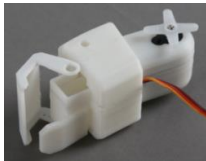


## Introducing Mankati XT Plus 3D-printer on FDM technology

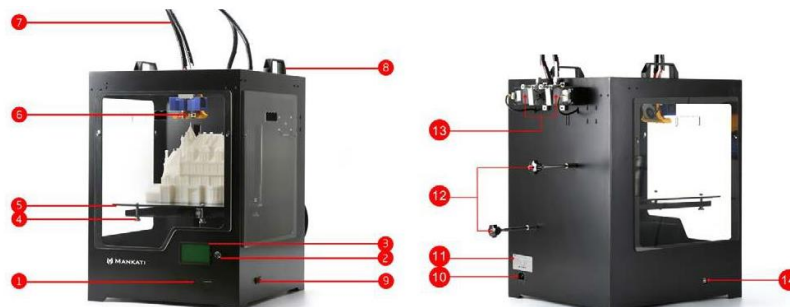
- 3D Printing is an additive manufacturing process that creates a physical object from a digital design. A digital model is turned into a solid three-dimensional physical object by adding material layer by layer.
- Fused Deposition Modeling (FDM) represents the largest installed base of 3D printers globally and is the most widely available 3D printing process, mainly used for low-cost prototyping and design verification with very fast turn around times.
- FDM printers use two kinds of materials, a modeling material, which constitutes the finished object, and a support material, which acts as a scaffolding to support the object as it is being printed.
- Examples of 3D-printed parts:



## Printer Specifications and Materials

| Model                     | Fullscale XT Plus                       |
|---------------------------|-----------------------------------------|
| Forming Tech.             | Fused Deposition Modeling (FDM)         |
| Extruder                  | High Temperature All Metal Extruder * 2 |
| Build Size                | 260*260*300 mm / 10.2*10.2*11.8 inch    |
| <b>Specification</b>      |                                         |
| Precision                 | X,Y axis 0.01 mm, Z axis 0.015 mm       |
| Layer Resolution          | 0.02~0.4 mm                             |
| Nozzle Diameter           | 0.4 mm                                  |
| Max. Travel Speed         | 250 mm/s                                |
| Max. Print Speed          | 180 mm/s                                |
| Max. Extruder Temperature | 300 °C / 572 °F                         |
| Max. Hot Bed Temperature  | 110 °C / 230 °F                         |
| Max. Extrude Speed        | 100 mm/s                                |
| <b>Filament</b>           |                                         |
| Filament Type             | ABS, PLA, PVA, PS                       |
| Filament Diameter         | 3 mm                                    |
| Filament Temperature      | 150~300 °C / 302~572 °F                 |
| Filament Colors           | Multicolor                              |


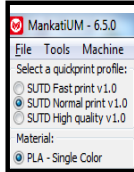
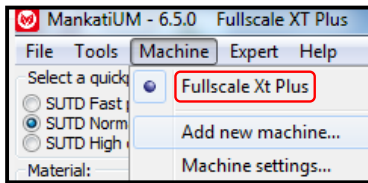
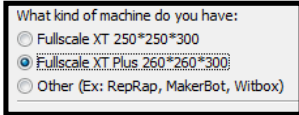
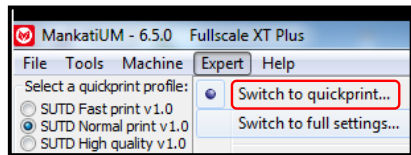
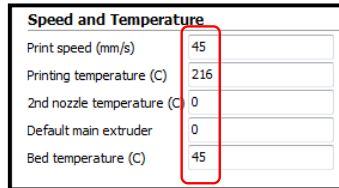
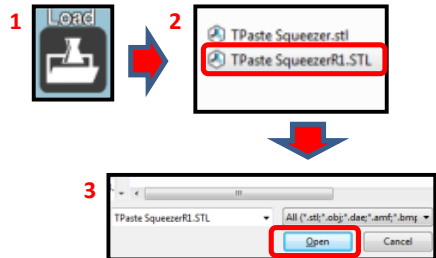
## Printer Hardware Overview

