FORMBOT

Xplorer

Assembly & Operation Manual

Xplorer is a high-performance 3D printer kit built for makers who demand precision, speed, and reliability. Designed for exploration and crafted for performance, it turns bold ideas into flawless prints.

VIVEDINO

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1 Introduction

The **Xplorer** is a modular 3D Printer Kit designed for makers, engineers, and enthusiasts who demand precision, modularity, and expandability from their machines.

Build Volume: 400 × 400 × 400 mm – large enough for ambitious prints and multi-part projects

Rigid Frame: Constructed with 30x30 mm aluminum extrusions for excellent structural stability

Metal Core: All motion system and load-bearing components are crafted from CNC-machined aluminum or precision sheet metal – no 3d printed parts in critical areas

Standard Components: Built using widely available, off-the-shelf 3D printer parts for easy maintenance and upgrades

Firmware: Runs official, unmodified **Klipper** firmware

Modular Architecture: Configure the Xplorer to suit your needs:

- Single Extruder
- IDEX (Independent Dual Extruder)
- Dual Gantry
- IQEX (Independent Quad Extruder)

Maker-Friendly: A platform built for modders – easy to adapt, extend, and experiment with your own ideas

Automated Calibration: Features automatic routines for bed probe offset and XYZ nozzle offset

Interface:

- WiFi
- Integrated chamber camera
- HDMI touchscreen display
- Convenient access to USB, LAN, and HDMI ports

The **Xplorer** is more than a printer – it's a foundation for innovation. Whether you're a DIY tinkerer or running a print farm, Xplorer delivers the versatility and precision you need.

The relevant documentation and files for this project can be found here:

- CAD Model of the printer: https://github.com/FORMBOT/Xplorer
- This Manual: https://github.com/FORMBOT/Xplorer_UpdateManager/tree/main/06_Manual
- System Image: https://github.com/FORMBOT/Xplorer/releases
- Slicer Profiles: https://github.com/FORMBOT/Xplorer_UpdateManager/tree/main/04_Slicer_Profiles
- STEP-Files: https://github.com/FORMBOT/Xplorer_UpdateManager/tree/main/05_STEP_FILES

2. Frame

The **Xplorer's frame** is built entirely from 30×30 mm aluminum extrusion profiles, providing a strong, stable foundation for quality printing.

The **assembly process** is intentionally straightforward, with a simple and logical structure that’s easy to follow—even for first-time builders.

To ensure **dimensional accuracy** and perfect alignment:

- **Milled reference surfaces** are used in all critical areas, so components align precisely during assembly.
- The result is **a frame that stays square, rigid, and vibration-resistant**, even during high-speed or multi-toolhead operations.

This **solid foundation** is key to the Xplorer’s modular architecture and consistently reliable print quality.

2.1 Frame beam MGN Y-Axis

x2

Necessary parts

1x Alu profile 30x585mm

⚠ **Make sure to pick the correct length from the package—there are many aluminium profiles cut at 580mm, but for this step, you will need the 585mm one. The only machining on the aluminium profile for this step are the M8 threads at each end.**

2x MGN12C Block – for **Single Gantry** configuration
4x MGN12C Block – for **Dual Gantry** configuration

1x MGN12 550mm rail

8x DIN912 M3x12 Screw

8x M3 T-Nut

Result

Single Gantry configuration

Dual Gantry configuration

Assembling steps

⚠ **Two frame beams are needed. Execute this assembly twice**

1

1. Transfer the MGN12C blocks from the printed part to the MGN12 rail
2. BE CAREFULL not to lose any balls from the MGN block !
3. For single gantry configuration are needed 2 MGN12C blocks and for dual gantry configuration are needed 4 MGN12C blocks
4. Add lubrication to the MGN blocks and ensure that they run smoothly on the rail. For greasing use 3 in 1 Oil or something similar.

i. The MGN12 Rails may be delivered with the blocks already installed on them. In this case, the first three assembly steps are not necessary

2

1. In the first and last hole of the rail, preassemble the printed part for MGN rail alignment using DIN 912x20 screws and M3 T-nuts
2. Preassemble DIN 912x12 screws and M3 T-nuts with a gap of two holes in between, as shown.

i. The printed part is used only for aligning the MGN rail onto the aluminium profile. After the rail is secured, the printed part will be removed, and the M3x20 screw will be replaced with an M3x12 screw.

2.1 Frame beam MGN Y-Axis

x2

Assembling steps

⚠ **Two frame beams are needed. Execute this assembly twice**

3

1. Place the MGN rail onto the aluminium profile, ensuring that all the M3 T-nuts are inserted into the channel of the aluminium profile.
2. Align the beginning of the rail with the edge of the aluminium profile as indicated.

4

1. Using a 2.5mm Allen key, tighten the screws at the ends of the MGN rail where the alignment parts are located.

5

1. Using a 2.5mm Allen key, tighten the rest of screws holding the MGN rail.

6

1. Using a 2.5mm Allen key, unscrew the screws holding the alignment parts.
2. Remove the alignment parts and the DIN912 M3x20 screws from the assembly

3. Use DIN 912 M3x12 screws to fix the rail where the alignment parts were previously.

2.2 Front pillar

x2

Necessary parts

1x Alu profile 30x835mm

The aluminium profile for this assembly step has several holes on its sides and on one side there is a 2.5mm deep milling.

1x MGN12H Block

1x MGN12 450mm rail

7x DIN912 M3x12 Screw

7x M3 T-Nut

Result

Assembling steps

⚠ **Two front pillars are needed. Execute this assembly twice**

1

1. Transfer the MGN12H block from the printed part to the MGN12 rail
2. BE CAREFULL not to lose any balls from the MGN block !
3. **Add lubrication to the MGN block and ensure that they run smoothly on the rail.** For greasing use Mobilux EP1 or EP2, For greasing use 3 in 1 Oil or something similar.

i. The MGN12 Rails may be delivered with the blocks already installed on them. In this case, the first three assembly steps are not necessary

2

1. In the first and last hole of the rail, preassemble the printed part for MGN rail alignment using DIN 912 M3x20 screws and M3 T-nuts
2. Preassemble DIN 912 M3x12 screws and M3 T-nuts with a gap of two holes in between, as shown. One gap will consist of only one hole

i. The printed part is used only for aligning the MGN rail onto the aluminium profile. After the rail is secured, the printed part will be removed, and the M3x20 screw will be replaced with an M3x12 screw.

2.2 Front pillar

x2

Assembling steps

⚠ **Two front pillars are needed. Execute this assembly twice**

3

1. Place the MGN rail onto the aluminium profile on the side with the 2.5mm deep milling, ensuring that all M3 T-nuts are inserted into the channel of the aluminium profile.
2. Place the beginning of the rail 32mm away from the edge of the milling, as indicated.

4

1. Using a 2.5mm Allen key, tighten the screws at the ends of the MGN rail where the alignment parts are located.

5

1. Using a 2.5mm Allen key, tighten the rest of screws holding the MGN rail.

6

1. Using a 2.5mm Allen key, unscrew the screws holding the alignment parts.
2. Remove the alignment parts and the DIN912 M3x20 screws from the assembly

3. Use DIN 912 M3x12 screws to fix the rail where the alignment parts were previously.

2.3 Frame left side

Necessary parts

1x Frame beam MGN Y-Axis
Previous assembled, Chapter 1.1.

