README.md

Cura-Dremel-3D20-Plugin

UPDATE July 12, 2018: Cura has now included this plugin within their plugin browser. Users are encouraged to use the plugin browser to install & update this plugin

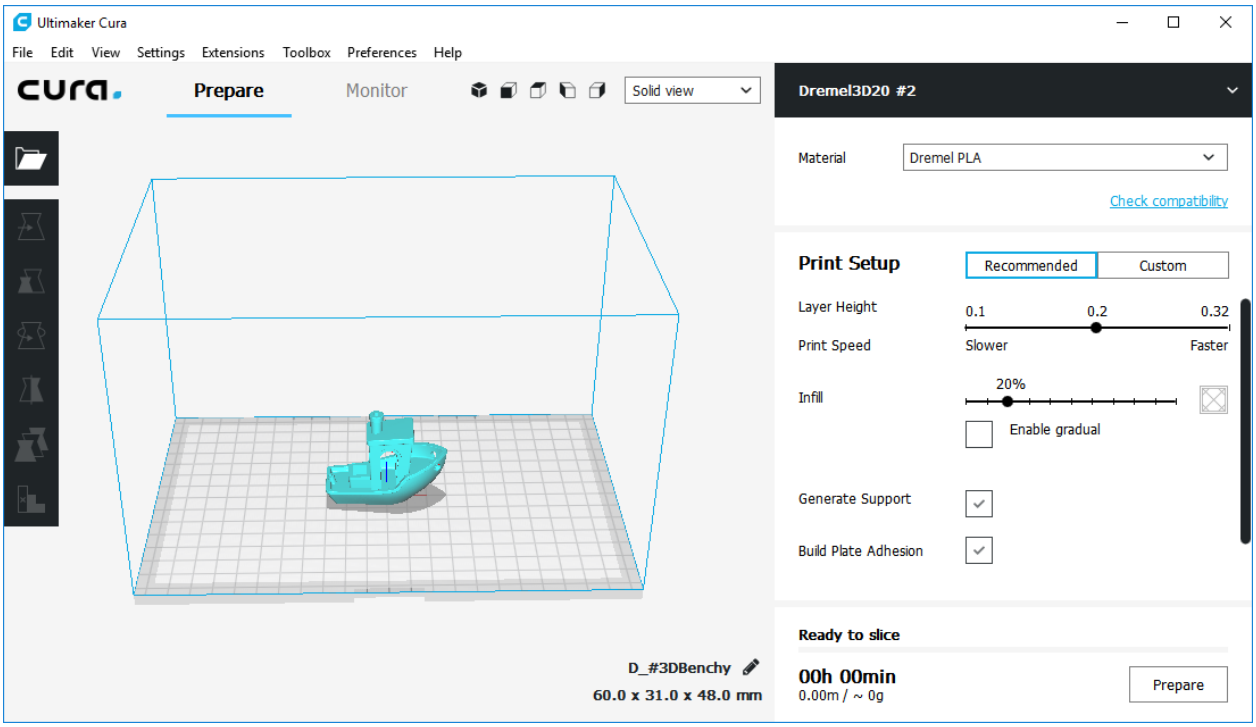
https://github.com/timmehtimmeh/Cura-Dremel-3D20-Plugin/

Dremel Ideabuilder 3D20 plugin for Cura version 3.4. This plugin enables the user to select a Dremel Ideabuilder 3D20 printer for use with Cura, and to export the proprietary .g3drem files using Cura as the slicing engine.

Although the software functions reasonably well for the author, the author will not guarantee that the software won't break your 3D printer, set property on fire, or do other **really_bad_things**. Users should be aware that neither the author of this software nor Ultimaker are in any way associated nor affiliated with Dremel or Bosch Industries.

This software is supplied without warranty and the user is responsible if they use this software and injury happens to their person or any other persons or damage occurs to any property as a result of using this software, and/or the files that it creates. Please remain near the 3D printer while using files generated by this software, and pay close attention to the 3D printer to verify that the machine is functioning properly. The software is provided AS-IS and any usage of this software or its output files is strictly at the user's own risk.

This code is **heavily** based upon the Cura gcode writer plugin.



This software consists of one plugin for Cura. The Dremel3D20 plugin contains the necessary printer files to add the Dremel IdeaBuilder 3D20 printer files to Cura and enables Cura to export the proprietary g3drem file format that the Dremel 3D20 needs in order to print.

