footprint Cancel

i Look at the datasheets and your original design to make sure you have the right dimensions of each part. Squink will remember previously-used parts

Back

Outline

Next

BotFactory

Power

Shutdown Reboot

Cancel

Calibration

Board Origin

Tray

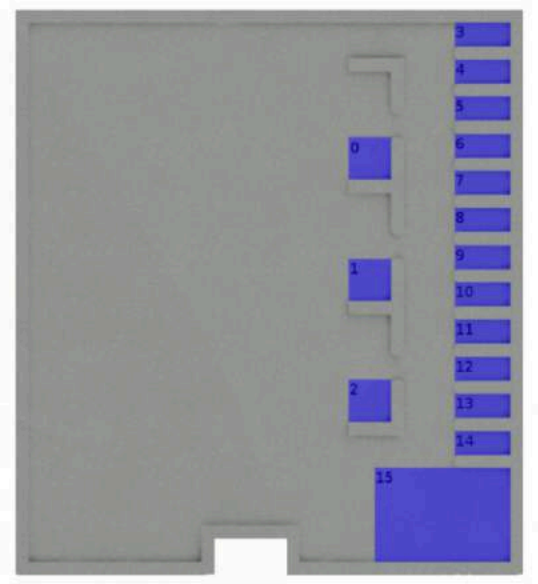
Footprints

Camera

Manual Mode

Computer Vision

Pick and Place Assembly



Part Orientation in Tray
Please put your componets in the tray so they match the 0° orientation of the footprint in your design software. Typically (but not always) the notch (or pin 1 in your footprint) is on the left side.

Reset AutoLoad Sort by original order (ascending)

<input type="checkbox"/>	Location	Status	Name	Comment
<input type="checkbox"/>	--	not placed	D8	LED_RED top
<input type="checkbox"/>	--	not placed	P1	CONN_3X2 top
<input type="checkbox"/>	--	not placed	PB1	PUSH_BUTTON top
<input type="checkbox"/>	--	not placed	PB2	PUSH_BUTTON top
<input type="checkbox"/>	--	not placed	R1	R_49.9 top
<input type="checkbox"/>	--	not placed	R2	R_49.9 top
<input type="checkbox"/>	--	not placed	R3	R_49.9 top
<input type="checkbox"/>	--	not placed	R4	R_49.9 top
<input type="checkbox"/>	--	not placed	R5	R_49.9 top
<input type="checkbox"/>	--	not placed	R6	R_49.9 top
<input type="checkbox"/>	--	not placed	R7	R_49.9 top
<input type="checkbox"/>	--	not placed	R8	R_49.9 top
<input type="checkbox"/>	--	not placed	R9	R_12K top

i Match the slot number on the tray to the part you'd like to place

Unlock Rotation Retry Skip Place

Back

WARNING: Moving Parts ⚙️

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next

BotFactory

Power

Shutdown Reboot

Cancel

Calibration

Board Origin

Tray

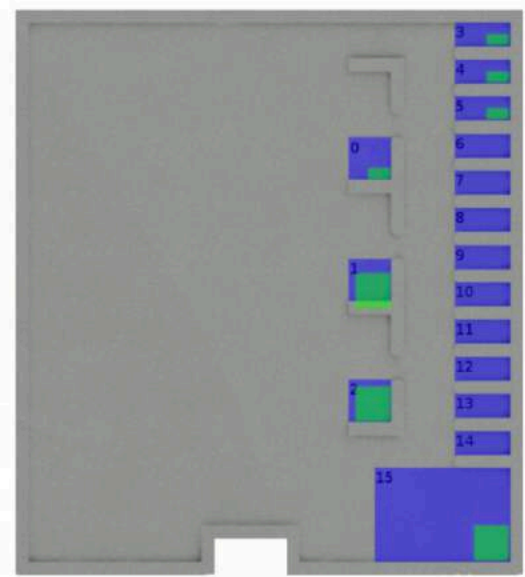
Footprints

Camera

Manual Mode

i Manual Mode makes it possible for a user to manually pick and place a part that the camera would deem too small to detect, like an 0402 or 0201

Pick and Place Assembly



Part Orientation in Tray
Please put your componets in the tray so they match the 0° orientation of the footprint in your design software. Typically (but not always) the notch (or pin 1 in your footprint) is on the left side.