1x Front pillar
Previous assembled, Chapter 1.2.

1x Alu profile
30x835mm
Same as the one in Chapter 1.2.

2x Alu profile
30x580mm

2x DIN912
M8x35
Screw

4x ISO 7380
M8x16
Screw

Result

Assembling steps

①

1. Lay the aluminium profiles on a flat surface, oriented as shown below.
2. Assemble the MGN Y-Axis frame beam with the front and back pillars by inserting its ends into the 2.5mm deep millings.
3. Pay attention to the orientation of the MGN Y-Axis frame beam relative to the front pillars.

4. Take 2x DIN912 M8x35 screws, apply a drop of Loctite 243 to the threads, and preassemble the MGN Y-Axis frame beam using a 6mm Allen key. DO NOT TIGHTEN the M8 screws yet, as some play is necessary to complete the next assembly step..

2.3 Frame left side

Assembling steps

②

1. Take 4x ISO 7380 M8x16 screws, apply a drop of Loctite 243 to the thread, and preassemble them at the ends of the 580mm aluminium profiles
2. Leave between the screw head and aluminium profile face approx.. 3mm space **(see detail C)**
3. Slide the 580mm aluminium profiles into their designated positions as shown in **detail A** and **detail B.**
4. **Now tighten all the screws holding the aluminium profiles together.**
5. Use 6mm Allen key to tighten the 2x DIN912 M8x35 screws holding the frame beam MGN for Y-Axis
6. Using a 5mm Allen key, access the screw head through the passthrough hole in the pillar and tighten the 4x ISO 7380 M8x16 screws. **(Detail A and B)**
7. Ensure that the 580mm aluminium profiles do not rotate while tightening the screws.

2.4 Frame right side

Necessary parts

1x Frame beam MGN Y-Axis
Previous assembled, Chapter 1.1.

1x Front pillar
Previous assembled, Chapter 1.2.

1x Alu profile
30x835mm
Same as the one in Chapter 1.2.

2x Alu profile
30x580mm

2x DIN912
M8x35
Screw

4x ISO 7380
M8x16
Screw

Result

Assembling steps

①

1. Lay the aluminium profiles on a flat surface, oriented as shown below.
2. Assemble the MGN Y-Axis frame beam with the front and back pillars by inserting its ends into the 2.5mm deep millings.
3. Pay attention to the orientation of the MGN Y-Axis frame beam relative to the front pillars.

4. Take 2x DIN912 M8x35 screws, apply a drop of Loctite 243 to the threads, and preassemble the MGN Y-Axis frame beam using a 6mm Allen key. DO NOT TIGHTEN the M8 screws yet, as some play is necessary to complete the next assembly step..

2.4 Frame right side

Assembling steps

②

1. Take 4x ISO 7380 M8x16 screws, apply a drop of Loctite 243 to the thread, and preassemble them at the ends of the 580mm aluminium profiles
2. Leave between the screw head and aluminium profile face approx.. 3mm space **(see detail C)**
3. Slide the 580mm aluminium profiles into their designated positions as shown in **detail A** and **detail B.**
4. Now tighten all the screws holding the aluminium profiles together.
5. Use 6mm Allen key to tighten the 2x DIN912 M8x35 screws holding the frame beam MGN for Y-Axis
6. Using a 5mm Allen key, access the screw head through the passthrough hole in the pillar and tighten the 4x ISO 7380 M8x16 screws. **(Detail A and B)**
7. Ensure that the 580mm aluminium profiles do not rotate while tightening the screws.

2.5 Frame back side

Necessary parts

1x Alu profile 30x727.5mm

1x Alu profile 30x580mm **With 2 side holes Without 2.5 deep milling**

1x Alu profile 30x580mm **With 2 side holes WITH 2.5 deep milling**

1x MGN12H Block

1x MGN12 450mm rail

7x DIN912 M3x12 Screw

2x DIN912 M8x35 Screw

7x M3 T-Nut

Result

Assembling steps

1

1. Transfer the MGN12H block from the printed part to the MGN12 rail
2. BE CAREFULL not to lose any balls from the MGN block !
3. **Add lubrication to the MGN block and ensure that they run smoothly on the rail.** For greasing use 3 in 1 Oil or something similar.

i. The MGN12 Rails may be delivered with the blocks already installed on them. In this case, the first three assembly steps are not necessary

2

1. In the first and last hole of the rail, preassemble the printed part for MGN rail alignment using DIN 912 M3x20 screws and M3 T-nuts
2. Preassemble DIN 912 M3x12 screws and M3 T-nuts with a gap of two holes in between, as shown. One gap will consist of only one hole

i. The printed part is used only for aligning the MGN rail onto the aluminium profile. After the rail is secured, the printed part will be removed, and the M3x20 screw will be replaced with an M3x12 screw.

2.5 Frame back side

Assembling steps

3

1. Place the MGN rail onto the aluminium profile, ensuring that the pass-through hole is positioned as indicated and oriented sideways as shown. **Refer also to Detail C.**
2. Place the beginning of the rail 25,5mm away from the edge of aluminium profile, as indicated.

4

1. Using a 2.5mm Allen key, tighten the screws at the ends of the MGN rail where the alignment parts are located.

5

1. Using a 2.5mm Allen key, tighten the rest of screws holding MGN rail.

6

1. Using a 2.5mm Allen key, unscrew the screws holding the alignment parts.
2. Remove the alignment parts and the DIN912 M3x20 screws from the assembly

3. Use DIN 912 M3x12 screws to fix the rail where the alignment parts were previously.

7

1. Lay the aluminium profiles on a flat surface, oriented as shown below.
2. Assemble the MGN Z-Axis frame beam with the two 580mm long aluminium profiles as shown.
3. Pay attention to the orientation and position of the 580mm profiles relative to the MGN Z-Axis frame beam:
   - The 2.5 mm milling should be positioned where the MGN rail is closer to the edge.
   - When the entire assembly is oriented as shown in the picture, the pass-through holes of both 580mm aluminium profiles must be on the left side. (Detail A and B)
4. Take 2x DIN912 M8x35 screws, apply a drop of Loctite 243 to the threads, and tighten the aluminium profile together.
5. Ensure that the 580mm aluminium profiles do not rotate while tightening the screws

2.6 Complete Frame

Necessary parts

1x Frame back side
Previous assembled, Chapter 1.5.

1x Frame left side
Previous assembled, Chapter 1.3.

1x Frame right side
Previous assembled, Chapter 1.4.