Note: This version of the Cura-Dremel-3D20-Plugin will not work with Cura versions 3.3.1 or earlier due to changes that Ultimaker implemented in the Cura architecture. For a version that works with earlier Cura versions see the table below:

Cura Version	Last version of the plugin that works with the version of Cura
3.4 or 3.4.1	version 0.4.7
3.3 or 3.3.1	version 0.4.3
3.2 or 3.2.1	version 0.4.2
3.0 or 3.1	version 0.2.5

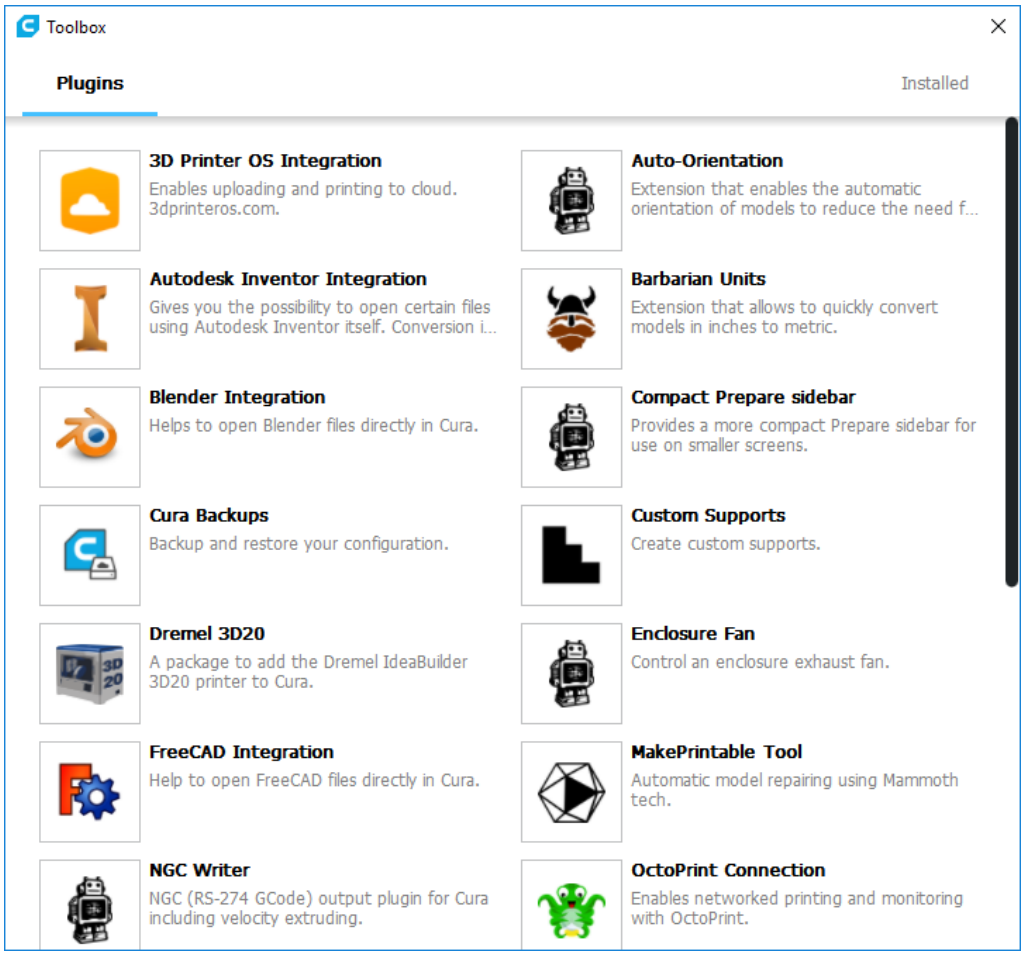
Installation

To install the plugins, follow the instructions below:

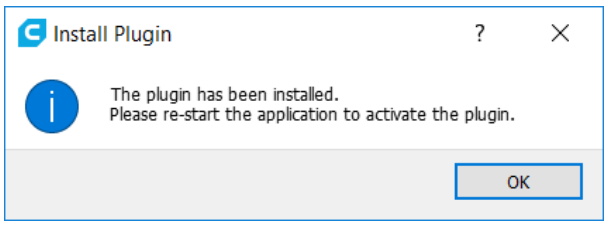
Note: Prior versions of this plugin are incompatible with Cura 3.4 Users upgrading from an older version may experience Cura crashing after upgrading. A fix for this is outlined below

0. Download and install Cura on your machine. This plugin has been tested on Windows 10 Professional 64 bit edition, and MacOS 10.12 (Sierra), but this plugin should work equally well on linux or any other operating system that Cura supports.

1. Open Cura, select the Toolbox menu, then select the "Browse Packages" item. Cura will bring up the package browser. Find the "Dremel 3D20" package in the list, then click install.



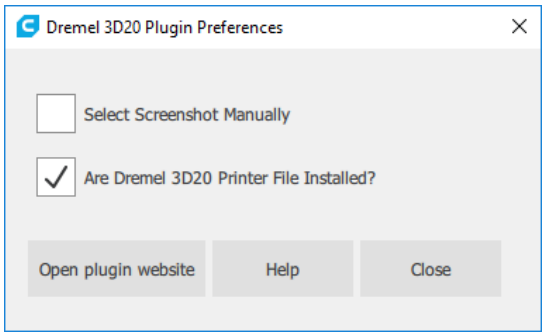
2. Cura will display a message window telling you to restart Cura.



