BIGTREETECH

ViViD User Manual

Preface

Thank you for choosing the BIGTREETECH ViViD Multi-Color Management System. This manual guides you through the hardware installation, firmware configuration, and slicer setup required to use ViViD, and is intended for users who are familiar with basic Klipper system operation and configuration. This documentation applies to ViViD hardware used with the MMS (Multi-Material System) software; if you choose to use HappyHare, please refer to its official documentation for configuration instructions.

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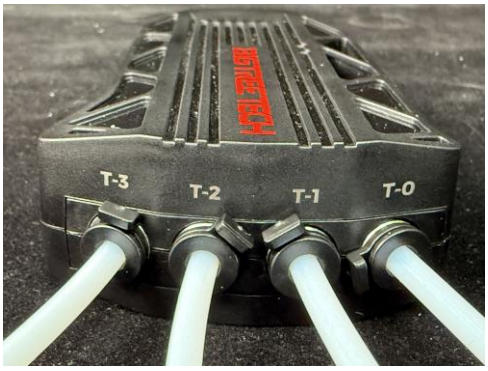
1. Assembly Guide

1.1. PTFE Tube Connection

1.1.1. Connecting the Buffer to the ViViD



First, release the clips, then use PTFE tubes to connect the Buffer to the ViViD, matching each port: connect T-0 to T-0, T-1 to T-1, T-2 to T-2, and T-3 to T-3. After completing the connections, secure the clips.

If you are using a VORON printer, a modified exhaust filter housing can be used to simplify tube routing. This modified housing includes a dedicated slot that allows the Buffer to be inserted directly, while the ViViD can be placed on top of the VORON enclosure.

Please download the print files here:
https://github.com/bigtreetech/BIGTREETECH_ViViD/tree/master/STL/Voron2.4

Important: PTFE Tube Routing Requirements

When routing the PTFE tubes between the ViViD and the Buffer, ensure that the tube path is smooth and free of sharp bends.

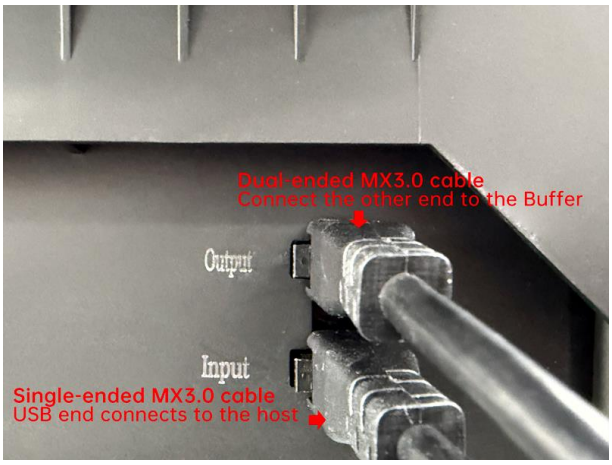
The minimum bending radius must not be less than 60 mm (100 mm or greater is recommended). Excessively tight bends will significantly increase friction, which can severely reduce filament switching success rates and may cause filament breakage.

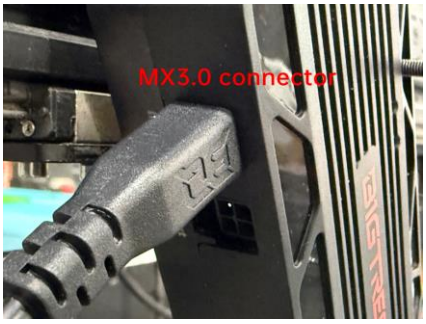
1.1.2. Connecting the Buffer to the Toolhead

After completing the tube connections, make sure to install the locking clip at the Buffer outlet. Otherwise, repeated filament tension may cause the PTFE tube to slip out.

1.2. Power Connection

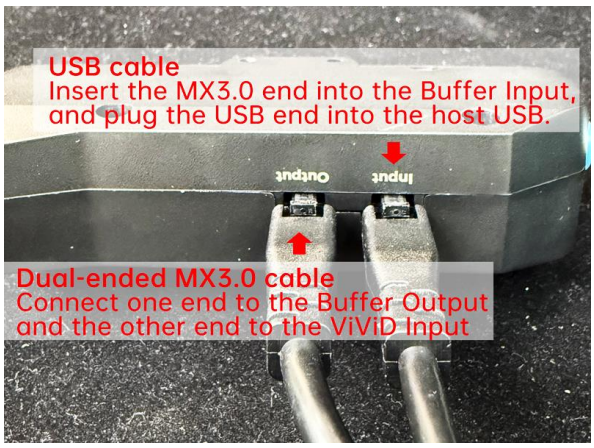
Two wiring methods are provided. They are functionally identical—choose according to your setup.

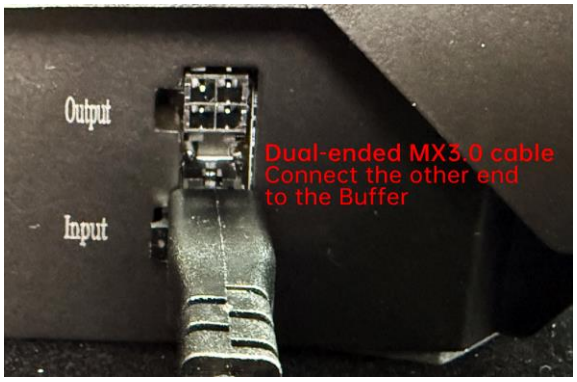




Method 1:

Use a USB cable: connect one end to the host USB, the other end to the ViViD Input port， Use a dual-head MX3.0 cable: connect ViViD's Output to Buffer's Input.





Method 2:

Use a USB cable to connect one end to the host USB, the other end to the Buffer’s Input. Then use another dual-head MX3.0 cable, plugging one end into the Buffer’s Output and the other end into the ViViD’s Input

Power Supply Instructions:

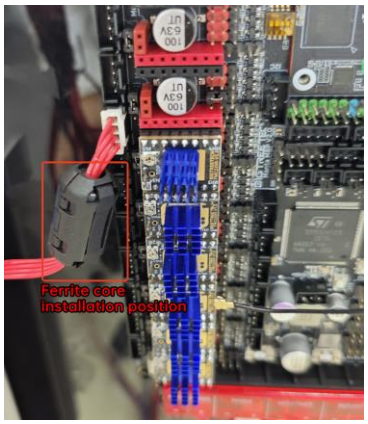
- The ViViD uses AC power. Please use a standard three-prong power cable (IEC C13) to connect the ViViD to an AC power outlet.

- After connecting, switch the power switch to the ON position (press the "|" symbol down).
- Once powered on, if software configuration is not completed or Klipper is not connected successfully, the indicator light will illuminate in **light red**.

1.3. Optional USB Signal Improvement

Installing USB Hub and Ferrite Cores

Some controller boards have USB interfaces driven directly by the SOC (e.g., Pi V1.2 series, Pi 2 series), which results in weaker USB signals and unstable long-distance communication. When connecting ViViD to these boards, you need to use the included USB HUB to enhance USB signal strength, increase transmission distance, and improve signal stability.



Ferrite cores can help prevent USB signal interference.

If the USB cable runs near stepper motors, motor operation may interfere with USB communication. In this case, it is recommended to add ferrite cores to the motor cables, preferably near the controller board connection.