1x Alu profile 30x580mm
With 2 side holes
Without 2.5 deep milling
Same as the one in Chapter 1.5

2x Alu profile 30x580mm
Same as the ones in Chapter 1.4

2x DIN912 M8x35 Screw

8x ISO 7380 M8x16 Screw

4x Rubber foot

Result

Assembling steps

1. Take 4x ISO 7380 M8x16 screws, apply a drop of Loctite 243 to the thread, and preassemble them at the ends of the 580mm aluminium profiles
2. Leave between the screw head and aluminium profile face approx.. 3mm space **(see detail A)**

1. Lay the frame back on a flat surface as shown below.
2. Slide one of the two side frames into position as indicated.
3. Make sure the side frame is perfectly aligned with the upper aluminium profile of the back frame at its edge. See Detail B
4. Using a 5mm Allen key, access the screws head through the passthrough holes in the pillars and tighten the 4x ISO 7380 M8x16 screws. **(Detail C)**
5. **Proceed the same way with the second side frame**

2.6 Complete Frame

Assembling steps

1. Take 4x ISO 7380 M8x16 screws, apply a drop of Loctite 243 to the thread, and preassemble them at the ends of the 580mm aluminium profiles
2. Leave between the screw head and aluminium profile face approx.. 3mm space **(see detail A)**
3. Slide the upper aluminium profile frames into position as indicated.
4. Using a 5mm Allen key, access the screws head through the passthrough holes in the pillars and tighten the 4x ISO 7380 M8x16 screws
5. Ensure that the 580mm aluminium profiles do not rotate while tightening the screws
6. Proceed the same way the aluminium profile from the bottom.
7. Make sure the orientation of the aluminium profile is correct so that its hole is aligned with the hole in the profile on the back side. See Detail B

4

1. Flip the frame on one side.
2. Slide the 580mm long aluminium profile in its designated position as show.
3. Take 2x DIN912 M8x35 screws, apply a drop of Loctite 243 to the threads, and tighten the aluminium profile from both sides as shown
4. Ensure that the 580mm aluminium profile do not rotate while tightening the screws

5

1. Assemble the rubber feet

3. XY Motion system

The **Xplorer's XY motion system** is designed with modularity and simplicity at its core. Depending on your chosen configuration — **Single Extruder**, **IDEX**, **Dual Gantry**, or **IQEX** — the XY system adapts accordingly, while maintaining a consistent mechanical foundation.

- **Modular Architecture:** The same core components are used across all configurations, minimizing part variety and simplifying sourcing and assembly.
- **Scalable Design:** From a single toolhead to a quad-extruder setup, the XY motion layout remains logical and clean.
- **Easy Assembly:** Clear, intuitive layout makes the build process straightforward, even with advanced configurations.

This unified design philosophy keeps the system **easy to build, maintain, and upgrade**, no matter how advanced your setup becomes.

3.1 Joint XY-Gantry

Necessary parts

2x Carriage Y-Axis – for **Single Gantry** configuration
4x Carriage Y-Axis – for **Dual Gantry** configuration

2x Fixation X-Axis Rail – for **Single Gantry** configuration
4x Fixation X-Axis Rail – for **Dual Gantry** configuration

2x Fixation Y-Axis Belt – for **Single Gantry** configuration
4x Fixation y-Axis Belt – for **Dual Gantry** configuration

2x DIN 7991 M4x16 Screw

Result

x2 / x4

Assembling steps

①

1. Take four DIN 7991 M4x16 screws, apply a drop of Loctite 243 to the threads, and assemble the parts to form the joint for the gantry as shown using a 2.5mm Allen key,
2. Tighten the screw thoroughly.
3. For single gantry configurations, this assembly is needed twice.
4. For dual gantry configurations, this assembly is needed four times.

3.2 XY-Gantry

Necessary parts

1x Complete frame, Previous assembled Chapter 1.

2x Fixation X-Axis Rail – for **Single Gantry** configuration
4x Fixation X-Axis Rail – for **Dual Gantry** configuration
Previous assembled Chapter 2.1

1x MGN12 550mm rail – for **Single Gantry** configuration
2x MGN12 550mm rail – for **Dual Gantry** configuration

1x MGN12H Block – for **Single Extruder** configuration
2x MGN12H Block – for **Dual Extruder** configuration (IDEX or Dual Gantry)
4x MGN12H Block – for **Four Extruder** configuration (IQEX)

4x DIN912 M3x16 Screw – for **Single Gantry** configuration
8x DIN912 M3x16 Screw – for **Dual Gantry** configuration

4x DIN 6923 M3 Nut – for **Single Gantry** configuration
8x DIN 6923 M3 Nut – for **Dual Gantry** configuration

16x ISO 7380 M3x10 Screw – for **Single Gantry** configuration
32x ISO 7380 M3x10 Screw – for **Dual Gantry** configuration

Result

Single Gantry configuration

Dual Gantry configuration

Assembling steps

①

1. Transfer the MGN12H blocks from the printed part to the MGN12 rail
2. BE CAREFULL not to lose any balls from the MGN block !
3. When a single extruder is planned on the gantry, ONLY ONE MGN12H block is needed.
4. When two extruders are planned on the gantry, TWO MGN12H block are needed.
5. Add lubrication to the MGN blocks and ensure that they run smoothly on the rail. For greasing use 3 in 1 Oil or something similar.

i. The MGN12 Rails may be delivered with the blocks already installed on them. In this case, the first three assembly steps are not necessary

3.2 XY-Gantry

Assembling steps

②

1. The joint for XY-Gantry is always the same; the only thing that varies is the orientation of the bracket where the belts from the Y-axis will be attached:
   - For the FIRST GANTRY, the bracket where the belts from the Y-axis will be attached must be UNDERNEATH the aluminium profile. Make sure to rotate the X-axis fixation accordingly when installing it. – highlighted with red circles in the image.
   - For the SECOND GANTRY, the bracket where the belts from the Y-axis will be attached must be ABOVE the aluminium profile. Make sure to rotate the X-axis fixation accordingly when installing it.
2. When installing, each joint requires eight ISO 7380 M3x10 screws. Tighten them using a 2mm Allen key
3. After the joint is tightened onto the MGN blocks, make sure it runs smoothly along the rail

Assembling steps

③

1. Place the 550mm long MGN12 rail on the XY joints
2. At each end, secure the MGN12 rail with two DIN 912 M3x16 screws and two DIN 6923 M3 nuts. A 2.5mm Allen key and a 5.5mm wrench will be needed for tightening
3. A gantry on the front side of the printer is only included in dual-gantry configurations.

3.3 Y-Axis Motors

Necessary parts

2x Fixation plates for Y-Axis Motors.

2x Nema17 48mm Steppers– for **Single Gantry** configuration
4x Nema17 48mm Steppers– for **Dual Gantry** configuration

2x Antivibration Gasket– for **Single Gantry** configuration
4x Antivibration Gasket– for **Dual Gantry** configuration

2x GT2 20T 9mm Pulley– for **Single Gantry** configuration
4x GT2 20T 9mm Pulley– for **Dual Gantry** configuration

8x ISO10642 M3x10 screw– for **Single Gantry** configuration
16x ISO10642 M3x10 screw– for **Dual Gantry** configuration

Result

Assembling steps

①

1. Attach a 20-tooth GT2 pulley for a 9mm wide belt to each Nema17 stepper motor
2. There must be a 6mm gap between the GT2 pulley and the stepper flange.
3. For a single gantry configuration, assemble this setup twice. For a dual gantry configuration, assemble it four times.

x2 / x4

3.3 Y-Axis Motors

Assembling steps

②

1. An anti-vibration gasket made of silicone is placed between the stepper motors and the mounting plate.
2. Assemble the motors onto the plate using ISO10642 M3x10 screws and a 2mm Allen key.
3. Ensure the motors are positioned correctly on the plate according to the LEFT and RIGHT assembly positions on the 3D printer frame.
4. The motor cable connector should always be oriented to face the 8mm passthrough hole in the mounting plate. See Detail A

3.4 Assembling Y-Motors on the frame

Necessary parts

1x Frame with gantries
Previous assembled
Chapter 3.2

1x Y-Motor Assembly **LEFT**
1x Y-Motor Assembly **RIGHT**
Setup for **Single Gantry** Config.

