MAKERGEAR

MICRO

GETTING STARTED GUIDE

SCRATCH BUILT EDITION

#MAKEYOUROWNMICRO

READ EVERYTHING PLEASE!

If you have chosen to build this thing from scratch, there are SO MANY little tiny things that might go wrong... So, we made one of our hyperactive engineers sit down & spend a COUNTLESS number of HOURS producing LOTS of detailed documentation to help YOU succeed. We'll be honest there is like a LOT of verbiage in the next 10 pages & it might get boring, but you should read it. All of it. If not for yourself, do it for that poor engineer & the nights he worked late in the hopes of making YOUR life easier.

Don't let all that hard work be made in vain.

BEFORE PLUGGING IN

A Convenient Checklist to Make Sure Nothing Blows Up... Just Kidding ...OR AM I?!

-Make sure you have properly uploaded the proper Marlin firmware provided on our GitHub onto a microSD card & that this card is inserted into the SKR board.

-The TFT28 Screen also requires its own firmware. Upload it onto a standard SD card & have it plugged into the screen before going further.

-Check EVERY wire connection! Each connector used should provide a nice snug connection either popping into place or being latched together. NO connection should be loose or easily removable. If a connection does seem loose, double check that it is plugged into the correct location with the proper orientation.

-Check the pins on each individual wire. Make sure they are fully inserted into the JST connectors & that they are not broken or loose by giving them each a gentle tug.

-Physically slide the machine's X, Y, & Z axis to confirm a proper mechanical assembly.

-Start with the Y axis by sliding the bed back & forth. Ensure that it travels smoothly without much resistance & can reach the Y End Stop successfully. The Y End Stop should click once the bed reaches it. When sliding the bed make sure the belt properly rotates both the Idler Pulley at the front of the machine, as well as the Drive Pulley mounted onto the Y Motor.

-Now check the X Axis by sliding the Hot End Mount from side to side. Confirm that it slides smoothly without interruption & that it successfully triggers the X End Stop once slid all the way to the left. Give the Hot End assembly a very light wiggle to check that it is securely fastened to the Hot End Mount. Lastly check that the belt is held snug withing the Hot End Mount by giving it a few gently tugs. This belt MUST be secure for your machine to succeed.

-Lastly check the Z Axis by turning the Z Knob both clockwise and counterclockwise. The entire X Axis assembly should move up & down relatively easy. You will feel the motor subtly click repeatedly as you manually rotate the Z Knob, this is normal. Make sure to not dig the tip of the nozzle into the bed when lowering or grind the entire assembly into the roof when raising the axis.

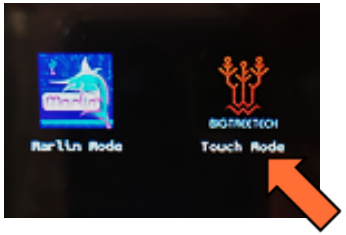
-Make sure to raise the Hot End at least an inch above the bed before plugging in your machine. The BL Touch Probe will deploy every time the machine is turned on and needs space to fully deploy or else it will fail its initial start up tests & the machine will need restarted.

NOW PLUG IN!

We are ALMOST there... Just a Little Housekeeping First

-As mentioned on the last page, once plugged in the BL Touch probe will initiate a short test in which it deploys & retracts twice each. If it does not do this, something could be wrong with the probe or its connection.

-Once the screen turns on & the firmware has finished installing, you might be greeted by the prompt below, in which case you'll select "Touch Mode"



-Does "Marlin Mode" work with this device? Yes. Is it nearly as cool? NO... but if you insist or if you accidentally hit the wrong mode, pressing the screen's knob like a button, and holding it for several seconds will allow you to return to this selection screen.

-You should end up at a screen like the one pictured below. You will also be greeted by a "Bed Leveling Failed" prompt. Ignore it. We'll address that a few steps from now. Make sure to follow along with the orange arrows provided by this guide.

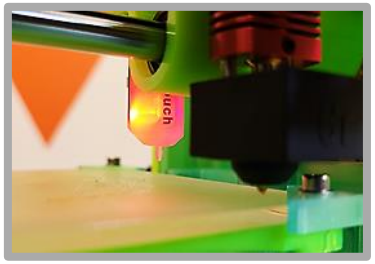
AFTER PLUGGING IN

These Next Steps MUST be Completed Before Your MICRO's First Print

Next, we want to test the 3 axis motors by homing all 3 axis. Both the X and Y axis will move into their respective limit switches, activating them twice before settling into their home position. The Z axis will raise slightly & then lower the probe into the center of the bed twice. If all 3 of the axis home as described, proceed to the next step. If not, there could be an issue with your motor connections.