Reset AutoLoad Sort by original order (ascending)

<input type="checkbox"/>	Location	Status	Name	Comment
<input type="checkbox"/>	Slot0	not placed	D8	LED_RED top
<input type="checkbox"/>	Slot1	not placed	P1	CONN_3X2 top
<input type="checkbox"/>	Slot2	not placed	PB1	PUSH_BUTTON top
<input type="checkbox"/>	Slot15	not placed	PB2	PUSH_BUTTON top
<input type="checkbox"/>	Slot3	not placed	R1	R_49.9 top
<input type="checkbox"/>	Slot4	not placed	R2	R_49.9 top
<input type="checkbox"/>	Slot5	not placed	R3	R_49.9 top
<input type="checkbox"/>	Slot6	not placed	R4	R_49.9 top
<input type="checkbox"/>	Slot7	not placed	R5	R_49.9 top
<input type="checkbox"/>	Slot8	not placed	R6	R_49.9 top
<input type="checkbox"/>	Slot9	not placed	R7	R_49.9 top
<input type="checkbox"/>	Slot10	not placed	R7	R_49.9 top
<input type="checkbox"/>	Slot11	not placed	R8	R_49.9 top
<input type="checkbox"/>	Slot12	not placed	R8	R_49.9 top
<input type="checkbox"/>	Slot13	not placed	R8	R_49.9 top
<input type="checkbox"/>	Slot14	not placed	R8	R_49.9 top
<input type="checkbox"/>	Slot15	not placed	R9	R_12K top