1x Y-Motor Assembly **LEFT**
1x Y-Motor Assembly **RIGHT**
Setup for **Dual Gantry** Config.

4x ISO7380
M8x30

Result

Single Gantry configuration

Dual Gantry configuration

Assembling steps

①

1. Place each Y motor assembly in its corresponding position on the 3D printer frame.
2. When building a single gantry configuration, the Y motors must be positioned below the beam for the MGN Y-axis. Refer to the picture below for details.
3. Tighten the Y motor assemblies in place as shown using DIN912 M8x35 screws. A 6mm Allen key is required for tightening.

3.5 Tensioner Y-Axis Belt

Necessary parts

2x Y Axis belt tensioner– for **Single Gantry** configuration
4x Y Axis belt tensioner– for **Dual Gantry** configuration

2x GT2 20 teeth 9mm idler– for **Single Gantry** configuration
4x GT2 20 teeth 9mm idler– for **Dual Gantry** configuration

2x ISO 7380 M5x25 Screw – for **Single Gantry** configuration
4x ISO 7380 M5x25 Screw – for **Dual Gantry** configuration

Result

x1 / x2

A

x1 / x2

B

Assembling steps

1

1. Install a 20-tooth GT2 idler for a 9mm wide belt on each Y-Axis tensioner.
2. The GT2 idler is secured with an ISO 7380 M5x25mm screw, which can be tightened using a 3mm Allen key.
3. The screw head must always be oriented toward the inside of the printer, which is why two assembly versions, A and B, are needed.(Details also on the next age)
4. For a single gantry configuration, each assembly variant (A and B) only needs to be done once.
5. For a dual gantry configuration, each assembly variant (A and B) needs to be done twice.

A

B

3.6 Tensioner Y-Axis Belt on the frame

Necessary parts

1x Assembly progress up to Chapter 3.4

1x Tensioner Y-Axis belt A– for **Single Gantry** configuration
2x Tensioner Y-Axis belt A– for **Dual Gantry** configuration

1x Tensioner Y-Axis belt B– for **Single Gantry** configuration
2x Tensioner Y-Axis belt B– for **Dual Gantry** configuration

2x ISO 7380 M4x30 Screw – for **Single Gantry** configuration
4x ISO 7380 M4x30 Screw – for **Dual Gantry** configuration

Result

Assembling steps

①

1. Use an ISO 7380 M4x30 screw to secure each Y-belt tensioner to the printer frame.
2. Ensure that assembly variants A and B are placed in their correct positions. Refer to the picture below.
3. DO NOT FULLY TIGHTEN the M4x30 screw; leave it loose so that a 5mm gap remains between the tensioner and the frame. See Detail A

3.7 Y-Axis Belts

Necessary parts

1x Assembly progress up to Chapter 3.6

4x 3d printed part *'02_49__XP__Fix_GT2_Y_Axis___V#.#'*– for **Single Gantry** configuration
8x 3d printed part *'02_49__XP__Fix_GT2_Y_Axis___V#.#'*– for **Dual Gantry** configuration

1x 3d printed part *'02_50__XP__Y-Axis_Limiter___V#.#'*– for **Single Gantry** configuration
2x 3d printed part *'02_50__XP__Y-Axis_Limiter___V#.#'*– for **Dual Gantry** configuration

2x ~116cm GT2x9mm belt- for **Single Gantry** configuration
4x ~116cm GT2x9mm belt- for **Dual Gantry** configuration

8x ISO 7380 M3x12 Screw – for **Single Gantry** configuration
16x ISO 7380 M3x12 Screw – for **Dual Gantry** configuration

Result

Assembling steps

①

1. Thread the 9mm GT2 belts over the idler and the Y motor pulley.
2. Bring the belt ends to the position of the gantry.
3. Repeat this process on both sides of the printer.
4. The belt on the upper side is only present on dual gantry configurations.

3.7 Y-Axis Belts

Assembling steps

②

1. At the ends of the GT2 belts attach the 3d printed part meant to fixate the belt end on the gantry joint.
2. Ensure the belt fixations are oriented correctly; the 'UP' mark should always be on the same side as the screw head
3. On the left side of the printer, the Y-axis motion limiters are assembled together with the Y-axis belt fixations. See the pictures bellow for details.
4. Secure one end of the belt to the gantry and only pre-install the other end.
5. Using pliers, pull the loose end of the belt until it is pretensioned.
6. Now tighten the remaining screws as well. A 2mm Allen key is required for this.
7. By gradually tightening the screws holding the belt tensioners, the Y-belts can be tightened to the required tension. See Detail A
8. All Y-belts must be tensioned evenly, and be careful not to over-tighten them.

3.8 Endstops Y-Axis

Necessary parts

1x Optical sensor– for **Single Gantry** configuration
2x Optical sensor'– for **Dual Gantry** configuration

1x 3d printed part *'02_05__XP__Bracket_B_Optical_Sensor_Y_Axis___V#.#'* - ONLY for **Dual Gantry** configuration

1x 3d printed part *'02_04__XP__Bracket_A_Optical_Sensor_Y_Axis___V#.#'*

2x Self-tapping screw 10mm – for **Single Gantry** configuration
4x ISO 7380 M3x12 Screw – for **Dual Gantry** configuration

1x ISO 7380 M5x10 Screw – for **Single Gantry** configuration
2x ISO 7380 M5x10 Screw – for **Dual Gantry** configuration

1x M5 T-Nut – for **Single Gantry** configuration
2x M5 T-Nut – for **Dual Gantry** configuration

Result

Assembling steps

①

1. Assemble the optical sensor onto the plastic part using two ST2.9x9.5mm screws. A T10 Torx driver is needed to tighten the screws.
2. Pre-assemble the M5x10 screw with the M5 T-nut as shown..

Installed only in dual gantry configurations.

3.8 Endstops Y-Axis

Assembling steps

②

1. For the optical sensor on the back side of the printer, insert the T-nut into the channel of the aluminium profile, then push the bracket upwards until it stops at the flange of the Y-Axis motors.
2. Tighten the M5 screw using a 3mm Allen key
3. For the optical sensor on the front side of the printer, insert the T-nut into the channel of the aluminium profile, then push the bracket downwards until it stops at the Y-axis belt tensioner. This sensor is installed only for DUAL Gantry configurations
4. Tighten the M5 screw using a 3mm Allen key

3.9 Oozing blockers

Necessary parts

1x Assembly progress up to Chapter 3.8

1x Anti-oozing fixation– **for single extrusion**
2x Anti-oozing fixation– **for dual extrusion**
4x Anti-oozing fixation– **for 4 extruder config**

1x 3d printed part *'02_02__XP__Fix_Wipe_Plate_Nozzle_Left__V#.#'* – **for IDEX**
2x 3d printed part *'02_02__XP__Fix_Wipe_Plate_Nozzle_Left__V#.#'* – **for IQEX**

1x 3d printed part *'02_03__IQEX__Fix_Wipe_Plate_Nozzle_Right__V#.#'*– **for single extr & dual gantry**
2x 3d printed part *'02_03__IQEX__Fix_Wipe_Plate_Nozzle_Right__V#.#'* – **for IQEX**

1x ISO 7380 M4x10 – **for single extrusion**
2x ISO 7380 M4x10 – **for dual extrusion**
4x ISO 7380 M4x10 – for **4 extruder config**

2x ISO 14585C ST2.9x9,5 – **for single extrusion**
4x ISO 14585C ST2.9x9,5 – **for dual extrusion**
8x ISO 14585C ST2.9x9,5 – for **4 extruder config**

1x Silicone pillow– **for single extrusion**
2x Silicone pillow– **for dual extrusion**
4x Silicone pillow– for **4 extruder config**

Result

Assembling steps

1. Assemble the 3D-printed part with the silicone pillow onto the sheet metal part using self-tapping screws.
2. Ensure proper positioning of the 3D-printed part ..