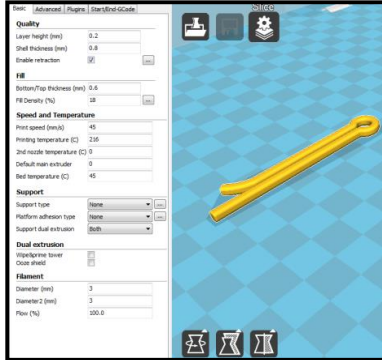

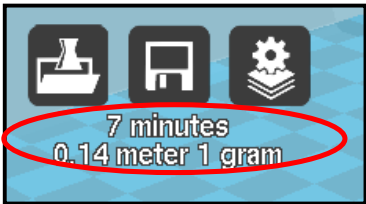



- |                         |                        |                   |
|-------------------------|------------------------|-------------------|
| 1. SD-card slot         | 6. Print head          | 11. Machine label |
| 2. Push and rotate knob | 7. Filament guide tube | 12. Spool holder  |
| 3. LCD screen           | 8. Printer holder      | 13. Feeder motor  |
| 4. Build plate screws   | 9. Power switch button | 14. USB Socket    |
| 5. Build plate          | 10. Power Socket       |                   |

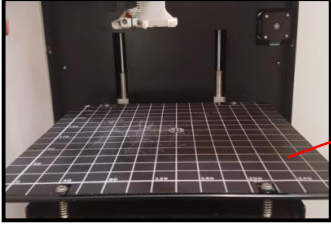
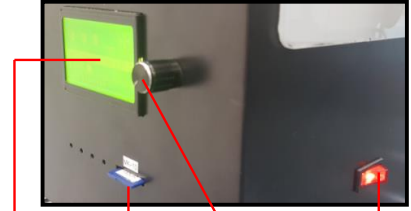
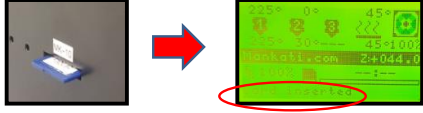
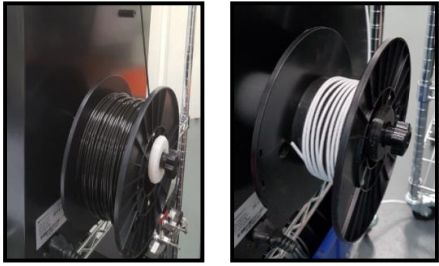

# Mankati XT Plus 3D-printing

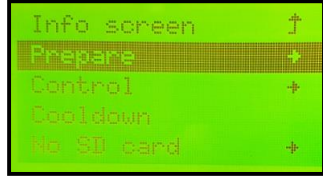

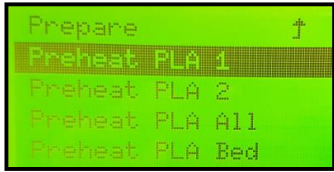
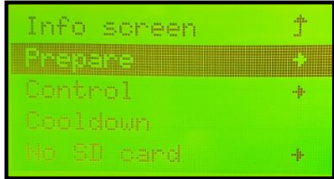
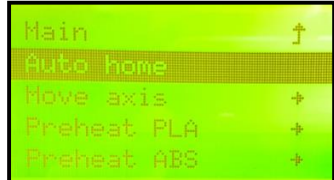
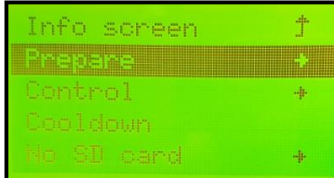
## 1. Software Settings & Model preparation