Unlock Rotation Retry Skip Place

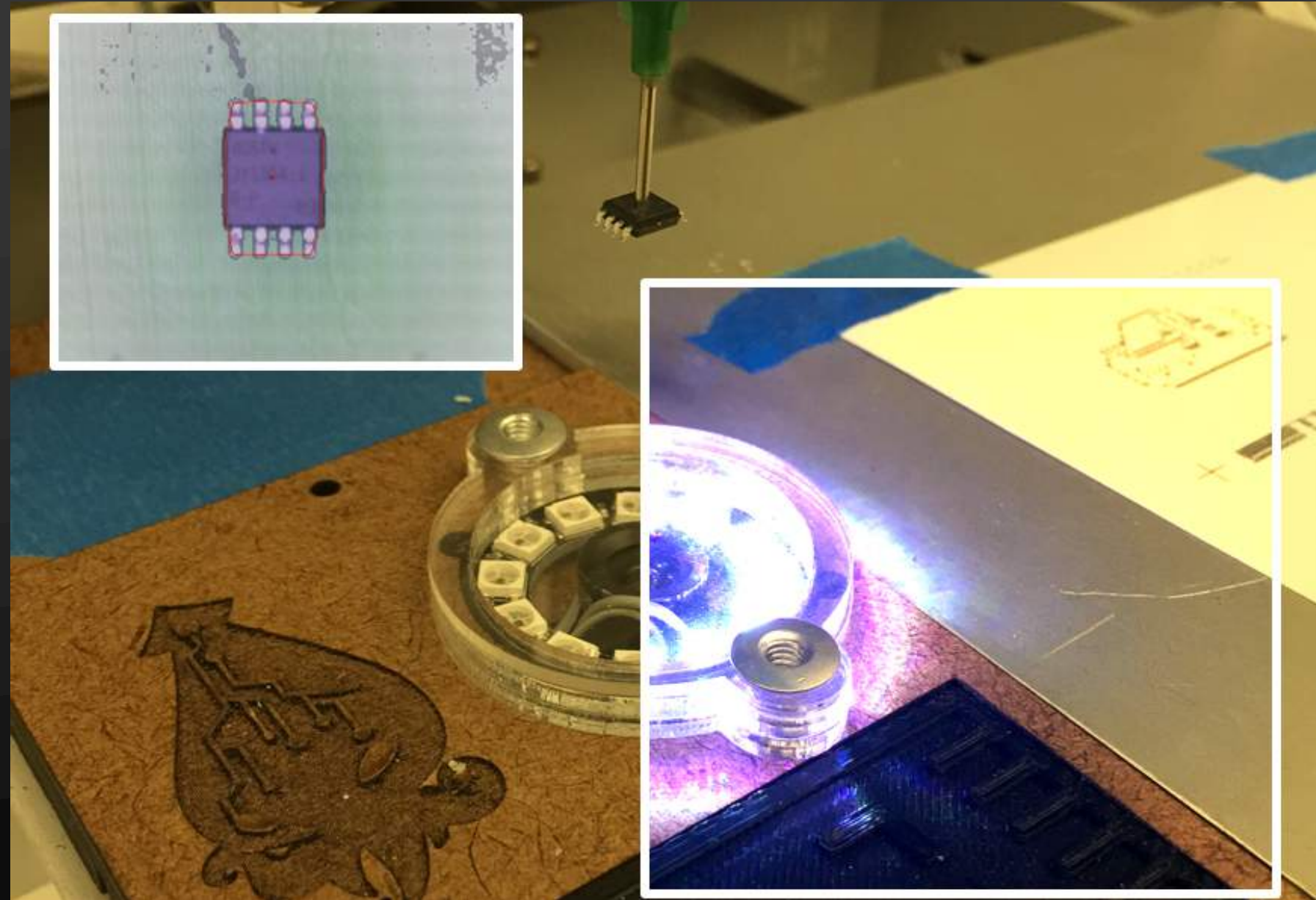
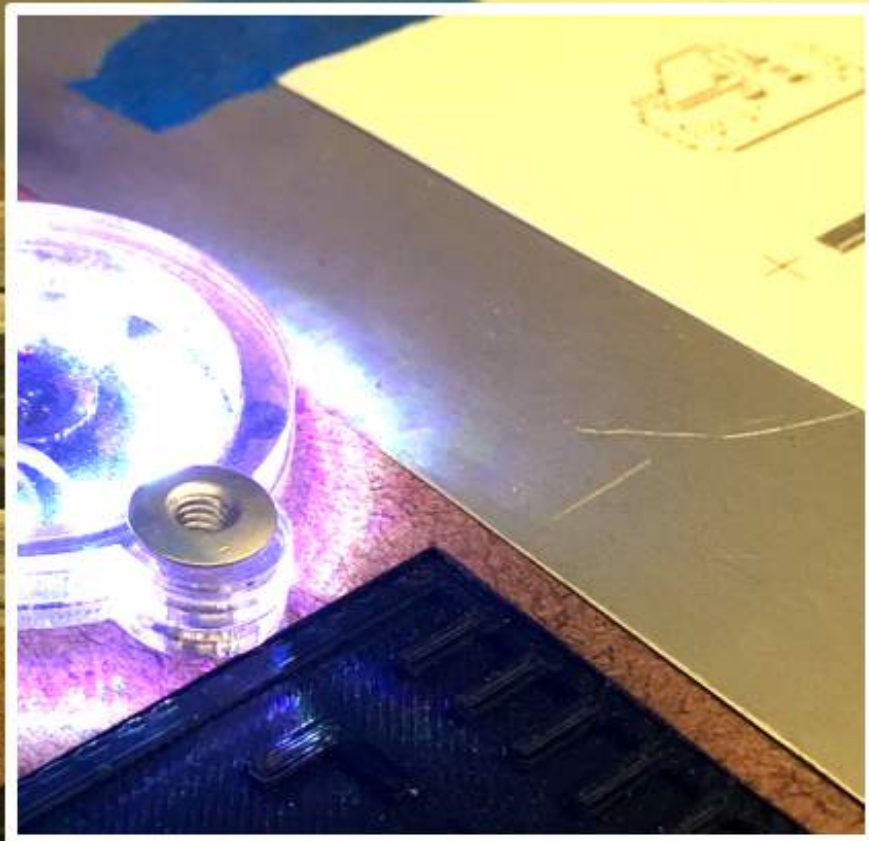
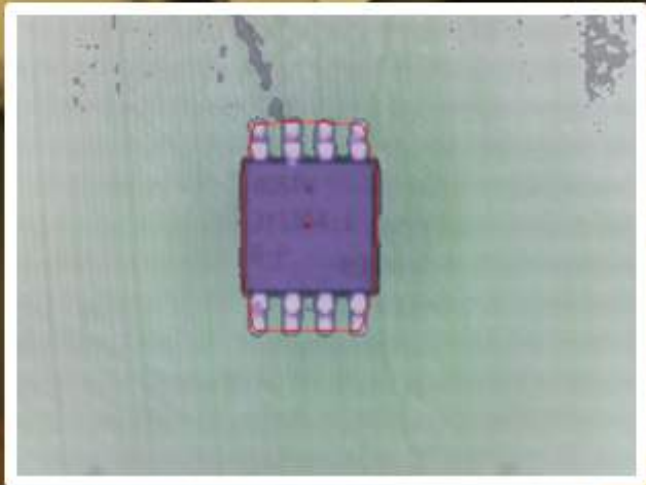
Back