2. Software Configuration

2.1. MMS Software Deployment

2.1.1. Installation Steps

1 **Enter the user directory:**

```
cd ~
```

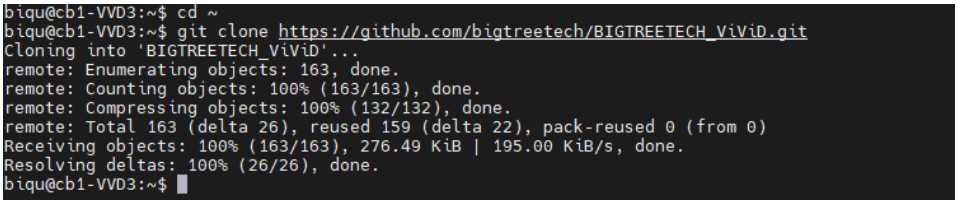
2 **Clone the repository:**

```
git clone https://github.com/bigtreetech/BIGTREETECH_MMS.git
```

3 **Enter the directory and run the install.sh:**

```
cd ~/BIGTREETECH_MMS
```

```
./install.sh
```

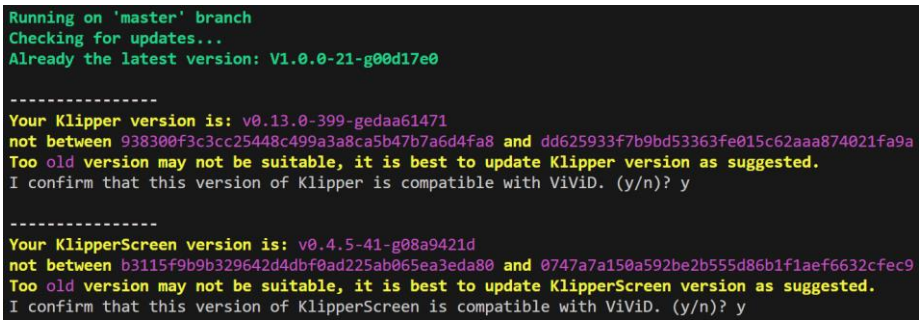


2.1.2. Script Configuration Guide

After running install.sh, the script will guide you through the setup: Enter “y” to confirm/enable, “n” to decline

Installation Steps (top to bottom):

Version Check:



Device Serial Port Check:

If a serial port is detected, the user will be asked to confirm that it belongs to the device.

```
---------------
Is usb-Klipper_stm32f042x6_buffer_33002C001443565335383320-if00 a Buffer serial port?
Buffer MCU serial id (y/n)? y
Is usb-Klipper_stm32g0b1xx_vivid_13002E000A50425539393020-if00 a ViViD serial port?
ViViD MCU serial id (y/n)? y
```

If not detected, you will be asked whether to continue installation.

```
---------------
Device serial id not found, please confirm if the ViViD cable is properly plugged in.
Do not configure the serial id for now, manually modify it after installation is complete. (y/n)? y
```

Module Configuration:

Confirm whether the “Cutter” is enabled

Confirm whether the “Entry Sensor” is enabled

Confirm whether “Purge” and “Brush” are enabled

```
---------------
Installing the Cutter is crucial!
Has the cutter been installed? (y/n)? y

---------------
Installing an Entry Sensor in toolhead can improve the accuracy of ViViD in identifying the location of filament!
Has the entry sensor been installed? (y/n)? y

---------------
If purge is enabled, the old filament can be quickly purged out.
If brush is enabled, it will clean up scrap stuck to the nozzle with a brush before start/resume printing.
Do you want to enable purge and brush
Enable (y/n)? y
```

Restart Klipper:

After the script completes, it will request a Klipper restart to apply changes. This step may require password entry.

```
----------------
Old config backup completed: /home/biqu/printer_data/config/sample-bigtreetech-mms-20251231_092310
Copying /home/biqu/BIGTREETECH_MMS/config/sample-bigtreetech-mms into /home/biqu/printer_data/config/sample-bigtreetech-mms directory...
Cutter must be configured, please configure the specific position in /home/biqu/printer_data/config/sample-bigtreetech-mms/base/mms-cut.cfg
Entry Sensor has been enabled, please configure the specific pin in /home/biqu/printer_data/config/sample-bigtreetech-mms/mms/mms.cfg
purge and brush has been enabled, please configure the specific position in /home/biqu/printer_data/config/sample-bigtreetech-mms/base/mms-purge.cfg
ViViD MCU serial id has not been set. Please modify it manually in /home/biqu/printer_data/config/sample-bigtreetech-mms/mms/mms.cfg
Buffer MCU serial id has not been set. Please modify it manually in /home/biqu/printer_data/config/sample-bigtreetech-mms/mms/mms.cfg
ViViD config has been added to /home/biqu/printer_data/config/printer.cfg
Klipper has been installed. Restart immediately? (This will interrupt printing if there are any ongoing tasks.) (y/n)? y
[sudo] password for biqu:
```

ViViD KlipperScreen Integration (Optional):

If KlipperScreen is already installed, you may press “Y” to install the ViViD-modified KlipperScreen version, which includes ViViD filament management menus.

A restart prompt will appear once installation is complete.

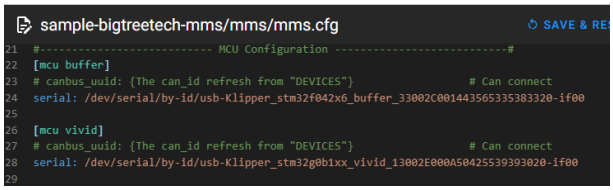
```
---------------
Installing KlipperScreen for ViViD will add a ViViD management menu to KlipperScreen.
Install KlipperScreen? (y/n)? y

---------------
Installing ViViD to KlipperScreen 0.2.0009
ViViD /home/biqu/KlipperScreen/vivid link completed!
ViViD KlipperScreen /home/biqu/KlipperScreen/screen.py patch completed!
ViViD KlipperScreen /home/biqu/KlipperScreen/panels/gcodes.py patch completed!
KlipperScreen has been installed. Restart immediately? (This may interrupt printing if there are any ongoi
ng tasks.) (y/n)? y
The KlipperScreen service has been restarted.

---------------
ViViD MCU serial id:
Buffer MCU serial id:
Cutter: 1
Entry Sensor: 1
Purge & Brush: 1
KlipperScreen: 1

---------------
ViViD script: V1.0.0-21-g00d17e0
Klipper: 0.1.0372
KlipperScreen: 0.2.0009

---------------
ViViD installation is complete.
```

2.2. MMS Software Configuration

2.2.1. ID Configuration (Serial ID)

Configuration file location: config/sample-bigtreetech-mms/mms.cfg

If startup fails or you see errors such as “unable to connect MCU ‘vivid’” or “unable to connect MCU ‘buffer’,” please check whether the **serial IDs** are configured correctly.

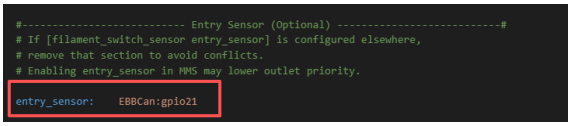


> **Note:** If the serial ID was detected during installation, it will be automatically filled in, and no manual changes are required.

2.2.2. Entry Sensor Configuration

Configuration file location: config/sample-bigtreetech-mms/mms.cfg

If your toolhead has an “Entry Sensor” installed approximately **5–15 mm** before the extruder gears, uncomment the configuration and set the correct entry_sensor pin.



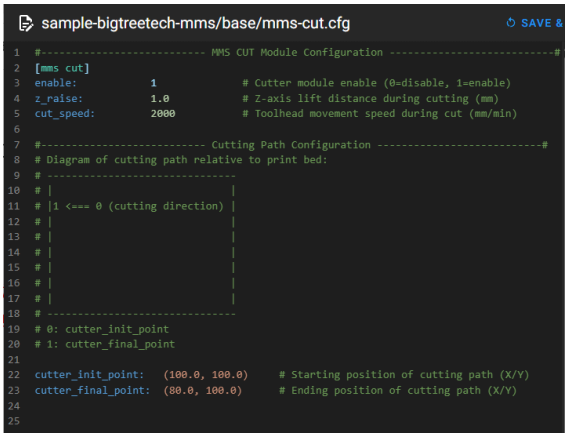
> **Important:** This sensor greatly improves filament switching accuracy. Without it, MMS relies on the Buffer sensor for estimation, which may reduce reliability.

2.2.3. Cutter Configuration

Configuration file location: config/sample-bigtreetech-mms/base/mms-cut.cfg

This file defines the cutter action installed on the toolhead.