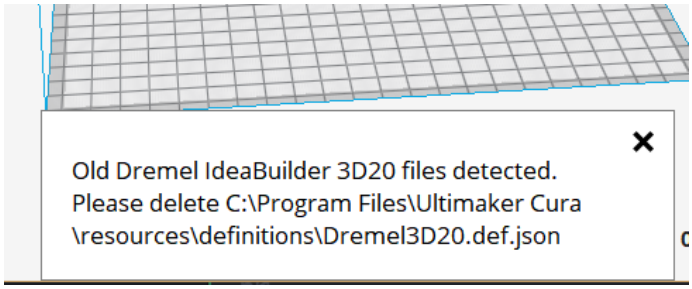
3. Close the Cura application

4. Upon restart you should have an option to add a Dremel3D20 printer (see "Using the Plugin" section below) - Congratulations, the plugin is now installed!

   Note: If any errors occurred the Dremel printer files contained within the plugin can be uninstalled and re-installed by going to the Extensions menu->Dremel3D20 Printer Plugin->preferences and uchecking and/or checking the checkbox next to "Dremel 3D Printer File Installed?" text



Note: If the Dremel3D20 plugin detects an installation in the main Cura application directory, it will pop up warnings telling the user to remove the old files before it installs the new files. Once the old files in the main cura application directory have been removed the plugin will automatically install new files to the appropriate locations without user intervention.

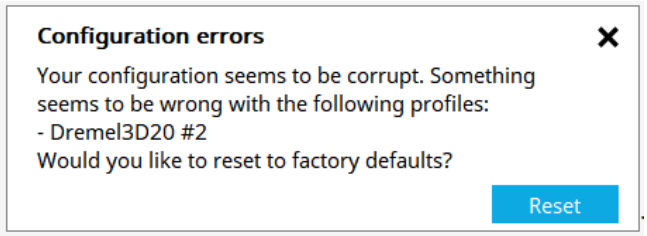


Users Upgrading from Cura 3.3 or earlier:

Upon installation Cura attempts to upgrade older versions of plugins and printers to the latest version. Unfortunately earlier versions of this plugin are incompatible with Cura 3.4 and users may experience a crash when updating. To fix this users should clear out their cache when prompted to by Cura either by manually clearing out the contents of the settings folder by:

EITHER:

1. Clicking the "Reset" button on Cura which says "Would you like to reset to factory defaults"



2. Relaunch Cura
3. Reinstall the latest version of the plugin

OR:

1. Deleting all contents within the following folder (select appropriate OS that you're using below):

Windows:

```
$USER/AppData/Roaming/cura/3.4/  where
$USER is your user's home directory, e.g. C:\Users\user
```

Mac:

```
$User/Library/Application\ Support/Cura/3.4/ where
$USER is your user's home directory, e.g. /Users/user
```

Linux:

```
$USER/.local/share/cura/$CURA_VERSION/settings/
$USER is your user's home directory, e.g. /home/user
```

2. Relaunch Cura
3. Reinstall the latest version of the plugin

Uninstallation

To uninstall the Dremel printer files, open the Extensions menu->Dremel3D20 Printer Plugin->preferences and uncheck the box next to "Dremel 3D Printer File Installed?".

To uninstall the plugin itself, navigate to Cura's Toolbox menu, select "Browse Packages" then click the installed button. Then

Note: These directories are subject to change at Ultimaker's discretion. The latest information on these directories can be found on this page

