Simple Print (MK1)

HYREL 3D
TRAINING SERIES
Agenda

 “Terra Firma”
 Physical Setup
 Print Vase
Terra Firma

- Q: What is / why “Terra Firma”?  
- A: Terra Firma translates to “Solid Earth”. This is the “firm ground” from which we will help build your knowledge, experience, and confidence to a point where you can explore, build, and be successful with your future projects with your HYREL machine(s) on your own. With firm ground under your feet, we can be sure your HYREL machine is operating properly.

- The purpose of this guide is to bring you back to firm ground if you suspect there are issues with your machine, G-code, slicing, .stl, etc.
For this to be effective, your HYREL machine must be able to do the following:

- Turn on
- Check communications
- Move all axis
- Heat up heated build platform

After your HYREL performs the above, you have confirmed a firm foundation from which to create your models.
Terra Firma

Step 1: Turn on

Power Supply:
ATX Form Factor
500W
Terra Firma

Step 1: Turn on

CAUTION:

Make sure you know your Outlet’s Voltage Requirements. If you are unsure, **start** with the Power Supply set to 230V and turn it on. If the machine does not turn on with the Power Supply set to 230V, then Set the Power Supply to 115V and turn it on.

Doing this in reverse WILL blow a capacitor in your Power Supply and will void your warranty.
Terra Firma

Step 1: Turn on

1. Plug in your power cord

2. Turn on your Power Supply
Terra Firma

Step 1: Turn on

System 30M Power On Button

Engine Power On Button
Terra Firma

Step 2: Check communications

System 30M
Emergency Off Button

Turn Clockwise to disengage
Terra Firma

Step 2: Check communications

Desktop Icon opens this window:
Terra Firma

Step 2: Check communications

Click here to turn on/off the light

This also serves as a double-check to make sure the PC is communicating with the printer.
Terra Firma

Step 2: Check communications

1. Select COM Port
2. Set Baud Rate to 38400
3. Click “Apply”
4. Click “PING”

NOTE: Only do this step if the light and/or motors are not moving.
Terra Firma

Step 2: Check communications

NOTE: If you do not see that the printer connected with the PC, try the reset button at the top right of REPETREL, or the reset button on the front of the System 30Ms (with tablets) and retry.
Terra Firma

Step 3: Move all axis
Terra Firma

Step 4: Heat up heated build platform
Terra Firma

Step 4: Heat up heated build platform

When the heated build platform button is activated, the embedded LED on the front, left of the heated build platform turns on.

Click the heated build platform button again to turn off your heated build platform.
Physical Setup

Q: What is / why do the “Physical Setup”?  
A: All machinists perform a physical setup (calibration) of their machines before they build. This process of leveling / putting things in tram and setting head offsets is vital to produce parts to specifications. In addition, this process prevents head crashes, which can damage heads and other parts of the machine.

Performing the following steps will ensure the next level of “Terra Firma” calibration.
Physical Setup

- Tram
- Install MK1 extruder
- Unload / load filament
- Heat up & purge MK1 extruder
- Set MK1 extruder Z-axis offset
- Prepare heated build platform
- Load G-code file

After the above has been performed, your HYREL will be ready to print the vase.
Physical Setup

Tram

Step 1: Install Digi-tram
Physical Setup

Tram

*Step 1: Install Digi-tram*
Physical Setup

Tram

*Step 1: Install Digi-tram*

Tighten thumbscrew in rear of Yoke to lock in the Extruder
Physical Setup

Tram

*Step 2: Place Removable Build Platform*

Set Screw
Do Not Cover

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DANGER HOTBED, 110°C. Do Not Touch!!!
Physical Setup

Tram

Step 2: Place Removable Build Platform

Use Blue Painter’s Tape to Hold Removable Build Platform

NOTE: Follow along the edge of the glass

For best results
Physical Setup

Tram

Step 3: Home, then Park

This will place the Digi-tram over the center of the build platform.
Physical Setup

Tram

*Step 4: Setting the Zero*

Elevate the build platform just pass the point the pin of the Digi-tram touches.

The Digi-tram will register the distance the pin was displaced.
Physical Setup

Tram

*Step 4: Setting the Zero*

Press the “Zero” button to set this point to zero.
Physical Setup

Tram

Step 5: Unlock the Four (4) Lock Screws

Included in your kit, use the 2.5mm Allen wrench to unlock the four (4) lock screws under the build platform.
Physical Setup

Tram

Step 6: Unlock your Motors
Physical Setup

Tram

*Step 7: Position Pin in first corner*
Physical Setup

Tram

Step 8: Adjust Set Screw with Philips Head Screwdriver

 +/- 0.01 is within tolerance

Adjustable Set Screw
Physical Setup

Tram

Step 9: Position Pin in next corner
Physical Setup

Tram

Step 10: Adjust Set Screw with Philips Head Screwdriver

NOTE: Continue this process through all of the corners, returning to the original corner.