- **Motion Logic:** Move from init position to final position, perform the cut, then return to init.
- **Coordinates:** X axis, Y axis.
- **Compatibility:** Supports Filametrix (X-axis) and A4T (Y-axis).
- **Setup Method:** After homing, manually move the toolhead in KlipperScreen or web UI like Mainsail to determine the cutter's initial impact coordinates (cutter_init_point) and final installed coordinates (cutter_final_point).



2.2.4. Purge Configuration

Configuration file location: config/sample-bigtreetech-mms/base/mms-purge.cfg

MMS uses Purge configuration to purge residual filament after loading.

Variable	Description
enable	Enable/disable purge (1/0)
orphan_filament_length	Purge length
purge_modifier	Length multiplier

Configuration Instructions: After the printer has been homed, use KlipperScreen or a web interface such as Mainsail to manually move the toolhead and determine the tray_point (the position where the toolhead remains during purging) and the eject_point (used for purge systems with an ejection mechanism: the toolhead performs the purge at the tray_point, then moves to the eject_point to eject the purged filament).

> **Note:** To prevent filament overflow or oozing during feeding and purging from affecting the printed model, configure the tray_point and eject_point at positions **outside the normal printing area.**

2.2.5. Brush Configuration

Configuration file location: config/sample-bigtreetech-mms/base/mms-purge.cfg

Defines nozzle wiping movement in the XY directions.

- Tapping is usually executed after wiping completes.
- **Configuration Instructions:**
  After homing, manually move the toolhead in KlipperScreen or web UI like Mainsail to determine the wipe coordinates (wipe-point).

Variable	Description
enable	Enable/disable this feature (1/0)
wipe-point	Set wipe position coordinates
wipe_times	Set number of wipes

2.2.6. Motion Parameter Configuration

Configuration file: config/sample-bigtreetech-mms/base/mms-motion.cfg

If the filament moves smoothly during testing but you observe that the Drive Gear is severely grinding or chewing into the filament, this usually indicates that the extrusion force is too high or that the drive acceleration is set excessively. Please adjust the mms-delivery.cfg file: reduce speed_drive and reduce accel_drive.

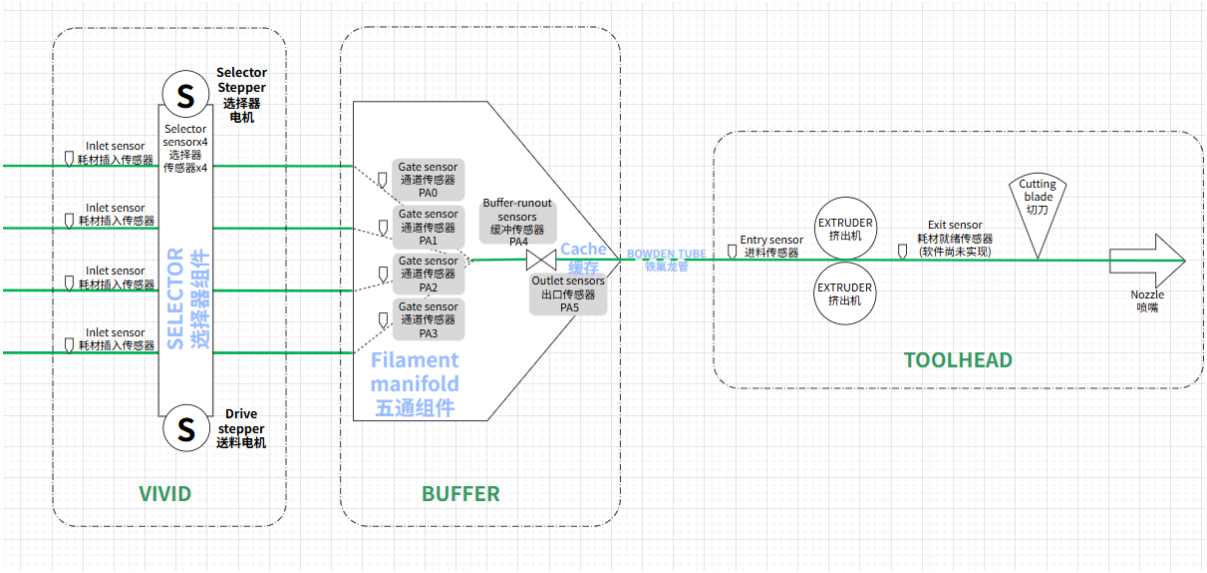
sample-bigtreetech-mms/base/mms-motion.cfg

```
#-------------------------- MMS Delivery Module Configuration ------------
[mms delivery]
speed_selector:           150   # Selector stepper speed (mm/s)
accel_selector:           150   # Selector stepper acceleration (mm/s²)
speed_drive:              80    # Drive stepper speed (mm/s)
accel_drive:              40    # Drive stepper acceleration (mm/s²)
stepper_move_distance:    1000  # Distance before endstop trigger (mm)
safety_retract_distance:  50    # Safety retract distance (mm)
slots_loop_times:         200   # Loop count for MMS_SLOTS_LOOP

```

After completing the above file configurations, ViViD is ready for operation. For further installation or debugging, please refer to the 6. Tuning Guide in this manual.

For more parameter descriptions, please view the documentation: https://github.com/bigtreetech/BIGTREETECH_MMS/blob/master/docs/zh/mms_config.md

3. ViViD Operation Logic and Debug Commands



It is strongly recommended to install the Entry Sensor before using ViViD.
The following is the overall movement logic after installing the entry sensor.

3.1. ViViD Workflow

For ease of understanding, the ViViD filament path can be simplified as: Buffer (T0-T3) -> Gate Sensor -> Entry Sensor -> Extruder -> Nozzle.

A standard MMS Swap (filament change) process is as follows:
Step 1: Eject Check (Unload Decision)

> **Condition check:** If either the Entry Sensor or the Gate Sensor is triggered, this indicates that filament is already loaded, and the system will enter the Eject (Unload) process.

Otherwise: If neither sensor is triggered, the system assumes no filament is currently loaded and will skip the eject process, proceeding directly to the "Load Process (Step 3)".

Step 2: Eject Process (Unloading Filament)

Tip forming and cutting:

If the Entry Sensor is triggered and the hotend temperature is above the extrusion temperature, the extruder will first perform a filament ramming action to shape the filament end. It will then execute the CUT action, and afterwards attempt to unload 120 mm of filament.

High-speed unloading:

Once the Entry Sensor is released, the system performs a long, high-speed retraction. Retraction continues until the Gate Sensor is released.

Eject completion:

After the main retraction, a short additional retraction is performed. Once completed, the eject process ends.

Step 3: Load Process (Loading Filament)

Selector adjustment:

After the Eject Process is completed, MMS proceeds with loading the new filament. The system first adjusts the Selector. The selector rotates until the correct position is reached and the corresponding selector sensor is triggered.

High-speed loading:

The system then performs a long-distance, high-speed filament feed. Loading continues until the Entry Sensor is triggered (if installed), or the Outlet Sensor is triggered (if no entry sensor is installed).

Transition to Charge:

Then enter Charge process. The ideal end state of the Load Process is that the filament tip is positioned just at the point where it can be gripped by the extruder drive gears.

Step 4: Charge Process

The Charge process is used to make the extruder grip the filament and determine whether the filament has been successfully gripped.

Grip attempt: The extruder attempts to grip, then the Drive Wheel will have slight movement.

State detection: During this stage, MMS continuously monitors the buffer runout **sensor** and the outlet sensor to determine whether the filament has been correctly gripped by the extruder.

Failure handling: If the filament is not successfully gripped, the system performs an **Eject**, then retries the **Load** process. The default retry count is **3 times**, which can be modified in the configuration file.

Success handling: If the filament is successfully gripped, the system proceeds to the Purge Process.

Step 5: Purge Process

Movement and initial purge: If the enable parameter is set to 1, the toolhead moves to specified coordinates then performs a short, low-speed filament purge.

Purging: After the initial extrusion, a higher-speed purge is executed. (The purge length and speed are fully configurable in the configuration file.)