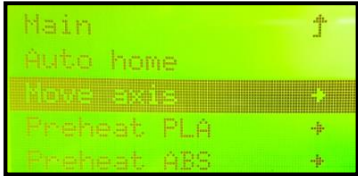


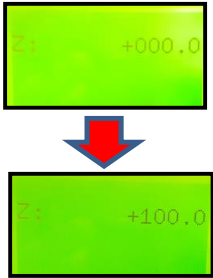
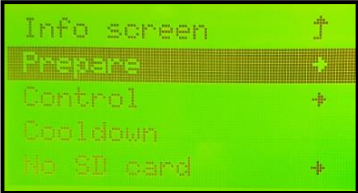
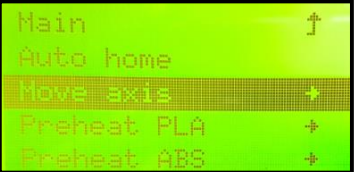
| S/N | Procedure                                                                                                                                                               | Pictorial Aid                                                                        |
|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1   | Open MankatiUM Slicer software from Desktop                                                                                                                             |    |
| 2   | Under “Select a quickprint profile”<br>(Locate directly under “File” pull-down menu)<br>Select “Normal Print” button<br>Select “PLA –Single Color” button               |    |
| 3   | Select “Machine” from the pull-down menu<br>Select “Add new machine” and then “Next”                                                                                    |    |
| 4   | Select “Fullscale XT Plus 260*260*300”<br>button and then “Next”<br>Select “Finish” tab                                                                                 |  |
| 5   | Select “Expert” from pull-down menu<br>Select “ Switch to full settings....”                                                                                            |  |
| 6   | Input the following value:<br>Print Speed = 45<br>Printing Temperature = 216<br>Bed Temperature = 45                                                                    |  |
| 7   | <b>Loading of 3D-model (.stl) file</b><br>Click on the “Load” icon<br>(Located at top-left of graphic interface)<br>Select “TPaste SqueezerR1.stl”<br>Select “Open” tab |  |


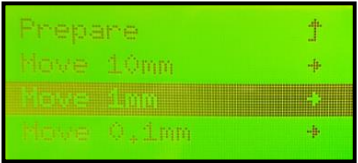




| S/N | Procedure                                                                                                                                           | Pictorial Aid                                                                        |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 8   | Loaded model                                                                                                                                        |    |
| 9   | <p><b><u>Slicing the loaded model</u></b></p> <p>Click on the “<b>Slice</b>” icon<br/>(Located at top-left of graphic interface)</p>                |    |
| 10  | Record the <b>time and filament length</b> required to print this model                                                                             |   |
| 11  | <p><b><u>Saving the sliced file</u></b></p> <p>Click “<b>Save toolpath</b>” icon<br/><b>Transfer</b> the saved toolpath (gcode) file to SD-Card</p> |  |

## 2. 3D-Printer print preparation (Quick Start)

| S/N | Procedure                                                                                                                                                                             | Pictorial Aid                                                                        |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 1   | <p><b><u>3D-Print the model</u></b></p> <p><b>Ensure</b> Build-bed (table) is empty and clean</p>                                                                                     |    |
| 2   | <p><b>Switch-On</b> the Printer<br/>(Switch is located on the right-hand side of printer)<br/>- Control Panel Screen lighted up.</p>                                                  |    |
| 3   | <p><b>Insert</b> SD-Card to printer SD-Card slot<br/>(Card Inserted appear on control panel screen)</p>                                                                               |   |
| 4   | <p><b>Check</b> for sufficient filament against the recorded length of the model to be printed<br/>If insufficient, replace it.<br/>(Filament roll is located behind the printer)</p> |  |
| 5   | <p><b><u>Preheat the nozzle for PLA filament</u></b></p> <p>Press [Control Knob]</p>                                                                                                  |  |