It is normal to repeat this process several times until all corners are within tolerance.
Physical Setup

Tram

Step 11: Lock the build platform lock screws

Included in your kit, use the 2.5mm Allen wrench to lock the four (4) lock screws under the build platform.
Physical Setup

Tram

*Step 12: Remove Digi-tram*

1. Unlock Yoke Thumbscrew
2. Remove Digi-tram
Physical Setup

MK1 Installation

Step 1: Locate the MK1 & yoke and both gibbs & connectors
Physical Setup

MK1 Installation

*Step 2: Align the gibs on the MK1 extruder and slide them into the yoke gib slot*
Physical Setup

MK1 Installation

Step 3: Check connection, then lock MK1 extruder into place on yoke

Ensure Connector is Seated Properly

Tighten thumbscrew in rear of Yoke to lock in the Extruder
Physical Setup

MK1 Installation

Step 4: What you see in REPETREL, 1 of 2

Before
Physical Setup

MK1 Installation

Step 4: *What you see in REPETREL, 2 of 2*
Physical Setup

Unload / Load filament

**Step 1: Heat up MK1 extruder**

NOTE: Always unload / load filament into your MK1 extruder at the extruding / service temperature of the material.

Avoiding this step can potentially cause a jam and void your warranty.
Physical Setup

Unload / Load filament

Step 1: Heat up MK1 extruder

NOTE: Always unload / load filament into your MK1 extruder at the extruding / service temperature of the material.

Avoiding this step can potentially cause a jam and void your warranty.
Physical Setup

Unload / Load filament

Step 2: Unload filament – Release guide tube

1. Press and hold down on blue tab

2. Pull up on guide tube
Physical Setup

Unload / Load filament

*Step 3: Use Rocker switch to unload the filament from the MK1 extruder*
Physical Setup

Unload / Load filament

*Step 4*: Inspect the unloaded filament

- Clean, un-cut, slightly melted tip
- Consistent notches in the filament
- If reloading, trim filament above notches before reloading
Physical Setup

Unload / Load filament

Step 5: Load the filament into the MK1 extruder
Physical Setup

Unload / Load filament

*Step 5: Load the filament into the MK1 extruder*

Align filament with the motor’s teeth / hobs
Physical Setup

Unload / Load filament

*Step 6: Use Rocker switch to load*
Physical Setup

Unload / Load filament

Step 7: Lock filament guide tube
Physical Setup

Heat up & purge MK1 extruder

Step 1: With the MK1 extruder at the material’s service temperature, run the extruder’s motor to purge the older material.
Physical Setup

Heat up & purge MK1 extruder

Step 2: After 8-10 in / 20-30cm has been extruded, stop the MK1 motor from extruding. The extruded filament should have flowed consistently.

Some dribble is normal. The heat causes the filament in the head to expand, and a small amount usually pushes out the bottom of the nozzle.

NOTE: It may take 3-5 seconds before any material starts to extrude, this is normal.
Physical Setup

Set Z-Height to MK1 extruder nozzle

*Step 1: Remove any filament dribble from the MK1 extruder nozzle*

Use the included wire brush or tweezers to remove
Physical Setup

Set Z-Height to MK1 extruder nozzle

Step 2: Press Home then Park to center the MK1 extruder over the print area.
Physical Setup

Set Z-Height to MK1 extruder nozzle

Step 3: Setting the Z-Height

1. Place a piece of paper between the nozzle and the build surface

2. Use Z-Height Calibration to bring the build surface to the nozzle

3. Once the piece of Paper just starts to pinch, the Extruder Height is correct.
Physical Setup

Bed Preparation

Step 1: Press Home, unlock motors, and turn on the heat to the bed.
Physical Setup

Bed Preparation

Step 2: *Slide the bed to a position where you can spray the bed with AquaNet*

**NOTE:** Never get any spray on the linear slide bearings. Use a piece of paper to shield them as necessary.
Physical Setup

Bed Preparation

Step 3: Allow the “wet” or “milky” looking patches on the glass bed to dry. Do not touch the spray applied areas with your fingers, the oils from your fingers will prevent proper adhesion.
Physical Setup

Bed Preparation

*NOTE: About sprays / AquaNet*

- Adhesion of the filament to the bed is of upmost importance because the bed is the only fixture for making the part.
- We prefer to use AquaNet hairspray (specifically the unscented version) when printing with ABS filament.
- The hairspray, when applied to the bed and dried, acts as a glue to keep ABS filament sticking to the bed.
- The heat of the heated build platform keeps a few of the bottom layers of ABS from completely shrinking and pulling off of the bed.
- **Make sure your bed temperature is at least 55°C before printing with ABS.**

- There are other techniques for getting ABS and other filament materials to stick to the bed. These other techniques are covered in a separate presentation on our website.
Physical Setup

Loading a G-Code file

Step 1: Open a .gcode file
Physical Setup

Loading a G-Code file

*Step 2: Browse and select .gcode file*
Physical Setup

Loading a G-Code file

Step 3: This is the screen you will see when the .gcode file is loaded.
Print Vase

Printing

Step 1: Press “Run Job” button

When running, this control panel opens.

The most used buttons are:
1.) Z Fine Adj [+][-]
2.) Kill Job
Print Vase

Printing

Step 2: Pay close attention to the first layers & adjust height while printing

For ABS, this print is near perfection

Use when lines are not touching

Use when lines are 50% wider than the adjacent lines
Print Vase

Printing

Step 3: When complete, remove print from build surface
More Information Available at:

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