Transition to Brush: Once purging is complete, the system enters the Brush Process.

Step 6: Brush Process

Nozzle cleaning: If the enable parameter is set to 1, the toolhead moves to the specified Brush coordinates and moves back and forth a specified number of times to clean nozzle residue.

Process completion: After the Brush Process finishes, the current swap cycle ends, and a complete filament swap is considered successfully completed.

3.2. Console Commands

The filament slots corresponding to ViViD's T0 through T3 are defined as SLOT0-SLOT3.

Command (Alias)	Purpose	Example (using SLOT0)
MMS	Show current MMS version	MMS
MMS STATUS	Show current status of all sensors	MMS STATUS
MMS_POP	Retract filament ends to a standby position in front of the Gate sensor	MMS_POP SLOT=0
MMS_SELECT	Control selector to select specified SLOT	MMS_SELECT SLOT=0

Command (Alias)	Purpose	Example (using SLOT0)
MMS_LOAD	Execute load action for specified SLOT (includes SELECT)	MMS_LOAD SLOT=0
MMS_MOVE	Control filament movement in specified slot toward extruder by specified length (negative for reverse)	MMS_MOVE SLOT=0 DISTANCE=10
MMS_EJECT	Unload the currently loaded filament	MMS_EJECT
MMS_BUFFER_ACTIVATE	Enable asynchronous loading function	MMS_BUFFER_ACTIVATE
MMS_BUFFER_DEACTIVATE	Disable asynchronous loading function	MMS_BUFFER_DEACTIVATE
MMS_CUT	Execute MMS built-in cutter action (can be used to verify cutter coordinates)	MMS_CUT
MMS_PURGE	Perform purging according to configured purge parameters (can be used independently for parameter and position verification)	MMS_PURGE
T*	Load filament from the corresponding slot into the extruder	T0 / T1 / T2 / T3

> **About T* commands:** The T* commands internally include the following processes: LOAD, CHARGE, and PURGE. If filament from another slot is already loaded when a T* command is issued, the system will first perform CUT, EJECT, and SELECT. It will then continue with LOAD → CHARGE → PURGE. T* commands are **c**ommonly used in slicers to execute a complete filament change process.

3.3. Fault Detection

When an abnormal condition occurs, users can send the “MMS_STATUS” command to analyze the current system state.

```
14:41 Slot pins status:
      slot[0] selector=0 inlet=1 gate=0 runout=0 outlet=0 entry=1
      slot[1] selector=0 inlet=1 gate=0 runout=0 outlet=0 entry=1
      slot[2] selector=0 inlet=1 gate=0 runout=0 outlet=0 entry=1
      slot[3] selector=0 inlet=1 gate=0 runout=0 outlet=0 entry=1
```

Note: If the Entry Sensor is not configured, Entry Sensor status will not be displayed.

Slot [0] → T0 (leftmost slot)

Slot [1] → T1 (second from the left)

Slot [2] → T2 (third from the left)

Slot [3] → T3 (rightmost slot)

[selector] indicates whether the corresponding slot is selected.

1 → The corresponding slot is selected
0 → The corresponding slot is not selected

[inlet] Indicates whether the filament inlet switch is triggered.
0 → Filament has not entered ViViD; inlet switch not triggered
1 → Filament has entered ViViD; inlet switch triggered

Indicates whether the Buffer inlet (Gate) sensor is triggered.
0 → Not triggered; filament has not entered the Buffer
1 → Triggered; filament has entered the Buffer

[outlet] Indicates whether the Buffer outlet sensor is triggered.
When filament enters nozzle and begins extrusion, used as judgment criterion for whether it has reached Extruder.
0 → Not triggered; filament is not being extruded

1 → Triggered; filament is under extrusion pressure

If the console reports three consecutive failures to trigger the outlet sensor, this indicates a filament feeding abnormality.

In this case, users should inspect the filament path and check whether the feeding channel is unobstructed.

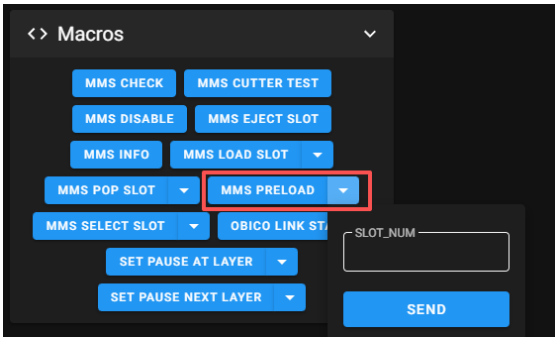
4. Feature Overview

4.1. Filament Loading

MMS supports automatic filament loading, however this mode is not recommended for beginners. To make operation easier to understand and control, a semi-automatic loading method is provided and recommended for initial use.

4.1.1. Loading Filament to the Buffer

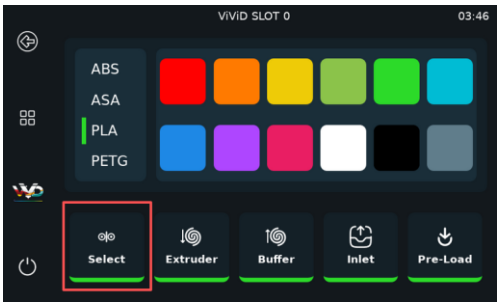
Using KlipperScreen (ViViD-adapted version):
1. On KlipperScreen, tap the corresponding slot to enter the filament management interface for that slot.
2. Tap the Pre-Load button.
3. Wait until the selector completes its homing and slot selection.
   This can be confirmed when mechanical movement stops or a steady motor sound is heard.
4. Once the selector is in position, insert the filament straight and vertically into the corresponding inlet.



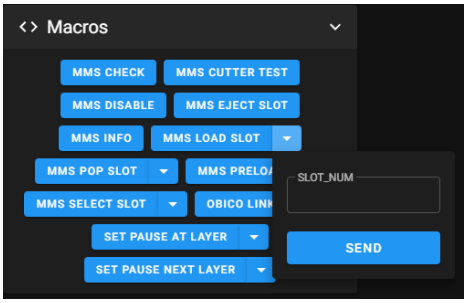
Using the Web Interface:

You can use the macro MMS PRELOAD, enter the corresponding SLOT, click SEND, then insert the filament vertically into the corresponding SLOT, and the filament will enter ViViD. When the Gate sensor is triggered, the filament will be automatically pre-loaded and retracted a short distance, entering standby state.

4.1.2. Loading Filament to the Toolhead Extruder



Using KlipperScreen (ViViD-adapted version):
After filament enters the buffer, tap the corresponding slot, enter the filament management interface for that slot, tap “Extruder”, and the filament will be fed to the Extruder. If heating is needed for loading, you need to enter the MMS_BUFFER_ACTIVATE command in the console, then execute the extrusion command.



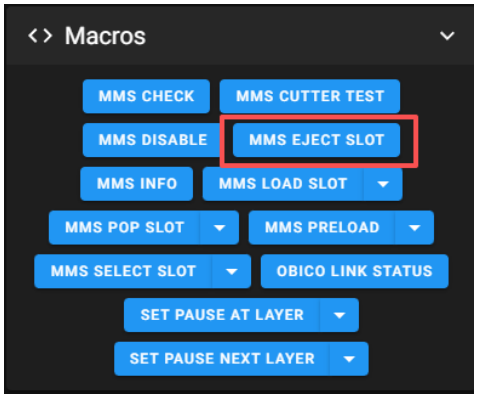
Using the Web Interface:
You can use the macro MMS LOAD SLOT, enter the corresponding SLOT, click SEND, and the filament from the corresponding SLOT will be fed into the extruder. The synchronous feeding function is enabled by default. If extrusion is required, simply heat the hotend manually and then issue the extrusion command.

4.2. Filament Unloading

4.2.1. Unloading Filament to the Buffer

Using KlipperScreen (ViViD-adapted version):
1. Enter the filament management page for the corresponding slot.
2. Tap “BUFFER”.
3. The filament will be retracted to a position outside the Buffer, with the Gate sensor no longer triggered.