3.10 Oozing blockers

Assembling steps

②

1. Use an ISO 7380 M4x10 screw to attach the anti-oozing fixation joint to the gantry. A 2.5mm Allen key is required to tighten the screw.
2. This assembly of the anti-oozing blocker must be completed for each extruder on the printer.

3.11 X-Axis Limiters

Necessary parts

1x Assembly progress up to Chapter 3.10

1x 3d printed part '*02_01__XP__Limiter_X_Axis___V#.#'*– **for single extrusion**
2x 3d printed part '*02_01__XP__Limiter_X_Axis___V#.#'*— **for dual extrusion**
4x 3d printed part '*02_01__XP__Limiter_X_Axis___V#.#'*– for **4 extruder config**

1x ISO 7380 M3x10 screw – **for single extrusion**
2x ISO 7380 M3x10 screw — **for dual extrusion**
4x ISO 7380 M3x10 screw – for **4 extruder config**

Result

Assembling steps

①

1. Use an ISO 7380 M3x10 screw to attach the X-Axis limiter to the gantry joint. A 2mm Allen key will be needed to tighten the screw
2. This assembly of X-Axis limiter must be completed for each extruder on the printer. To view all the positions where the X-Axis limiter can be installed, refer to the pictures below.

3.12 X-Axis Carriage

Necessary parts

1x Assembly progress up to Chapter 3.11

1x Hotend fixation, Motor bracket, Nema14 Motor, GT2 16T 6mm Pulley, Hotend – **for single extrusion**
2x Hotend fixation, Motor bracket, Nema14 Motor, GT2 16T 6mm Pulley, Hotend — **for dual extrusion**
4x Hotend fixation, Motor bracket, Nema14 Motor, GT2 16T 6mm Pulley, Hotend – for **4 extruder config**

2x GT2 16T 6mm idler, ISO10642 M3x20 – **for single extrusion**
4x GT2 16T 6mm idler, ISO10642 M3x20 — **for dual extrusion**
8x GT2 16T 6mm idler, ISO10642 M3x20 – for **4 extruder config**

6x ISO10642 M3x12 – **for single extrusion**
12x ISO10642 M3x12 — **for dual extrusion**
24x ISO10642 M3x12 – for **4 extruder config**

4x DIN912 M2.5x8 screw – **for single extrusion**
8x DIN912 M2.5x8 screw — **for dual extrusion**
16x DIN912 M2.5x8 screw – for **4 extruder config**

Result

Assembling steps

① **x1 / x2 / x4**

1. It is critical to correctly orient the screw holding the nozzle-heater assembly in place! When assembling the hot end, position it in front of the fixation plate, as shown in the images below.
2. The wires from the hot end should be directed toward the back of the fixation.
3. Secure the hot end in place using DIN912 M2.5x8 screws and a 2mm Allen key.
4. Insert a 23mm PTFE tube into the hot end.
5. Repeat this assembly for each extruder to be installed on the printer.

3.12 X-Axis Carriage

Assembling steps

②

1. Use ISO 10642 M3x12 screws to secure the aluminium part that holds the hotend onto the MGN12 carriage. A 2mm Allen key is required.
2. The hotend is always positioned on the same side as the oozing blockers. In a dual gantry configuration, the hotends from each gantry face each other. See the pictures below.

③

x1 / x2 / x4

1. Attach a 16-tooth GT2 pulley for a 6mm wide belt to the Nema14 stepper motor
2. There must be a 2mm gap between the GT2 pulley and the stepper flange.
3. Repeat this assembly for each extruder to be installed on the printer.

④

x1 / x2 / x4

1. Attach the NEMA 14 motor to the aluminum bracket using ISO10642 M3x12 screws.
2. Ensure the motor wires are facing backward from the bracket.
3. A 2mm Allen key is required.
4. Repeat this assembly for each extruder to be installed on the printer.

⑤

1. Use ISO 10642 M3x12 screws to secure the aluminium part that holds the motor onto the MGN12 carriage. A 2mm Allen key is required.
2. Repeat this assembly for each extruder to be installed on the printer.

3.13 Endstops X-Axis

Necessary parts

1x Assembly progress up to Chapter 3.12

1x Optical sensor– **for single extrusion**
2x Optical sensor— **for dual extrusion**
4x Optical sensor– for **4 extruder config**

2x ISO 7380 M3x8 screw – **for single extrusion**
4x ISO 7380 M3x8 screw — **for dual extrusion**
8x ISO 7380 M3x8 screw – for **4 extruder config**

Result

Assembling steps

1

1. Attach the optical sensor the X-Axis carriage using ISO 7380 M3x8 screws. A 2mm Allen key will be needed to tighten the screw
2. Ensure that the sensor always faces the axis limiter.
3. Repeat this assembly for each extruder to be installed on the printer.

3.14 X-Axis Belts

Necessary parts

1x Assembly progress up to Chapter 3.13

2x 3d printed part
'02_06__XP__Fixation_GT2_X_Axis___V#.#'– **for single Gantry**
4x '02_06__XP__Fixation_GT2_X_Axis___V#.#'– **for dual Gantry**

4x DIN912 M3x12 Screw – **for single Gantry**
8x DIN912 M3x12 Screw – **for dual Gantry**

2x ISO7380 M3x12 Screw & M3x6 Screw – **for single Gantry**
4x ISO7380 M3x12 Screw & M3x6 Screw – **for dual Gantry**

1x ~60cm GT2x6mm belt- for **Single Gantry** configuration
2x ~60cm GT2x6mm belt- for **Dual Gantry** configuration

2x GT2 16T 6mm idler, ISO10642 M3x20 – **for single extrusion**
4x GT2 16T 6mm idler, ISO10642 M3x20 — **for dual extrusion**
8x GT2 16T 6mm idler, ISO10642 M3x20 – for **4 extruder config**

Result

Assembling steps

①

1. Thread the 6mm GT2 belts over the X motor pulley.
2. Place the GT2 idlers in their designated positions as shown, ensuring that the belt runs over the idlers and motor pulley as indicated.(FIRST PUT THE BELT IN PLACE !)
3. Fixate the GT2 idlers with ISO10642 M3x20 screws
4. If there are two print heads on the gantry, follow the same process for the second print head.
5. Repeat he steps above on the second gantry if you are building a printer with dual gantries.