| S/N | Procedure                                                                                                                              | Pictorial Aid                                                                                                                                                                                                                                                                                                                                                                                      |
|-----|----------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6   | <p><b><u>Preheating the nozzle</u></b></p> <p>Turn [<b>Control Knob</b>] and Select [<b>Prepare</b>]</p>                               |  <p>A screenshot of a green LCD screen with a black border. The screen displays a menu with five options: 'Info screen' with an up arrow, 'Prepare' with a right arrow (highlighted), 'Control' with a right arrow, 'Cooldown' with a right arrow, and 'No SD card' with a right arrow.</p>                      |
| 7   | <p>Select [<b>Preheat PLA</b>]</p>                                                                                                     |  <p>A screenshot of a green LCD screen with a black border. The screen displays a menu with five options: 'Main' with an up arrow, 'Auto home' with a right arrow, 'Move axis' with a right arrow, 'Preheat PLA' with a right arrow (highlighted), and 'Preheat ABS' with a right arrow.</p>                     |
| 8   | <p>Select [<b>Preheat PLA 1</b>]</p> <p><i>(Control Panel Screen appear and table is heated up to preset temperature of ~50°C)</i></p> |  <p>A screenshot of a green LCD screen with a black border. The screen displays a menu with five options: 'Prepare' with an up arrow, 'Preheat PLA 1' with a right arrow (highlighted), 'Preheat PLA 2' with a right arrow, 'Preheat PLA All' with a right arrow, and 'Preheat PLA Bed' with a right arrow.</p> |
| 9   | <p><b><u>Setting XY-home position</u></b></p> <p>Press [<b>Control Knob</b>] and Select [<b>Prepare</b>]</p>                           |  <p>A screenshot of a green LCD screen with a black border. The screen displays a menu with five options: 'Info screen' with an up arrow, 'Prepare' with a right arrow (highlighted), 'Control' with a right arrow, 'Cooldown' with a right arrow, and 'No SD card' with a right arrow.</p>                    |
| 10  | <p>Select [<b>Auto home</b>]</p> <p><i>Wait for action to be completed<br/>(Table will travel up to nozzle tip)</i></p>                |  <p>A screenshot of a green LCD screen with a black border. The screen displays a menu with five options: 'Main' with an up arrow, 'Auto home' with a right arrow (highlighted), 'Move axis' with a right arrow, 'Preheat PLA' with a right arrow, and 'Preheat ABS' with a right arrow.</p>                   |
| 11  | <p><b><u>Lowering the Build-bed (table)</u></b></p> <p>Press [<b>Control Knob</b>] and Select [<b>Prepare</b>]</p>                     |  <p>A screenshot of a green LCD screen with a black border. The screen displays a menu with five options: 'Info screen' with an up arrow, 'Prepare' with a right arrow (highlighted), 'Control' with a right arrow, 'Cooldown' with a right arrow, and 'No SD card' with a right arrow.</p>                    |

| S/N | Procedure                                                                                                                                                                   | Pictorial Aid                                                                         |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| 12  | Select [ <b>Move Axis</b> ]                                                                                                                                                 |     |
| 13  | Select [ <b>Move 1mm</b> ]<br>(Set the incremental travel movement by 1mm)                                                                                                  |     |
| 14  | Select [ <b>Move Z</b> ]                                                                                                                                                    |     |
| 15  | Turn [ <b>Control Knob</b> ] <b><i>Clockwise to an approximate value of +100</i></b> and wait for the action to be completed.<br>(Table will travel downward by this value) |  |
| 16  | <b><u>Extruding filament before starting a print</u></b><br>Press [ <b>Control Knob</b> ] and Select [ <b>Prepare</b> ]                                                     |   |
| 17  | Select [ <b>Move Axis</b> ]                                                                                                                                                 |   |

| S/N | Procedure                                                                                                                                                                                                                                                                                                                                                        | Pictorial Aid                                                                                                                                                            |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 18  | Select [Move 1mm]                                                                                                                                                                                                                                                                                                                                                |                                                                                        |
| 19  | Select [Extruder]                                                                                                                                                                                                                                                                                                                                                |                                                                                        |
| 20  | Turn [Control Knob] <b><i>Clockwise to an approximate value of +100</i></b> and wait for the action to be completed.<br><i>(Filament should flow freely out of the nozzle tip)</i>                                                                                                                                                                               |   |
| 21  | <u><b>Selecting the file to be printed</b></u><br>Ensure table is empty and clean<br>Press [Control Knob] and Select [Print from SD]                                                                                                                                                                                                                             |                                                                                      |
| 22  | Turn [Control Knob] and select the file to be printed                                                                                                                                                                                                                                                                                                            |                                                                                      |
| 23  | <u><b>Safety Pointers</b></u><br><br><b><u>Do Not:</u></b><br><input type="checkbox"/> Touch the heated nozzle (it's hot)<br><input type="checkbox"/> Touch any loose wire<br><input type="checkbox"/> Insert your hand into the printing area when printing is in progress<br><br><b><u>Do:</u></b><br><input type="checkbox"/> Ask for help if your are unsure |                                                                                                                                                                          |



### 3. Removing the printed part

| S/N | Procedure                                                                                                                                      | Pictorial Aid                                                                       |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1   | When printing is completed, the table will move to its XY-home position and heat to $\sim 50^{\circ}\text{C}$ automatically for model removal. |  |
| 2   | Use a scraper provided to gently remove the model, avoid damaging the plastics-sheet, heated-table glass and the printed model.                |  |
| 3   | <b>Return</b> all tools back to their proper place after use.                                                                                  |  |
|     |                                                                                                                                                |                                                                                     |
|     |                                                                                                                                                |                                                                                     |
|     |                                                                                                                                                |                                                                                     |