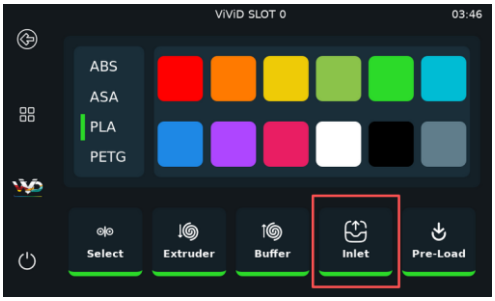
If the filament is already inside the extruder: you need to execute MMS_EJECT in the web console.



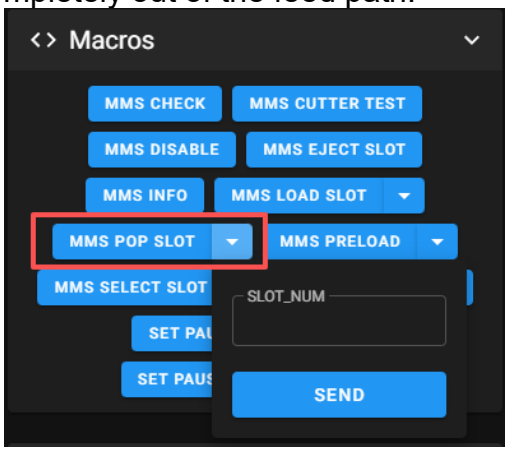
Using the Web Interface:

Use the macro MMS EJECT SLOT. This will retract the filament from all slots to a position outside the Buffer where the Gate sensor is not triggered.

4.2.2. Unloading Filament Completely (No Filament State)



Using KlipperScreen (ViViD-adapted version):
Enter the filament management page for the corresponding slot and tap “Inlet”. The filament will be pushed completely out of the feed path.

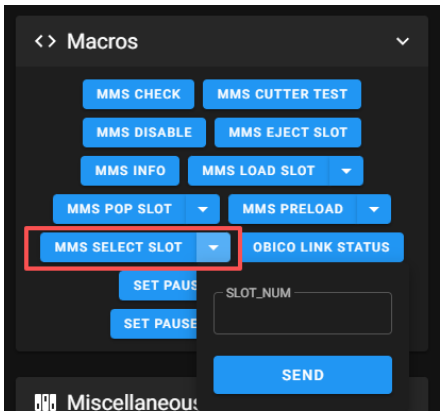


Using the Web Interface:
Use the macro “MMS POP SLOT”, enter the corresponding slot, and after clicking “SEND”, the filament from the selected slot will be moved completely out of the feed path."

Note: If the filament has already entered the extruder, you must first execute “MMS_EJECT” before using “Inlet” or “MMS POP SLOT”.

4.3. Switching the Selected Slot

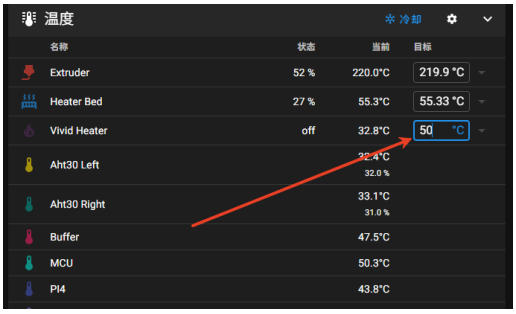
Using KlipperScreen (ViViD-adapted version):
Enter the filament management page for the desired slot and tap “Select”. The selector will rotate and engage the corresponding slot.



Using the Web Interface:
Use the macro “MMS SELECT SLOT”, enter the corresponding slot, and after clicking “SEND”, the selector will select and engage the specified slot.

4.4. Chamber Heating

You can enable chamber heating by modifying the target value of ViViD Heater in Mainsail. If KlipperScreen (ViViD-adapted version) is installed, heating can also be enabled using the on-screen controls.



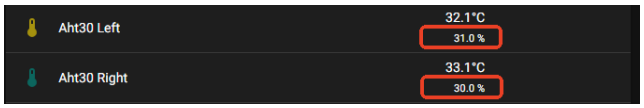
In Mainsail

In KlipperScreen

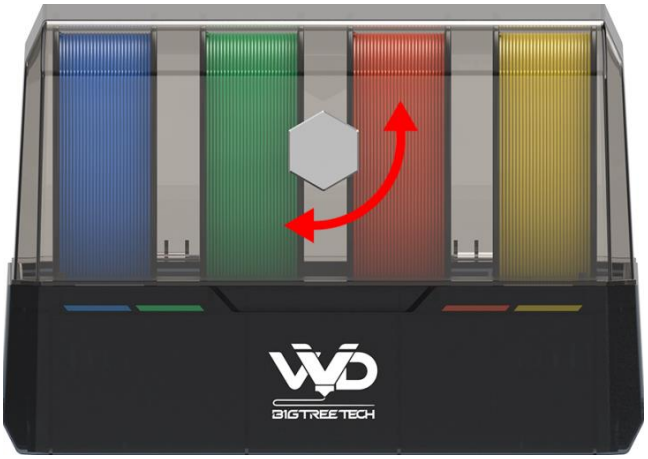
Recommended Drying Temperatures and Default KlipperScreen Drying Time

Material	*Temperature (°C)*	*Time*
PLA	**45**	**4 h**
PETG	**50**	**4 h**
ABS	**55**	**4 h**
ASA	**55**	**4 h**

If high humidity readings are observed during heating, you may adjust the Humidity Exhaust Valve to open or close the vents, thereby enabling or disabling ventilation. The temperature and humidity sensors are located on the left and right internal partitions of the chamber.



> Open: When heating is enabled, opening the vents allows moisture to be expelled, improving filament drying effectiveness.
>
> Closed: When heating is disabled, closing the vents helps maintain internal humidity and prevents filament from absorbing moisture.



4.5. Automatic Filament Loading

After gaining sufficient familiarity with ViViD's operating principles, users may enable automatic filament loading for greater convenience.

sample-bigtreetech-mms/base/mms-motion.cfg

```
#--------------------------- MMS Autoload Module Configuration ----------------
[mms autoload]
enable:                 0     # Autoload module enable (0=disable, 1=enable)
```

1. Enable the Autoload module in the configuration file.
2. Straighten the filament and place it into the corresponding slot.
3. The selector motor will rotate rapidly to align the slot.
4. Once the extruder begins moving, insert the filament.

Important: Always wait until the selector motor has fully rotated into position before inserting the filament.
Inserting the filament too early may cause it to slip out from the side of the feed path.

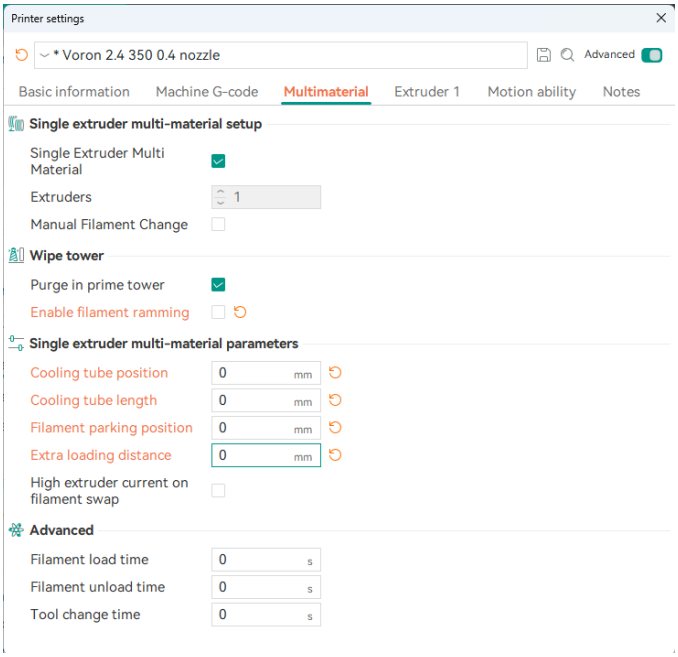
5. Slicer Software Configuration

This section uses Orca Slicer as an example.