3.14 X-Axis Belts

Assembling steps

②

1. Fold the end of the belt and insert it into the printed part until it reaches the opposite side
2. Secure the belt in the printed part using an ISO 7380 M3x12 screw as shown. A 2mm Allen key is required.
3. Attach the end of the belt to the gantry joint with DIN 912 M3x12 screws, as shown in Detail C. A 2.5mm Allen key is required.
4. Tighten the DIN 912 M3x12 screws until there is approximately a 5mm gap between the printed part and the gantry joint, as shown in Detail A.
5. Finally, tighten the securing ISO 7380 M3x6 screw.
6. At the other end, repeat the same process as in Step 1, ensuring that the resulting belt length allows for a gap of approximately 5mm to the gantry joint (see Detail A), then proceed with Step 2.
7. Attach the belt to the gantry as described in Step 3 and tighten the DIN 912 M3x12 screws until the belt is properly tensioned.
8. Tighten the securing ISO 7380 M3x6 screw (same as was done in Step 5)
9. Cut the excess length of the belt coming out of the printed part, leaving some extra length (see Detail B). This reserve length is useful when adding a second print head to the gantry

⑥

3.15 Toolboard

Necessary parts

1x Assembly progress up to Chapter 3.14

1x 3d printed part '*02_07__XP__Fix_EBB36___V#.#*'– **for single extrusion**
2x 3d printed part '*02_07__XP__Fix_EBB36___V#.#*'– **for dual extrusion**
4x 3d printed part '*02_07__XP__Fix_EBB36___V#.#*'– for **4 extruder config**

1x BigTreeTech EBB36 Toolboard– **for single extrusion**
2x BigTreeTech EBB36 Toolboard– **for dual extrusion**
4x BigTreeTech EBB36 Toolboard– for **4 extruder config**

2x ISO 14585C ST2.9x9,5 & ISO 7380 M3x8 screw – **for single extrusion**
4x ISO 14585C ST2.9x9,5 & ISO 7380 M3x8 screw – **for dual extrusion**
8x ISO 14585C ST2.9x9,5 & ISO 7380 M3x8 screw – for **4 extruder config**

Result

Assembling steps

① **x1 / x2 / x4**

1. Using Self-tapping screw 10mms fixate the EBB36 toolboard to the 3d printed part . A T10 Torx driver is required to tighten the ST2.9x9 screws.
2. If it is not already attached, make sure to install the aluminum radiator onto the chip for the stepper motor.
3. Repeat this assembly for each extruder to be installed on the printer.

3.15 Toolboard

Assembling steps

②

1. Before attaching the toolboard to the X-axis carriage, connect the wires from the hotend heater as shown in Detail A. It is much easier to connect these wires now than it would be after installing the toolboard onto the carriage.
2. Attach the toolboard to the X-axis carriage using ISO 7380 M3x8 screws. A 2mm Allen key is required.
3. Connect the wires from the thermistor and optical sensor to the EBB board as indicated.
4. Connect the indicated ground pin from the EBB board to the toolboard carriage. Use an ISO 7380 M3x8 screw to secure it in one of an available hole that is for the optical sensor mounting on the opposite side.
5. Bundle all the wires together, including those from the X-motor, and secure them with a cable tie as shown.
6. Repeat the previous steps for each extruder to be installed on the printer.

3.16 Extruders

Necessary parts

1x Assembly progress up to Chapter 3.15

1x Orbiter2 & SmartSensor combo– **for single extrusion**
2x Orbiter2 & SmartSensor combo– **for dual extrusion**
4x Orbiter2 & SmartSensor combo– for **4 extruder config**

2x ISO 7380 M3x8 screw – **for single extrusion**
4x ISO 7380 M3x8 screw – **for dual extrusion**
8x ISO 7380 M3x8 screw – for **4 extruder config**

Result

Assembling steps

1

x1 / x2 / x4

1. If the Smart Sensor is not already installed on top of the extruder, install it first.
2. Loosen the screws holding the motor until their ends are aligned with the motor flange.
3. Slide the Smart Sensor into place.
4. Retighten the screws holding the motor.
5. Secure the Smart Sensor with M3 washers and M3 nuts as shown below. A 5.5mm wrench is needed for tightening the M3 nuts.
6. The M3 nuts and washers are included in the sensor package.
7. The tip of the filament guide underneath should be as close as possible to the extruder wheel (see Detail B).
8. Adjust the gap by tightening the guide from below, as shown in Detail A.
9. Repeat this assembly steps for each extruder to be installed on the printer.

Assembling steps

②

x1 / x2 / x4

1. Install the extruder and Smart Sensor combo onto the X-axis carriage using ISO 7380 M3x8 screws. A 2mm Allen key is required
2. Connect the wires from the extruder and Smart Sensor to the EBB board as indicated.
3. The connector on the EBB is not keyed, so the connector from the Smart Sensor can be plugged in either direction. MAKE SURE to orient the Smart Sensor connector correctly. Connecting it the other way around can damage the sensor. Refer to the picture below for proper orientation.
4. Repeat this assembly steps for each extruder to be installed on the printer.

https://www.orbiterprojects.com/smart-sensor-for-orbiter-v2/

3.17 Printhead fans

Necessary parts

1x Assembly progress up to Chapter 3.16

1x bed levelling probe

1x 3d printed part *'02_39__XP__PHead_E0_Fan_Duct___V#.#'*

2x M3 Brass insert

1x 3d printed part *'02_40__XP__PHead_Ex_Fan_Duct___V#.#'* - **for dual extrusion**
3x 3d printed part *'02_40__XP__PHead_Ex_Fan_Duct___V#.#'* - **for 4 extruder config**

1x Fan 10x40mm– **for single extrusion**
2x Fan 10x40mm– **for dual extrusion**
4x Fan 10x40mm– for **4 extruder config**

2x Blower 10x40mm & LEDs – **for single extrusion**
4x Blower 10x40mm & LEDs – **for dual extrusion**
8x Blower 10x40mm & LEDs – for **4 extruder config**

6x Self-tapping screw 10mm – **for single extrusion**
12x Self-tapping screw 10mm – **for dual extrusion**
24x Self-tapping screw 10mm – for **4 extruder config**

4x ISO 7380 M3x8 screw – **for single extrusion**
8x & ISO 7380 M3x8 screw – **for dual extrusion**
16x ISO 7380 M3x8 screw – for **4 extruder config**

4x ISO 14585C ST2.9x16 screw – **for single extrusion**
8x ISO 14585C ST2.9x16 screw – **for dual extrusion**
16x ISO 14585C ST2.9x16 screw – for **4 extruder config**

Result

Assembling steps

①

1. Install the brass inserts by heating them and pressing them into their designated holes. Using a soldering iron is an effective way to accomplish this.
2. Preinstall the ISO7380 M3x8 screws
3. Insert the bed levelling probe into its designated place.
4. Position the tip of the probe 13mm from the edge of the mount, as shown in Detail A.
5. Tighten the ISO7380 M3x8 screws
6. These assembly steps are only necessary for Tool 0, as the other printheads do not have a levelling probe.

3.17 Printhead fans

Assembling steps

⚠ For Tools 1, 2, and 3, use the 3D-printed part without fixation for the probe: 02_40_XP_PHead_Ex_Fan_Duct_V#.#

②

x1 / x2 / x4

1. Install the LEDs into the holes as shown in the pictures below.
2. Route the wires from the LEDs sideways and secure them together with a cable tie, as shown in the picture below.
3. Repeat this assembly steps for each extruder to be installed on the printer.