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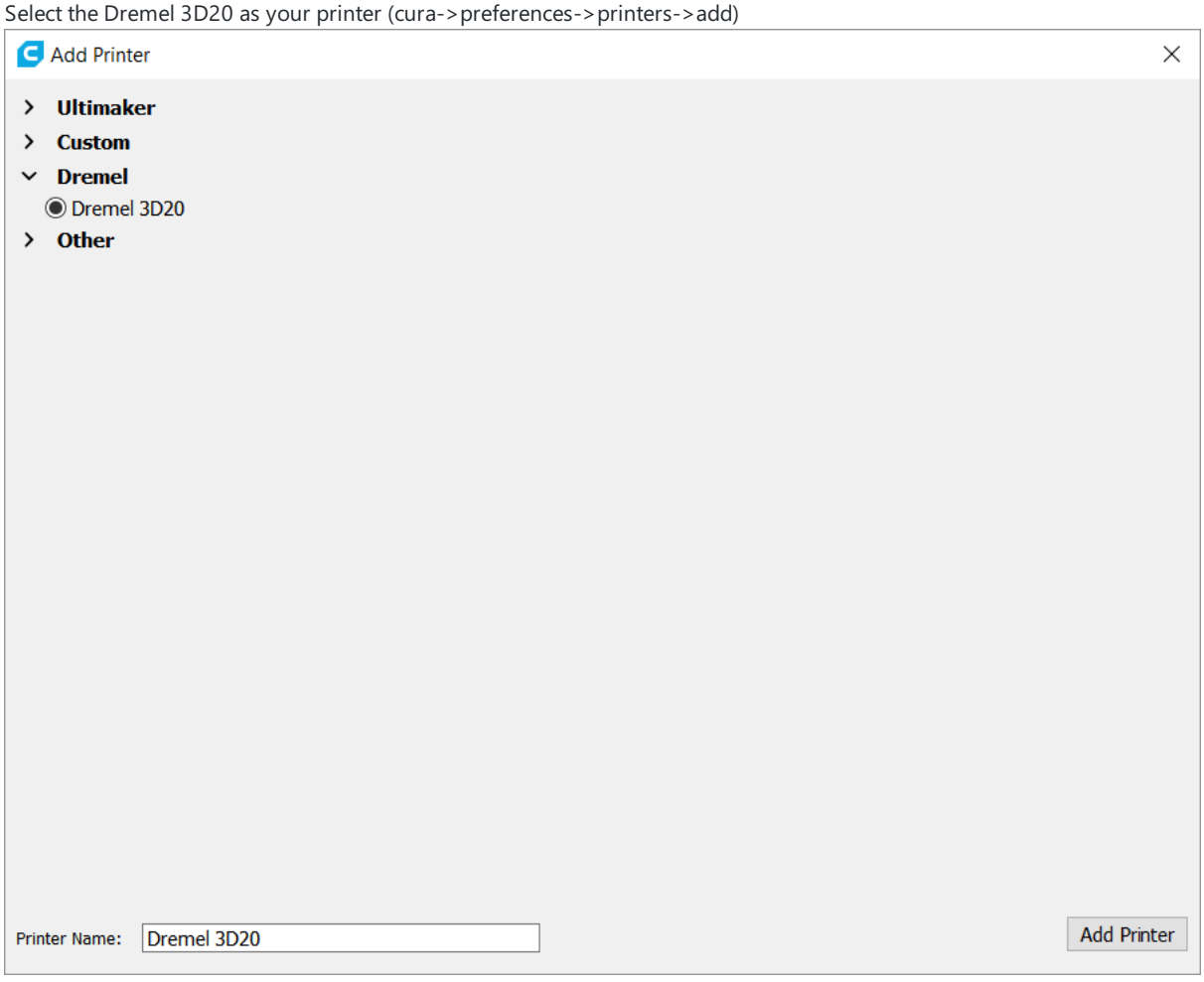
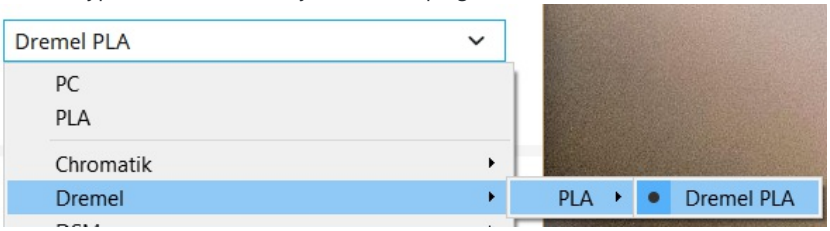
Using the Plugin

Once the plugin has been installed you can use it by following the steps outlined below:

1. Open Cura
2. Select the Dremel 3D20 as your printer (cura->preferences->printers->add)



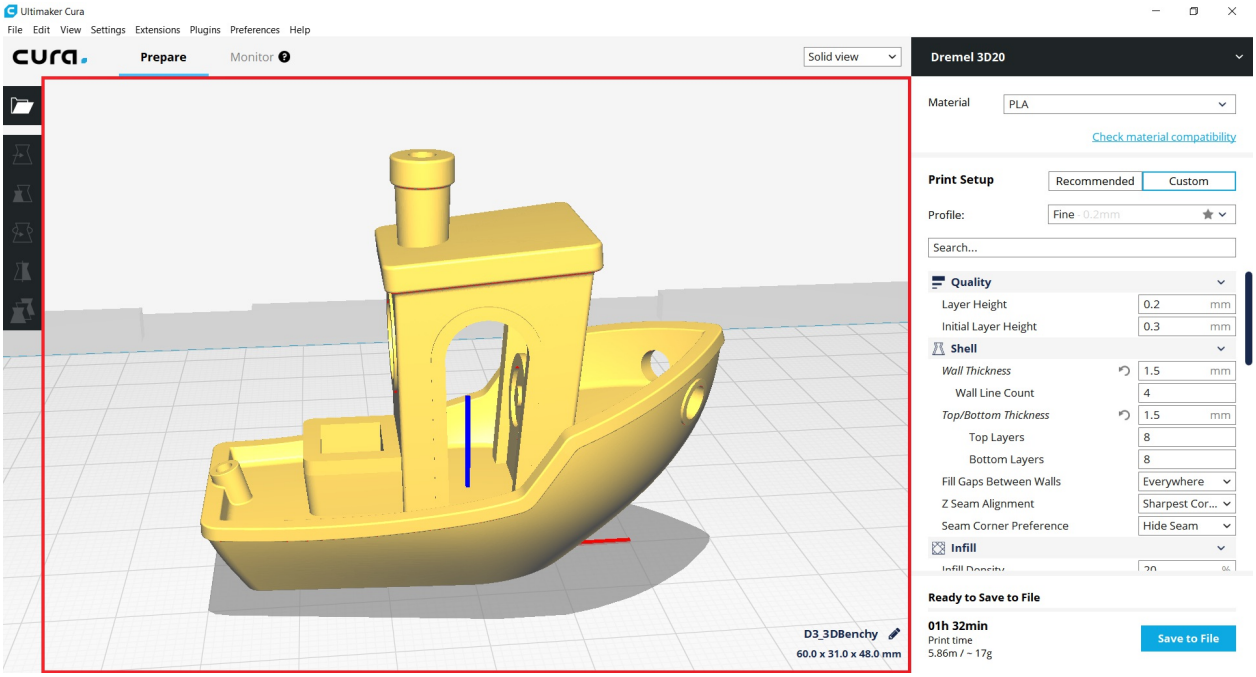
3. Select a type of PLA filament. By default the plugin uses the Dremel PLA filament that is included with the plugin.



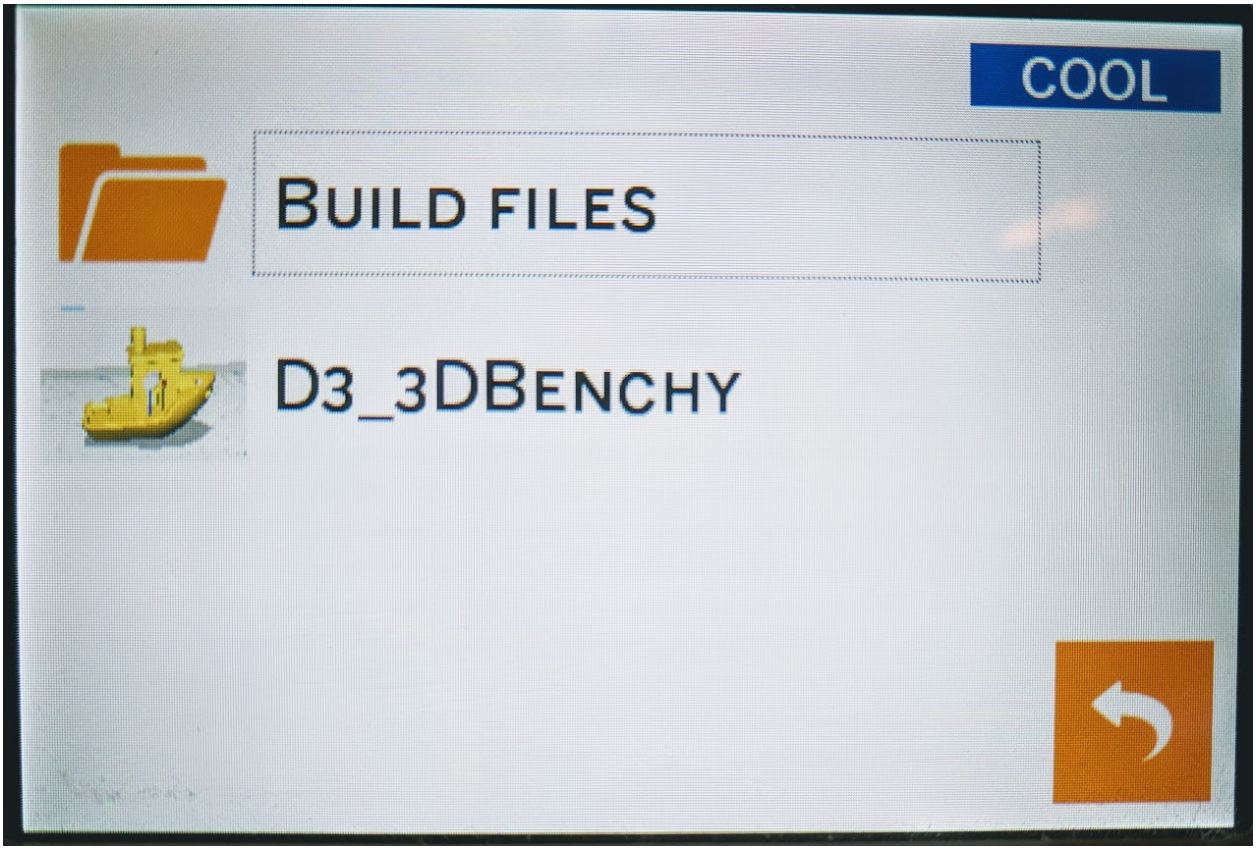
4. Set the slicing options that you want.