WARNING: Moving Parts

The print head will be moving in the upcoming steps. Please keep your hands away from the printer.

Next

ASSEMBLY: CAMERA





BotFactory

Power



Shutdown

Reboot

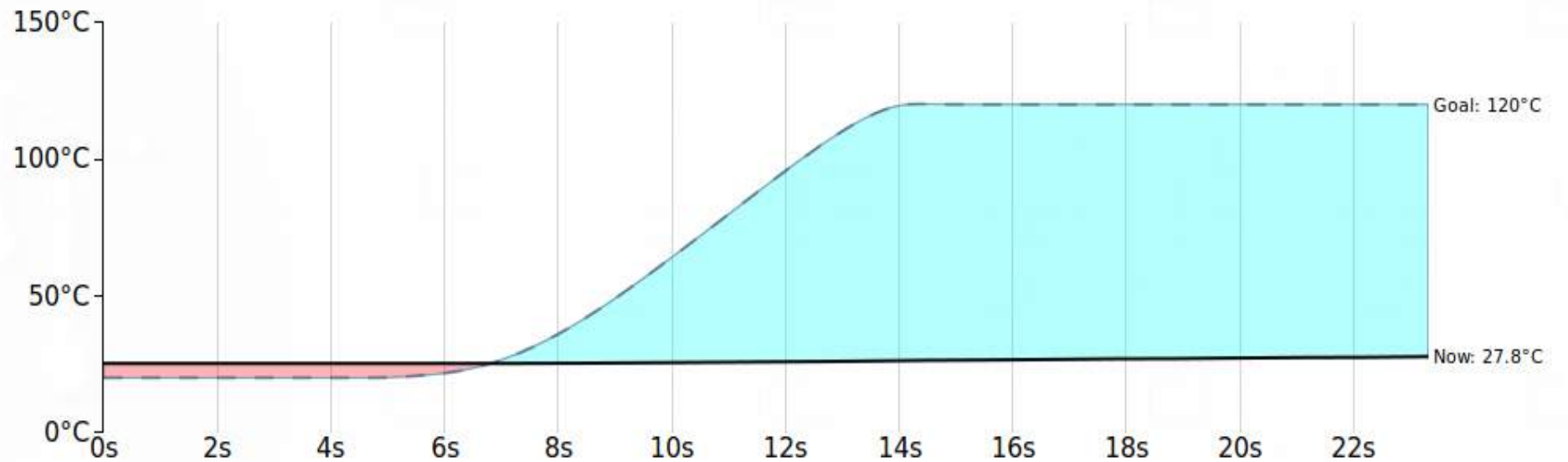


Use the heatbed dashboard to run a thermal cycle and cure the conductive glue to connect the components to the traces completely