Please adjust the slicer settings according to the recommendations below.

5.1. Disable Filament Ramming in the Slicer

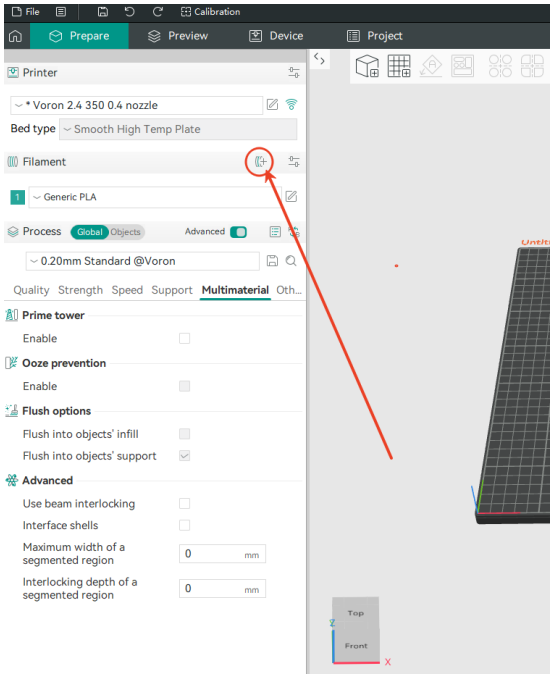
Whether you are using MMS or HappyHare, the filament change logic already includes filament ramming operations.



- **Operation:** Disable filament ramming generated by the slicer to prevent repeated ramming actions from causing re-melted filament buildup and potential hotend clogging.
- **G-code Estimation:** If you need more accurate G-code execution time estimation, you may manually enter the estimated time for each step in the slicer's advanced options.

5.2. Enable Multi-Material Printing

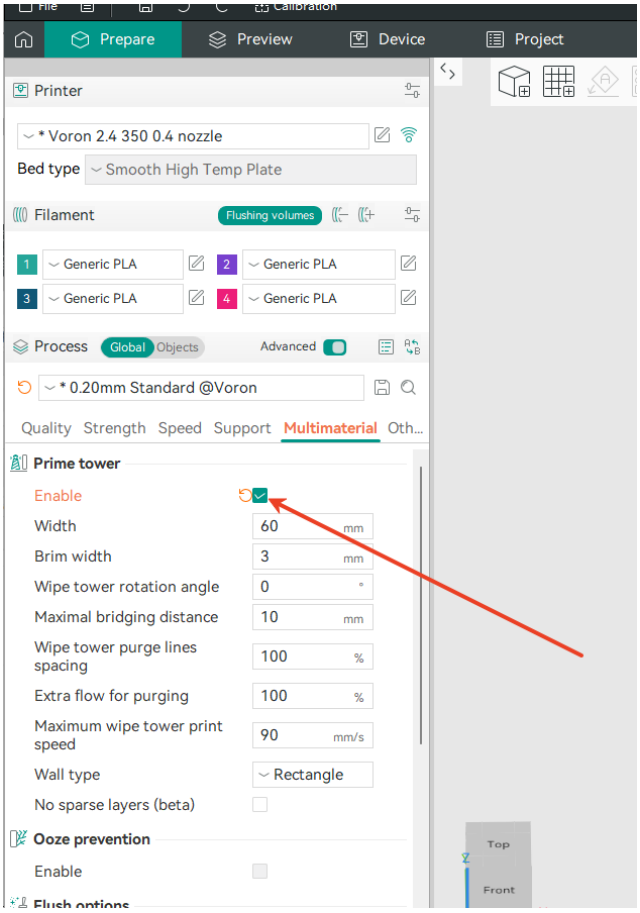
Enable multi-material printing by adding multiple materials using the corresponding options in the slicer.



> **Important Notes:**
> 1. When using ViViD, multi-material printing must be enabled; otherwise, ViViD will not operate correctly.
>
> 2. Avoid combining materials with large temperature differences, because preheating for high-temperature materials may cause lower-temperature filaments to soften or melt inside the heatbreak, potentially leading to clogging.

5.3. Enable Wipe Tower

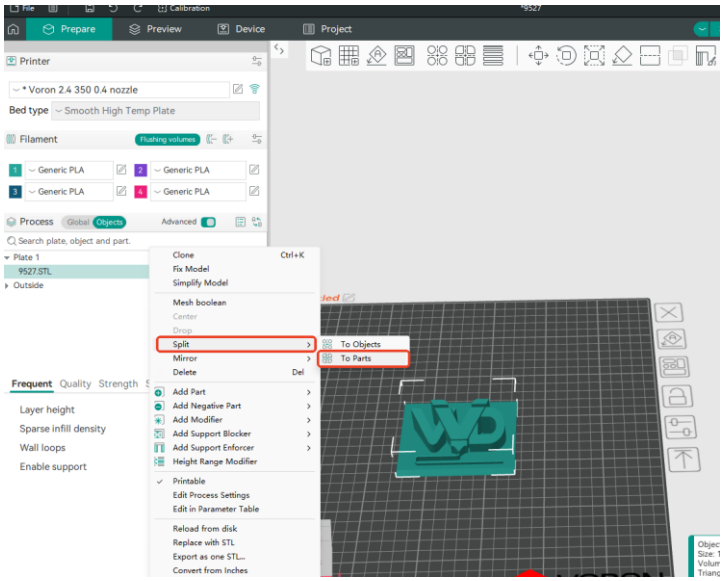
You must enable the prime tower feature, as the it helps prevent color contamination during filament changes and reduces minor surface defects caused by oozing or residual filament.



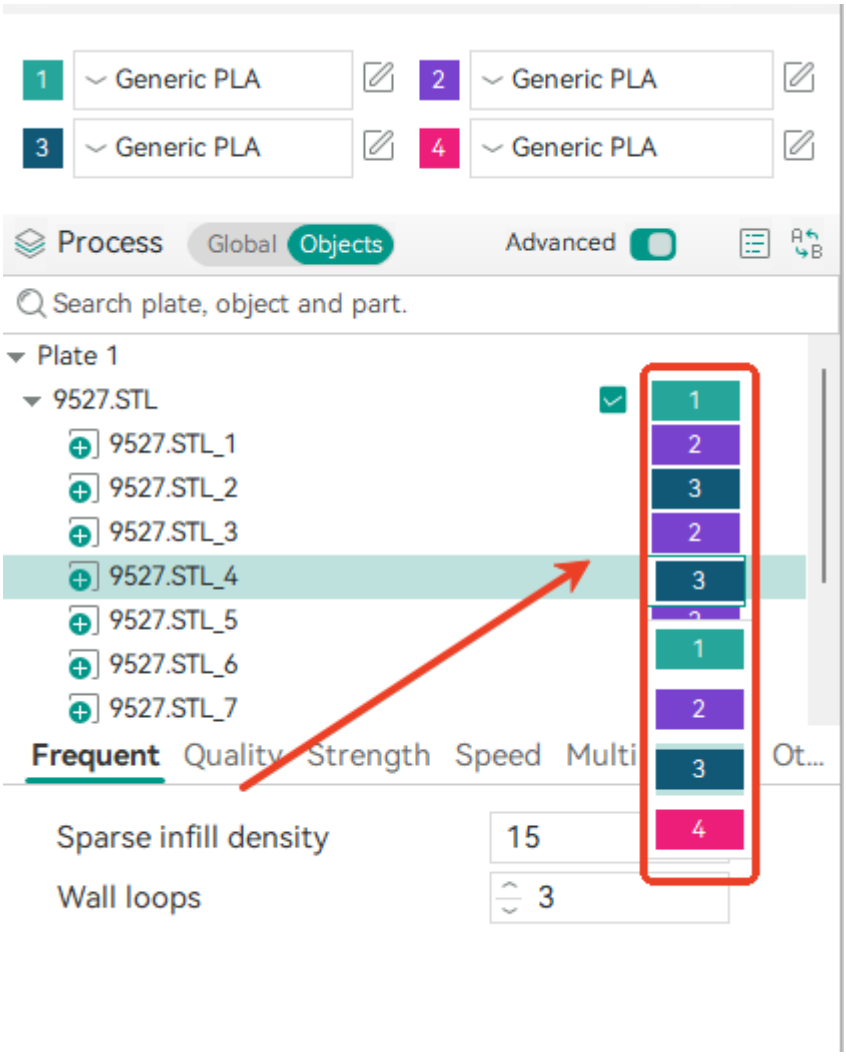
5.4. Model Splitting and Material Assignment

Model Splitting: For most models designed for multi-color printing, you can use Orca Slicer's "Split" function to "Split to Parts".