5. (Optional, but recommended if using the screenshot feature outlined in the Preview Image Options section below) Zoom in on the part until it fills the screen. As the plugin saves out the .g3drem file it will grab a screenshot of the main Cura window for use as the preview image that is displayed on the Ideabuilder screen. The area inside the red box shown in the image below will be used in the screenshot (the red box will not appear in the actual Cura window when you use the plugin). **Please Note:** The preview on the Dremel will be **much** better if you zoom in on the part that you're printing until the part fills the screenshot area.

For instance:

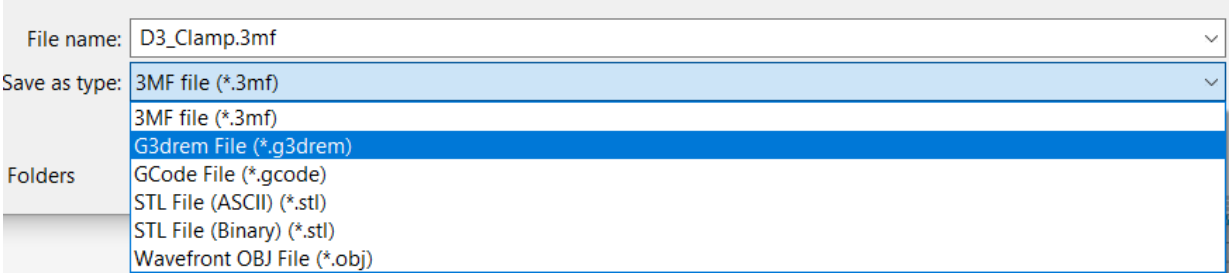


Will show this on the IdeaBuilder 3D20:



Nifty Feature: The screenshot will work with the visualizer plugins, so feel free to try the "xray view" or "layer view" options if you like those visualizations better.

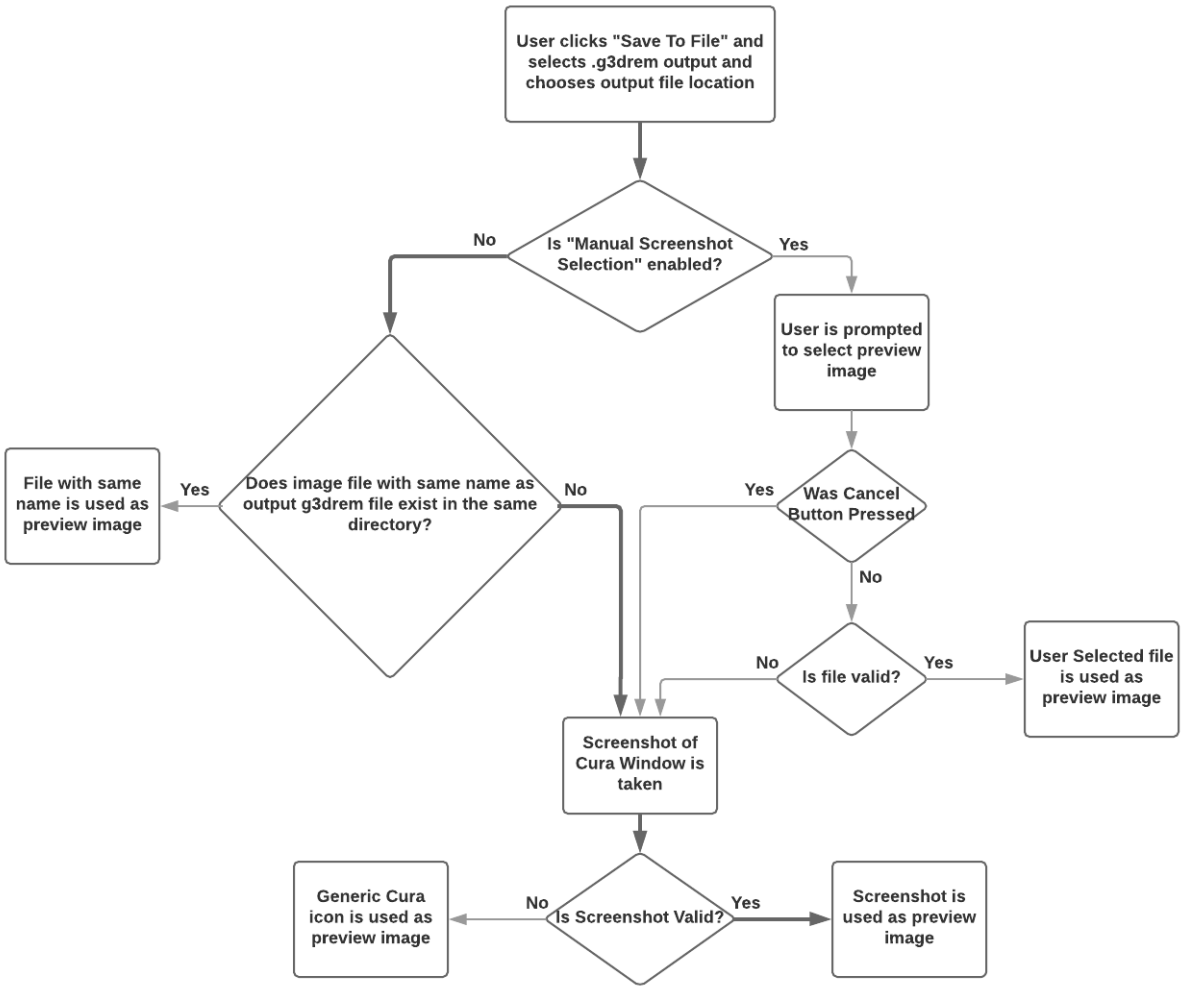
6. Click "File->Save As", or "save to file", selecting .g3drem as the output file format.