Heatbed Dashboard

Target Temperature (°C): 110.00

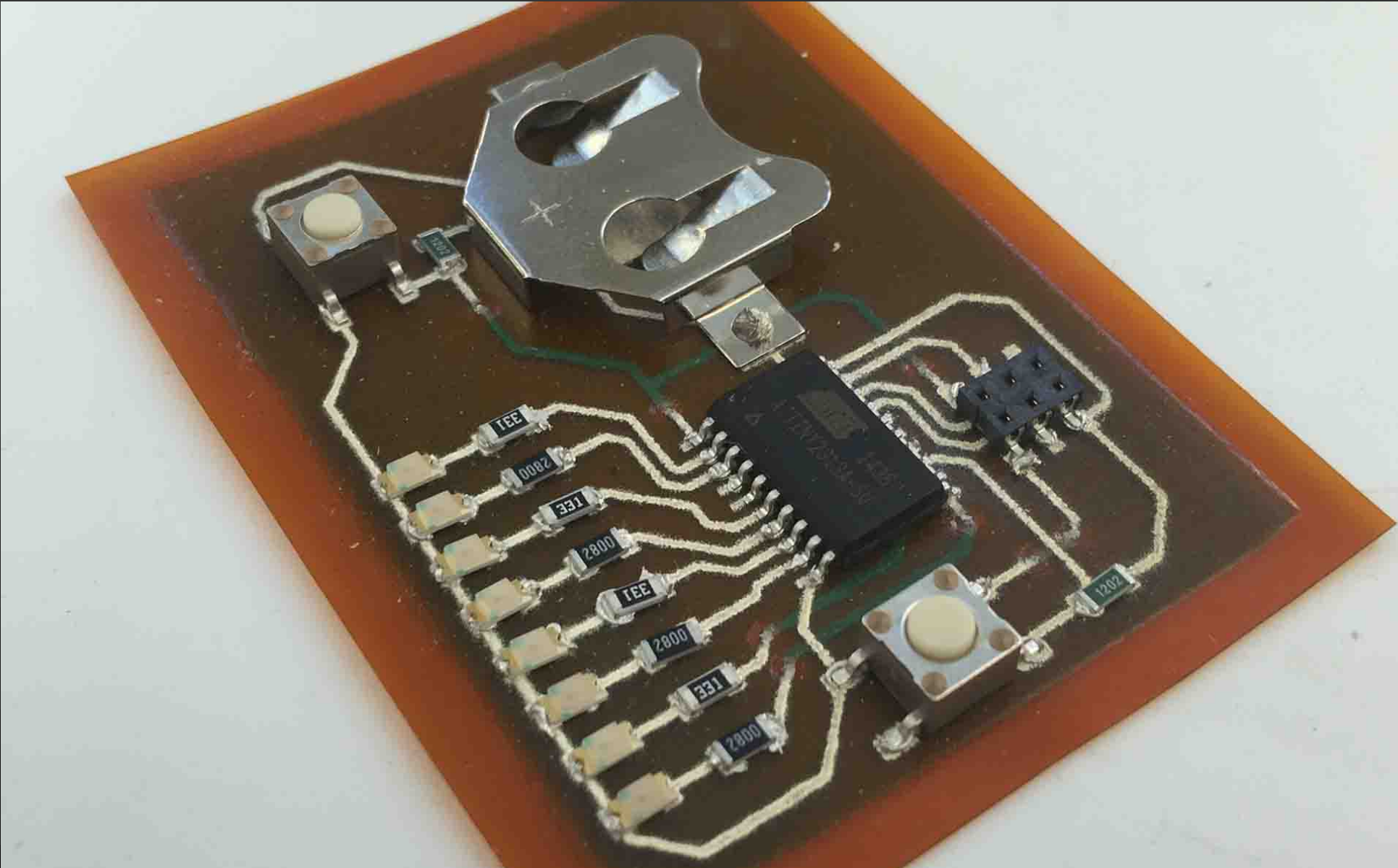
Timer (minutes): 60.00



Stop

Start

FINAL MULTILAYERED BOARD



CONTACT US IF YOU HAVE MORE QUESTIONS!

CONTACT@BOTFACTORY.CO