③

x1 / x2 / x4

1. Using ISO 14585C ST2.9x16 screws fixate the 40x10mm fan to the 3d printed part . A T10 Torx driver is required to tighten the ST2.9x16 screws.
2. Route the wires from the fan through the channel on the 3D-printed part, as indicated.
3. Repeat this assembly for each extruder to be installed on the printer.

④

x1 / x2 / x4

1. Route the wires from the blower through the channel on the 3D-printed part parallel to the one from the fan in the front, as indicated.
2. Using Self-tapping screw 10mms fixate the 40x10mm blower to the 3d printed part . A T10 Torx driver is required to tighten the ST2.9x9.5 screws.
3. MAKE SURE nut to pinch the wires when assembling the blower
4. Repeat this assembly for each extruder to be installed on the printer.

⑤

x1 / x2 / x4

1. Place the ISO7380 M3x8 screws inside the holes, they will be tighten in the next assembly step
2. Using Self-tapping screw 10mms fixate the 40x10mm blower to the 3d printed part . A T10 Torx driver is required to tighten the ST2.9x9.5 screws.
3. Repeat this assembly for each extruder to be installed on the printer.

3.17 Printhead fans

Assembling steps

⑥ x1 / x2 / x4

1. Attach the fan assembly group to the X-axis carriage.
2. Tighten the ISO 7380 M3x8 screws using a 2mm Allen key
3. Repeat this assembly for each extruder to be installed on the printer.

⑦ x1 / x2 / x4

1. Connect the wires from the fans, LEDs, fan and blower to the EBB board as indicated.
2. The connector on the EBB is not keyed, so the connector from the Bed Probe can be plugged in either direction. MAKE SURE to orient the Bed Probe connector correctly. Connecting it the other way around can damage the bed probe. Refer to the attached picture for proper orientation.
3. Secure the wires coming from the left side of the tool head with a cable tie to the printed part holding the tool board. See Detail A
4. Bundle together the wires coming from the hotend with a cable. See Detail B.
5. MAKE SURE that the wires from the blower on the left side of the tool head do not come into contact with the MGN rail.
6. Repeat this assembly steps for each extruder to be installed on the printer.

4. Z Axis

The **Xplorer's Z-axis** is engineered for speed, precision, and reliability — using a **belted motion system** instead of traditional lead screws, eliminating artifacts commonly associated with screw-driven setups (like Z-banding or wobble).

Key Features:

- **Three Independently Driven Z Motors:** Enables automatic bed tilt adjustment and allows for future implementation of **non-planar printing** techniques.
- **Belted Z Drive:** Fast, quiet, and clean — with no backlash or screw-induced artifacts. Delivers smooth vertical motion and consistent layer stacking.
- **Z-Max Homing:** The Z-axis homes at the **bottom of the printer**, making it ideal for recovery scenarios. In the event of a power failure or print interruption, all three axes can be safely re-homed before resuming the print — fully compatible with potential **printer recovery** features in Klipper.

4.1 Z-Axis Motors right

Necessary parts

1x Z-Motor module right

1x fixation plate front for Z-Motors

4x ISO7380 M4x10 screw

4x ISO7380 M5x10 screw

4x DIN985 M4 nut

4x M5 T-Nut

Result

Assembling steps

1

1. Take the Z-axis motor module for the RIGHT side out of the package. Make sure you select the correct one, as the left and right modules are built mirrored. Refer to Detail A.
2. Make sure that the fixation plate is oriented correctly relative to the motor module
3. Using ISO7380 M4x10 screws and M4 nuts, fixate the z-motor module onto the fixation plate as shown. A 2.5mm Allen key and a 7mm wrench will be need for tightening the screws.
4. Loosen the screws holding the GT2 pulley for the Z-axis belt. These screws will be tightened again after the belt is properly tensioned. See detail B.
5. Preassemble the ISO7380 M5x10 screws and M5 t-nuts

4.2 Z-Axis Motor left

Necessary parts

1x Z-Motor module left

1x fixation plate front for Z-Motors

4x ISO7380 M4x10 screw

4x ISO7380 M5x10 screw

4x DIN985 M4 nut

4x M5 T-Nut

Result

Assembling steps

①

1. Take the Z-axis motor module for the LEFT side out of the package. Make sure you select the correct one, as the left and right modules are built mirrored. Refer to Detail A.
2. Make sure that the fixation plate is oriented correctly relative to the motor module
3. Using ISO7380 M4x10 screws and M4 nuts, fixate the z-motor module onto the fixation plate as shown. A 2.5mm Allen key and a 7mm wrench will be need for tightening the screws.
4. Loosen the screws holding the GT2 pulley for the Z-axis belt. These screws will be tightened again after the belt is properly tensioned. See detail B.
5. Preassemble the ISO7380 M5x10 screws and M5 t-nuts

4.3 Z-Axis Motor back

Necessary parts

1x Z-Motor module left

1x fixation plate back for Z-Motor

4x ISO7380 M4x10 screw

4x ISO7380 M5x10 screw

4x DIN985 M4 nut

4x M5 T-Nut

Result

Assembling steps

1

1. Take the Z-axis motor module for the LEFT side out of the package (for the back side, a left-side motor module is also used). Make sure you select the correct one, as the left and right modules are built mirrored. Refer to Detail A.
2. Make sure that the fixation plate is oriented correctly relative to the motor module
3. Using ISO7380 M4x10 screws and M4 nuts, fixate the z-motor module onto the fixation plate as shown. A 2.5mm Allen key and a 7mm wrench will be need for tightening the screws.
4. Loosen the screws holding the GT2 pulley for the Z-axis belt. These screws will be tightened again after the belt is properly tensioned. See detail B.
5. Preassemble the ISO7380 M5x10 screws and M5 t-nuts

4.4 Z-Axis Motors on frame

Necessary parts

1x Assembly progress up to Chapter 3.17

1x Z-axis motor module RIGHT assembled in Chapter 4.1

1x Z-axis motor module LEFT assembled in Chapter 4.2

1x Z-axis motor module BACK assembled in Chapter 4.3

Result

Assembling steps

1

1. Take the previously assembled Z-axis motor modules and place each in its designated position on the printer frame as shown in the pictures bellow.
2. Push the aluminum plate against the pillars as indicated in Details A, B, and C.
3. Tighten the ISO7380 M5x10 screws using a 3mm Allen key.

4.6 Bed arms

Necessary parts

1x Assembly progress up to Chapter 4.5

1x Bed arm RIGHT

1x Bed arm LEFT

24x ISO7380 M3x5 screw

1x Bed arm Back

12x M3 Brass insert

3x Spherical bearing G5C

3x 3d printed part *'02_41__XP__Fix_Bearing_GE5C___V#.#'*

3x 3d printed part *'02_36__XP__Z_Axis_Endstop_Limiter___V#.#'*

Result

Assembling steps

1

1. Install the brass inserts by heating them and pressing them into their designated holes. Using a soldering iron is an effective way to accomplish this.
2. Insert the spherical bearing into the 3D-printed part.
3. Attach the 3D-printed part with the spherical bearing inside to the edge of the bed arm using two ISO 7380 M3x5 screws, tightening them with a 2mm Allen key.
4. For all three bed arms, assemble the bearing cage in the same way.