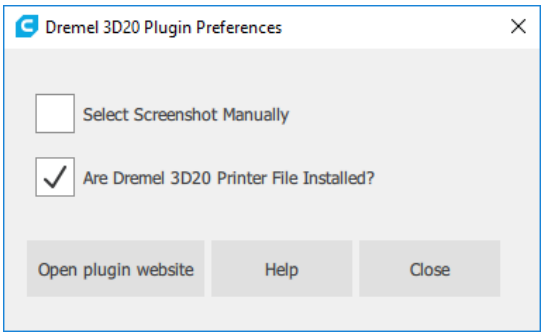
7. Save this file to a SD card
8. Insert the SD card into your IdeaBuilder 3D20
9. Turn on the printer
10. Select the appropriate file to print.
    The plugin implements the logic outlined in the Preview Image Options section below to select a preview image on the Dremel screen.
11. Click print
12. Enjoy - if you have any feature suggestions or encounter issues, feel free to raise them in the "Issues" section.

Preview Image Options

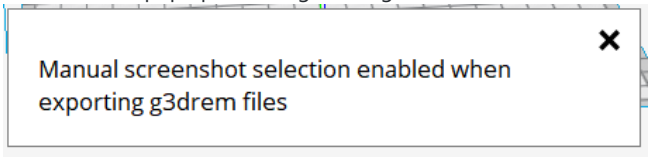
The plugin has implemented the following logic for selecting a preview image that will show up on the Dremel screen. The thick dark line follows the default options which are selected at plugin installation. To deviate from the default options you must intervene as outlined in the text below:



1. The plugin has an option to allow the user to select an image file manually for use as the preview on the Ideabuilder 3D20 screen. To enable this feature, go to the Extensions menu, and select Dremel3D20 Printer Plugin->preferences and check the box next to the text that reads "Select Screenshot Manually."



Cura will then pop up a message stating that screenshot selection is enabled



To disable this feature after enabling it, simply click the "Toggle Screenshot Selection" menu item again, and a message will state that the screenshot selection is disabled.

After enabling manual selection, once the user selects a location to save the .g3drem file out a secondary file selection menu will be brought up allowing the user to select a screenshot. If an image file is selected then it will be used, if the cancel button is pressed then the plugin will skip Step 2 and proceed to Step 3

2. If manual screenshot selection is disabled, then the plugin searches the directory where the user saves the .g3drem file for an image file with the same name. If no valid image file with the same name is found in the same directory, then the plugin proceeds to Step 3. Valid image extensions are .png, .jpg, .jpeg, .gif, and .bmp.

```
For example if the user saves llama.g3drem to the dekstop and the desktop folder
has a llama.jpg image file within it then the llama.jpg file will be used as the
preview image on the Dremel:
```

(llama photo by Johann "nojhan" Dréo, distributed under a CC BY-SA 2.0 FR license.)

3. If a screenshot has not been found after steps 1 and 2, then the plugin attempts to take a screenshot of the main Cura window and save it to the file (explained in Step 5 above) This is the default behavior of the plugin, and is what will happen

normally if the user doesn't perform the actions listed in Steps 1 and 2.

4. If the screenshot fails for some reason then a generic Cura icon will be selected as the preview image.

Note

Please note the following:

- The plugin has been tested using Cura 3.4 on Windows 10 x64, MacOS Sierra (MacOS 10.12), MacOS El Capitan (10.11), and Ubuntu versions 17.10 and 16.04. Testing on non-Windows platforms occurs less frequently than on Windows. If you are using another platform and encounter issues with the plugin, feel free to raise an issue with the "Issues" section of the plugin's website.
- This plugin has been tested to work in the basic print case, however users may still encounter problems with the print head crashing into your parts if you attempt to print multiple parts on the same print bed one-after-another instead of printing them all-at-once.