HOW TO HOME YOUR MACHINE

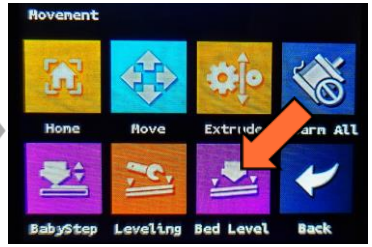
Homing any 3D printer is like telling the machine where to start, and it lets the machine know where its Hot End is. From the "Home" screen, you can home any individual axis or all 3 at once by hitting the yellow "Home" button. Always make sure the bed is clear & nothing can impede the machine's movement before homing. Let the homing sequence finish completely before advancing to the next steps.



AFTER PLUGGING IN [cont.]

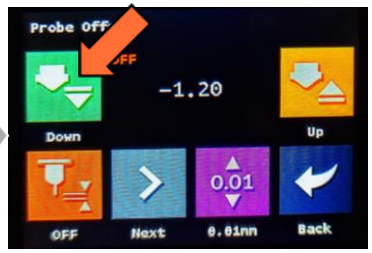
Once homing is completed, the probe offset must be set. This tells the MICRO how far the tip of the nozzle is from the tip of the BL Touch probe. If set correctly your first layers will be placed the perfect distance above the bed and will properly adhere to the bed surface. If this value is too high, the nozzle will be too far from the bed & none of the printed plastic will stick properly to the bed. If too low, the nozzle will be ground into the bed and the plastic will come out too squished or not at all.

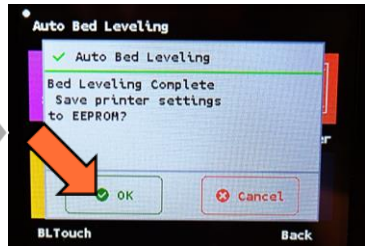
SETTING THE PROBE OFFSET



After “P Offset” is selected, the machine will once again home the Z axis.

From here you will need to grab the blue strip of plastic called a “Feeler Gauge” from the provided tool kit.





Place the Feeler Gauge beneath the tip of the nozzle and use the “Down” button to lower the nozzle towards the bed. Lower the nozzle until it just barely touches the Feeler Gauge. The increments in which the nozzle moves can be tweaked via the purple button initially labeled, “0.01mm”

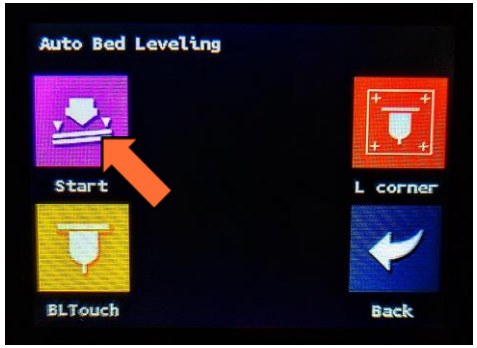
Once you feel that the perfect offset value has been reached, hit the “Next” button twice or until the “Save” button appears next to hit. Select “Save” and the following prompt will pop up to which you respond, “OK”

AFTER PLUGGING IN [cont.]

This setting is essentially the equivalent of Automatic Bed Leveling which will make sure that your first layers are always flat & flush with your bed. If not set properly, the nozzle will vary in its distance from the bed while printing. This can cause portions of the print to not stick properly or not extrude at all which will almost always cause your print to fail

ACTIVATING BED LEVEL COMPENSATION

Return once more to the "Auto Bed Leveling" screen (found under the "Movement" option in the main menu)



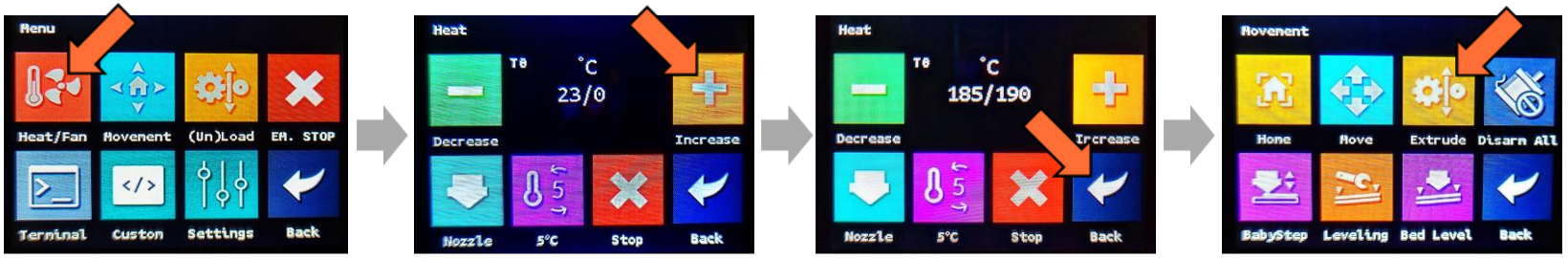
Pressing "Start" will lead into the machine's probing sequence during which the printer will generate a mesh. This mesh basically let's the printer know how the bed is shaped/slanted & will use the Z Motor to compensate for these variations while printing.