This function can split components while preserving the model's original appearance design and relative positions.

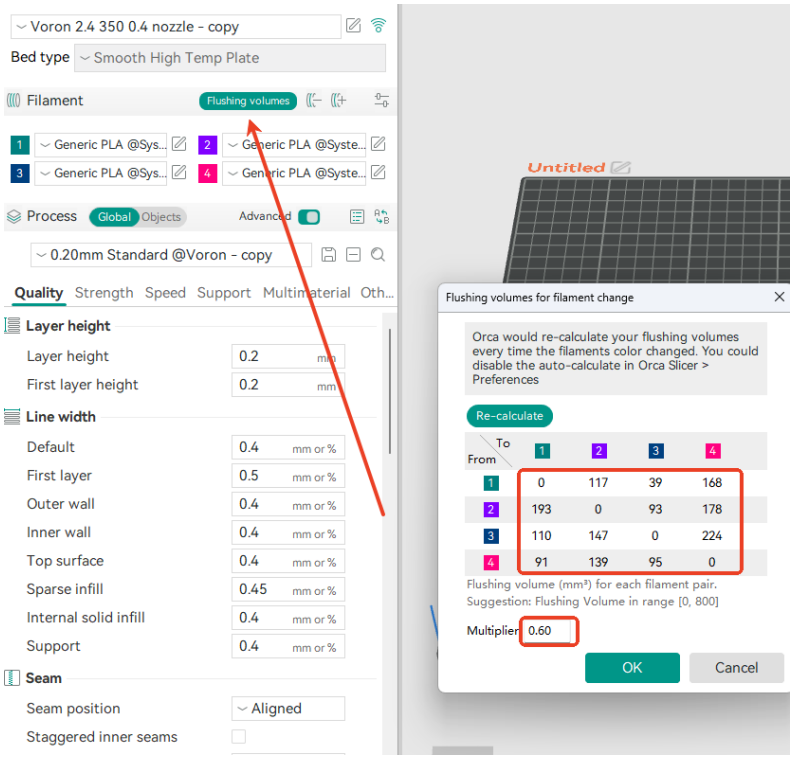


Assign Materials: You can assign different materials to each "part object" in the Process - Objects tab, or apply parameters using modifiers.



5.5. Purge Length Adjustment

After slicing, you may notice that different colors use different purge lengths on the prime tower. This is intentional and ensures that the previously loaded filament inside the toolhead is fully purged before the new color is used.



Adjustment: If you wish to reduce filament waste, you may adjust the flushing volume values or apply a purge length multiplier.

Apply: After modifying flushing volume parameters, you must re-slice the model for the changes to take effect in the newly generated G-code.

> **Additional Notes:** If you observe overlapping paths in the sliced preview, select all model parts, combine them into a single group, and adjust the object order to determine which object takes priority in overlapping regions.
>
> **Tip:** Detailed explanations of Orca Slicer's advanced features are beyond the scope of this manual. Please refer to the official Orca Slicer documentation for further guidance.

Your multi-color slicing setup is complete!
Upload the generated G-code to your printer and perform a test print.

Happy printing!

6. Tuning Guide

6.1. Parameter Description

The install.sh script supports the following parameters:

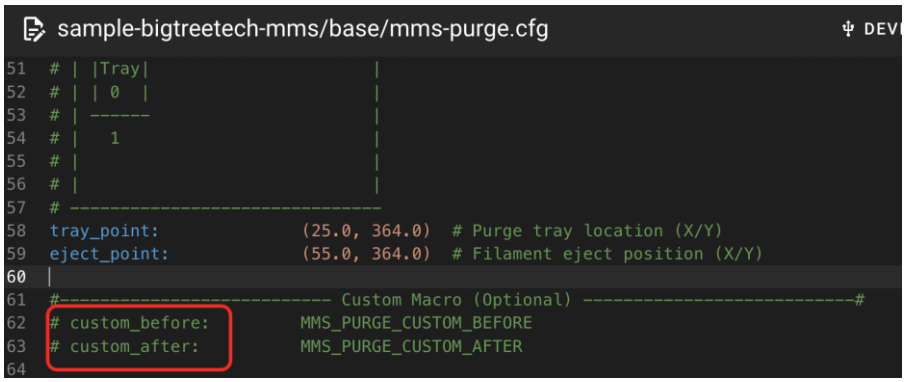
Parameter	Description
-h	Display help information (Help).
-i	Perform installation (Install).
-d	Perform uninstallation (Uninstall).
-g	Get version information (Get version).
-z	Skip the GitHub update check. By default, the script automatically checks for the latest version on GitHub. If you have modified the script locally, use this parameter to disable updates.

> **Example:** To skip the GitHub update check and uninstall MMS, run: ./install.sh -zd

6.2. Advanced MMS Usage

6.2.1. Custom Macro Interfaces

MMS provides custom macro hook interfaces for almost every process, except for the Load process.

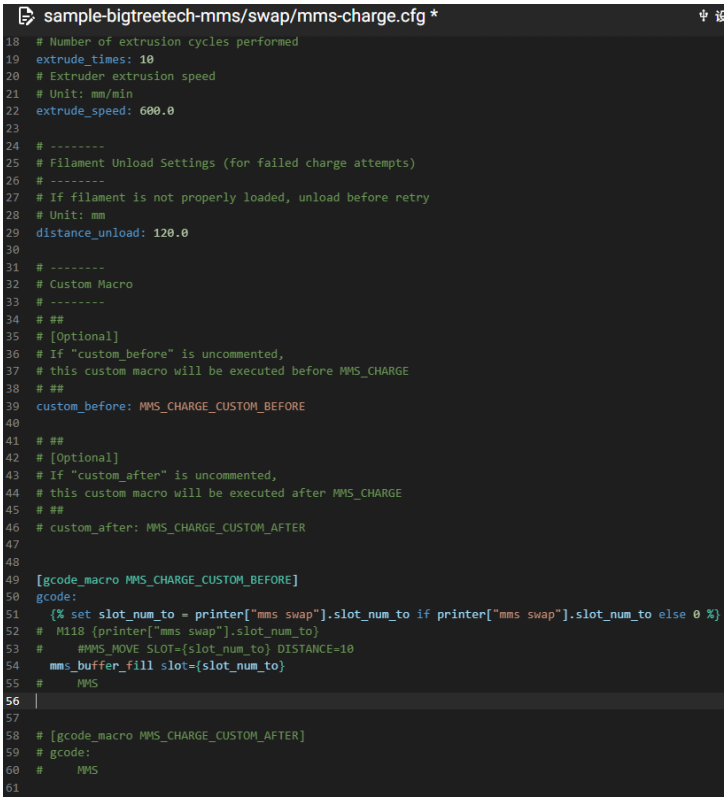


> **Example:** In the purge configuration file, you can find macro hook definitions such as: [gcode_macro MMS_PURGE_START].

As a reference, BIGTREETECH provides a Blobifier macro example, which can be found in the official BIGTREETECH documentation.