Wishlist

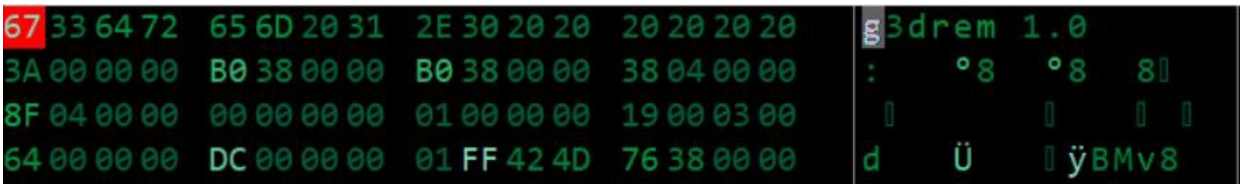
The following items would be great to add to this plugin - any and all collaboration is welcome - feel free to raise an issue if there's a feature you'd like

- Get this plugin integrated into Ultimaker's plugin repo (in progress)

Technical Details of the .g3drem File Format

The g3drem file format consists of a few sections. The header is a mix of binary data and ASCII data, which is followed by an 80x60 pixel bitmap image written to the file, which is then followed by standard 3d printer gcode saved in ASCII format.

An Example of the binary header looks like this:



A description of the current understanding of this file format is below:

Binary Data	Description
`67 33 64 72 65 6d 20 31 2e 30 20 20 20 20 20 20`	Ascii for 'g3drem 1.0 ' (See 1 below)
`3a 00 00 00 b0 38 00 00 b0 38 00 00 38 04 00 00`	Memory Locations #s and Time(sec) (See 2 through 5 below)
`8f 04 00 00 00 00 00 00 01 00 00 00 19 00 03 00`	Filament(mm), Flags, Height, Infill, Shell (See 6 through 11 below)
`64 00 00 00 DC 00 00 00 01 ff [80x60 Bmp image]`	Speed, Temps, Material and BMP (See 12 through 18 below)
`[standard 3d printer gcode]`	Gcode in ASCII (See 19 below)

The sections of the file are:

1. `67 33 64 72 65 6d 20 31 2e 30 20 20 20 20 20 20` = ASCII text 'g3drem 1.0 '
2. `3a 00 00 00` = four-byte little-endian uint containing the offset in the file to the start of the thumbnail
3. `b0 38 00 00` = four-byte little-endian uint containing the offset in the file to the start of a large image

4. `b0 38 00 00` = four-byte little-endian uint containing the offset in the file to the start of the gcode
5. `38 04 00 00` = four-byte little-endian uint containing the number of seconds that the print will take
6. `8f 04 00 00` = four-byte little-endian uint containing the estimated number of millimeters of filament that the right extruder will use
7. `00 00 00 00` = four-byte little-endian uint containing the estimated number of millimeters of filament that the left extruder will use (always zero for Ideabuilder3D20)
8. `01 00` = two-byte little-endian ushort that consists of boolean OR-ed flags: 0x01=right extruder, 0x02=left extruder, 0x04=bed heating, 0x08=support enabled
9. `00 00` = A two-byte little-endian ushort number that contains the layer height in micrometers
10. `19 00` = A two-byte little-endian ushort number that contains the infill percentage
11. `03 00` = A two-byte little-endian ushort number containing the number of shell layers
12. `64 00` = A two-byte little-endian ushort number containing the print speed
13. `00 00` = A two-byte little-endian ushort number containing the platform temperature
14. `DC 00` = A two-byte little-endian ushort number containing the right extruder temperature
15. `00 00` = A two-byte little-endian ushort number containing the left extruder temperature. (always zero for Ideabuilder3D20)
16. `01` = A one byte unsigned number containing the material for the right extruder. 0 is ABS, 1 is PLA, 2 is dissolvable material, 15 is no material (Always 1 for Ideabuilder 3D20)
17. `ff` = A one byte unsigned number containing the material for the left extruder. 0 is ABS, 1 is PLA, 2 is dissolvable material, 15 is no material (Always 15 for Ideabuilder 3D20)
18. A bitmap containing the preview image that the Dremel 3D20 will use to display on the screen (See the usage instructions step 5) This plugin uses an image of size 80x60 pixels for the preview image, and automatically rescales user-selected and screenshot images to be 80x60.
19. Standard 3d printer gcode (Marlin flavor seems to be working, but if you encounter issues please feel free to raise them here

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Contributors:

Many thanks belong to the following users, who have spent their time and energy to report issues and help make the plugin better:

- WeavingColors
- SwapFaceL
- metalman3797
- blablaaddi
- Swizzler121
- Appesteijn
- Ghostkeeper
- LipuFei