Before returning to the main menu, make sure the BL Touch is activated by hitting this button. It should display "BL: on" and can be toggled on & off with each press.

AFTER PLUGGING IN [cont.]

Finally, we will be loading filament into your MICRO. Only use a PLA that has a recommended printing temperature range that includes 190°C or below. You may need to straighten out the first couple inches of the filament's end to help thread it into the filament drive.

LOADING THE FILAMENT



Increase the nozzle temperature to 190°C before returning to the "Movement" menu via the "Back" button. The left temperature value in white is the actual temp, while the right value is the temp you set it to. You can adjust your temperature increments via the purple button initially labeled "5°C"

Pinch the lever of the MICRO's filament drive to compress the spring. This will separate the brass drive gear from the silver bearing/pulley creating a space for you to feed an end of the filament up into the PTFE guide tube. Manually feed the filament until it reaches the hot end, and then use the screen to drive the filament further via the "Load" button. Continue to load filament until it extrudes out of the hot end's nozzle in a smooth & uniform manner.

STARTING YOUR FIRST PRINT

Wow... Here We Go!

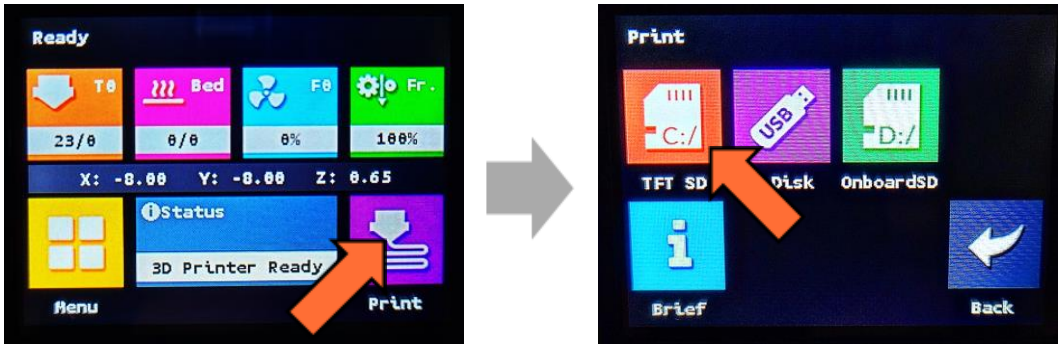
-Make sure one more time that the print bed is clear and free of debris.

-Confirm that your filament is loaded, and that the spool is placed within a spool holder directly next to the filament drive. This spool of filament must be fed directly upwards into the filament drive allowing the filament to unwind in a natural manner.

-Plug the included SD Card into the SD slot next to the touch screen. This is where you'll store gcodes for all of your prints.

-Confirm your MICRO is placed on a sturdy surface in a well-ventilated space.

-Start your print...



Select the gcode file you'd like to print. We suggest starting with the "MICROVase" as a test.

-Once heated up, the machine will go directly into its first layers. Be prepared to cancel the print if the first layers are not adhering properly. If the nozzle simply seems slightly too close or too far, you can use the Z Knob to make small adjustments, one click at a time.

PRINTING WITH THE MICRO

A Random List of Tips & Tricks to Set You up for Success

-ONLY use PLA when printing. You made a 3D printed 3D printer NOT an industrial machine for prototyping with exotic materials.

-We suggest printing on this machine with a layer height of .2mm or higher.

-A print speed of 40mm per second or slower is highly recommended. This will decrease the likelihood of the belts slipping or the smaller X and Y motors from skipping. These problems can be recognized by layer shifts mid print.

-NEVER Exceed a printing temperature of 200°C. Since we are using such a small cooling fan, over time the heat might leak upwards & start melting your printer if the nozzle temp is set too high.

-For the same reason as the previous point, NEVER operate the printer if the Hot End's cooling fan is malfunctioning. Make sure this fan is running at the start of EVERY print. The fan should come on automatically anytime the nozzle temperature exceeds 30°C

-DO NOT remove the PTFE tubing or Nozzle from the Hot End Assemble unless absolutely necessary. With this style of Hot End, removing/replacing either one of these will highly increase your chances of the assembly clogging or getting jammed.

-NEVER operate your printer without the included blue collar fit snug onto the Hot End Assembly. This ensures the PTFE tube stays in place & reduces the risk of filament clogs

-Unload the filament when your machine is not in use. Leaving filament loaded in the printer when it is not in use increases the likelihood of your printer's nozzle getting clogged.

-Unplug the MICRO when it is not printing for extended periods of time. You MUST let the nozzle completely cool below 30°C before turning the unit off.

-Have fun creating new things with a machine YOU created!