6.2.2. Reducing a High Charge Failure Rate

If the extruder structure makes it difficult to achieve an ideal transition between the end of the Load process and the start of the Charge process, you can try adding the following G-code to the “charge_before” macro:




```
# Example macro: Perform a short buffer-fill action before Charge
```

```
# Modify the macro name and content as needed
# [gcode_macro MMS_CHARGE_BEFORE]
# gcode:
```

```
#   MMS_MOVE SLOT={SLOT} DISTANCE=5
```

> ***Note:*** *If this macro does not significantly reduce Charge failures, structural adjustments may be required:*

- Check for excessive resistance at the Entry Sensor.
- Check for steps, gaps, or sharp transitions between the PTFE tube and the extruder drive gears.
- In some cases, mechanical modifications to the toolhead may be necessary to better support multi-material filament changes.

6.2.3. Troubleshooting Eject Failures

If filament fails to retract to a position in front of the Gate sensor during the Eject process, check the information returned by “MMS0” in the console.

- **If “entry=1”:**

  Check whether the cutter has successfully cut the filament and completed its retraction movement.

  Check whether filament remains under the Entry Sensor and is holding it open.
- **Reliability Note:** Users are responsible for ensuring the reliability and correct installation of all sensors mounted on the toolhead.

---

7. Other Information

7.1. Frequently Asked Questions and Troubleshooting

Q1: I cannot control ViViD to perform filament drying

A: Please check whether the SET_HEATER_TEMPERATURE macro has been overridden or modified.

A known cause of this issue is a bed fan control macro commonly used in the VORON community. This macro forcibly remaps heater inputs to the hotend, heated bed, and other heaters, while blocking temperature control commands for any heater classified as “other”.

To retain its original functionality while allowing other heaters (such as the ViViD heater) to operate correctly, modify the macro as follows:

```
[gcode_macro SET_HEATER_TEMPERATURE]
```

```
rename_existing: _SET_HEATER_TEMPERATURE
gcode:
  # Parameters
  {% set HEATER = params.HEATER|default("None") %}
  {% set TARGET = params.TARGET|default(0)|int %}
  # Vars
  {% set THRESHOLD = printer["gcode_macro _BEDFANVARS"].threshold|int %}
  {% if HEATER|lower == "extruder" %}
    M104 S{TARGET}
  {% elif HEATER|lower == "heater_bed" %}
    M99140 S{TARGET}
  {% else %}
    _SET_HEATER_TEMPERATURE HEATER={HEATER} TARGET={TARGET}
  {% endif %}
  # Set fans to low if heater_bed temp is requested above threshold
  # temp, and kick off monitoring loop.
  {% if HEATER|lower == "heater_bed" %}
    {% if TARGET >= THRESHOLD %}
      BEDFANSSLOW
      UPDATE_DELAYED_GCODE ID=bedfanloop DURATION=1
    {% else %}
      BEDFANSOFF
      UPDATE_DELAYED_GCODE ID=bedfanloop DURATION=0 # Cancel bed fan loop if it's
running
    {% endif %}
```

```
  {% endif %}
```

Q2: Layer shifting occurs frequently when printing multi-color models

A： This issue commonly occurs after the toolhead cutter impacts mechanical structures, which may cause XY belt skipping or stepper motor missed steps.

Please check the following:

Configuration checks: Verify that no configuration causes overtravel or collisions with structural components.

Homing method: Sensorless homing is not recommended for multi-color printers that use a toolhead-mounted cutter.。

Motor temperature: If the above issues are not present, check the stepper motor temperature:

- If the temperature is not excessively high, you may slightly increase motor current.
- If the temperature is too high, consider adding additional motor cooling or lowering the chamber temperature during printing.

Q3: Filament slips out from the side of the feed path

A: Due to the operating principle of ViViD, the selector motor applies pressure to the filament after rotating. If the filament is inserted at an angle, this pressure may cause the filament to slip out sideways.

Solutions:

Option 1: Switch the selector to another slot, straighten the filament, and insert it vertically.

Option 2: Straighten the filament first, then use the “Pre-Load” function, and refer to the filament loading instructions in Section 4 for details.

7.2. Firmware Compilation Options

Manual firmware compilation is not recommended, as it may cause certain preset functions to stop working (for example, the status indicator LED behavior when the device is not connected to the host).

If a firmware update is required, both the ViViD main unit and the Buffer module come pre-installed with Katapult (formerly known as CanBoot). You can use Katapult’s “flashtool.py” to flash firmware provided in the official GitHub repository.

Firmware Flashing Example (The following example is for demonstration only. Replace the device ID and firmware path with your actual values):

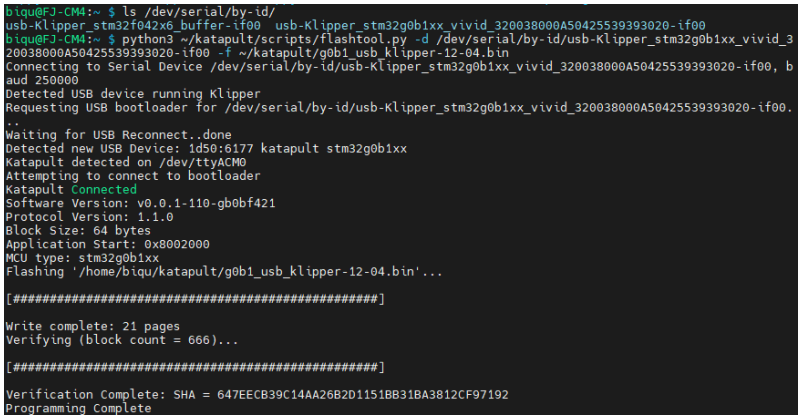
Retrieve device ID:

```
ls /dev/serial/by-id/*
```

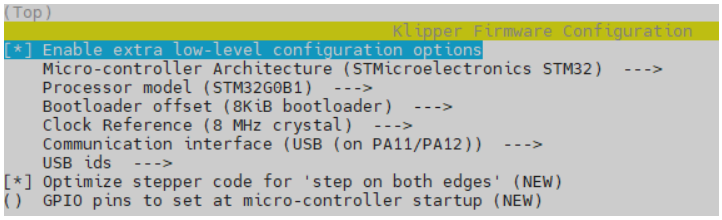
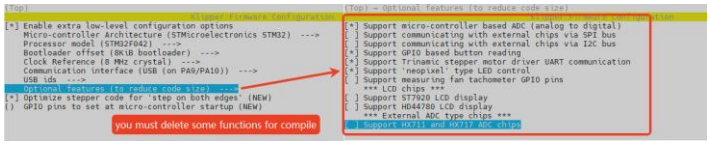
Execute the flashing command:

```
python3 ~/katapult/scripts/flashtool.py -d /dev/serial/by-id/usb-Klipper_stm32g0b1xx_vivid_320038000A50425539393020-if00 -f ~/katapult/g0b1_usb_klipper-12-04.bin
```

- -d specifies the device ID obtained above
- -f specifies the firmware file path



If manual compilation is absolutely required, use the following settings:

Module	MCU Model	Notes
ViViD Main Unit	STM32G0B1	
Buffer Module	STM32F042	

> ***Important – Buffer Firmware Compilation:*** *The STM32F042 has limited flash memory and cannot accommodate the full Klipper firmware. When compiling Buffer firmware, strictly follow the compilation instructions and disable certain features in the configuration menu to reduce firmware size.*

7.3. Optional Configurations

7.3.1. Hardware: Blobifier

The Blobifier module generates and stores purge waste in a compact and high-density form.

> **Advantages:** Reduces build plate contamination caused by accumulated purge waste and makes purge waste removal more efficient and convenient.

7.3.2. Software: Spoolman (Spool Management)

At the time of writing this manual, MMS does not yet support Spoolman.

- **For HappyHare users:** Spoolman can be used to manage filament spools conveniently.
- **Filament labels:** Or achieve filament label reading (Due to structural limitations, ViViD may not reliably read Bambu Lab RFID tags. However, custom label solutions are available, and labels can be manually transferred when changing spools.)
- **Future integration:** Orca Slicer is expected to add Spoolman support in future releases.
- **Final goal:** The intended user experience is synchronized filament information across the MMU, slicer, and database—similar to the Bambu AMS ecosystem.