4.6 Bed arms

Assembling steps

②

1. Use four ISO 7380 M3x5 screws to attach the arm to the MGN12H carriage on the right front pillar.
2. A 2mm Allen key will be needed to tighten the screws

③

1. Use four ISO 7380 M3x5 screws to attach the arm to the MGN12H carriage on the left front pillar.
2. A 2mm Allen key will be needed to tighten the screws

④

1. Use four ISO 7380 M3x5 screws to attach the arm to the MGN12H carriage on the back pillar.
2. A 2mm Allen key will be needed to tighten the screws.
3. Reaching these screws is considerably more difficult compared to the front bed arms.

Assembling steps

5

1. Install the brass inserts by heating them and pressing them into their designated holes. Using a soldering iron is an effective way to accomplish this.

6

1. Use two ISO 7380 M3x5 screws to attach the 3d printed part to the left bed arm
2. A 2mm Allen key will be needed to tighten the screws.

7

1. Use two ISO 7380 M3x5 screws to attach the 3d printed part to the right bed arm
2. A 2mm Allen key will be needed to tighten the screws.

8

1. Use two ISO 7380 M3x5 screws to attach the 3d printed part to the back bed arm
2. A 2mm Allen key will be needed to tighten the screws.

4.7 Z-Axis Belt idlers

Necessary parts

1x Assembly progress up to Chapter 4.6

2x Fixation Z Belt idler front

2x Idler cage

2x Fixation Z Belt idler back

4x Spacer

3x GT2 20 teeth 9mm idler

4x ISO7380 M5x10 screw

4x M5 T-Nut

4x ISO7380 M5x16 screw

2x ISO7380 M5x35 screw

2x ISO7380 M8x30 screw

4x Washer 5x8x1mm

1x ISO7380 M5x40 screw

1x ISO7380 M8x40 screw

1x DIN985 M8 Nut

1x DIN985 M5 Nut

Result

Assembling steps

①

1. Insert the ISO7380 M3x35mm screw into the cage, and on the other side, place the GT2 idler, washers, and spacer onto the screw.
2. Fixate the idler cage with two ISO7380 M3x16mm and the ISO7380 M3x35mm . A 3mm Allen key is necessary.
3. Preassemble the ISO7380 M3x10mm screw and M5-Nut as shown.
4. The left and right sides are assembled using the same components; only the assembly side differs. Refer to the attached images for details.

4.7 Z-Axis Belt idlers

Assembling steps

②

1. Take the previously assembled idlers and attach each to its corresponding side of the printer with an ISO 7380 M8x30 screw. Use a 5mm Allen key to tighten this screw.
2. Also, use a 3mm Allen key to tighten the M5 screw from below.

③

1. On both Z-axis idler mounts at the back, preassemble an ISO 7380 M5x10 screw with an M5 T-nut.
2. Secure one of the mounts onto the pillar. Tighten it on the upper side with an ISO 7380 M8x40 screw, and below, tighten the previously preassembled M5 screw and T-nut. A 5mm and a 3mm Allen key are needed.
3. Insert an ISO 7380 M5x40 screw into the front hole, and on the other side, stack the spacers and the GT2 20-tooth 9mm idler in the specified order.
4. Close the assembly with the second idler mount. On the upper side, tighten it with a DIN 985 M8 nut, and below, tighten the previously preassembled M5 screw and T-nut. On the front side, secure the assembly with a DIN 985 M5 nut. Wrenches will be needed to tighten the DIN 985 nuts.

4.8 Z-Axis Belts

Necessary parts

1x Assembly progress up to Chapter 4.7

2x 3d printed part *'02_38__XP__Tensioner_GT2_Z_Axis_back___V#.#'*

4x 3d printed part *'02_37__XP__Tensioner_GT2_Z_Axis___V#.#'*

6x DIN912 M3x25mm screw

6x DIN912 M3x16mm screw

6x DIN912 M3x12 Screw

2x ISO 7380 M3x8 screw

18x M3 Brass insert

4x DIN912 M3x8 Screw

3x ~111cm GT2x9mm belt

Result

Assembling steps

1

1. On all three pillars, the Z-axis belt must be threaded in the same way:
   1) Start from below the bed arm.
   2) Thread it through the hole in the bed arm.
   3) Go over the GT2 idler and then back down.
   4) Pass it downwards through the bed arm again.
   5) Thread the belt through the hole in the fixation plate for the Z-motors.
   6) Go over the GT2 pulley and back upwards.
   7) Thread the belt through the hole in the fixation plate for the Z-motors back into the printer chamber.
   8) Pull the belt until it reaches the bed arm.
2. For the front bed arms, the open end of the belt should be on the front side, while for the back bed arm, the open end should be on the back side.

4.8 Z-Axis Belts

Assembling steps

②

1. 3D-printed parts will be assembled at the ends of the 9mm belts to serve as fixation and tensioners.
2. Take the 3D-printed part designated for the front bed arms and install four M3 inserts as shown.
3. Install the brass inserts by heating them and pressing them into their designated holes. Using a soldering iron is an effective way to accomplish this.
4. Fold end 'a' of the belt (refer to the previous page to identify end 'a') and insert it into the 3D-printed part.
5. Push the folded belt until it comes out on the other side and reaches the indicated edges.
6. Insert a DIN 912 M3x16mm screw from the side to secure the belt in place.
7. Preassemble two M3x25mm screws, tightening them only until they reach the other side of the 3D-printed part, as shown in the marking in the picture below.
8. Repeat the same assembly steps for both front bed arms.

③

1. Pull the belt upwards until the folded end 'a' with the 3D-printed part on it reaches the inside of the front bed arm.
2. Secure the 3D-printed part using DIN 912 M3x12mm screws from the front; a 2.5mm Allen key will be needed. When tightening the belt, these screws must first be loosened.
3. The same assembly steps should be completed for the other side of the printer (only the right side is represented in the pictures below).

4.8 Z-Axis Belts

Assembling steps

4

1. 3D-printed parts will be assembled at the ends of the 9mm belts to serve as fixation.
2. Take the 3D-printed part designated for the front bed arms and install two M3 inserts as shown.
3. Install the brass inserts by heating them and pressing them into their designated holes. Using a soldering iron is an effective way to accomplish this.
4. Fold end 'b' of the belt.
5. Make the fold as close as possible to the final belt length. The fold should be approximately 13mm away from the holes in the bed arm where the fixation will be applied.
6. Insert the folded belt it into the 3D-printed part and push it until it comes out on the other side and reaches the indicated edges.
7. Insert a DIN 912 M3x16mm screw from the side to secure the belt in place..
8. Repeat the same assembly steps for both front bed arms.

5

1. Pull the belt upwards until the folded end 'b' with the 3D-printed part on it reaches the inside of the front bed arm.
2. Secure the 3D-printed part using DIN 912 M3x12mm and DIN 912 M3x25mm screws from the front; a 2.5mm Allen key will be needed.
3. If the belt is too loose, then loosen the screws holding end 'a.'
4. Gradually and symmetrically tighten the DIN 912 M3x25mm screws from below until the belt is properly tensioned. DO NOT OVERTIGHTEN the belt. Then, retighten the screws holding end 'a.'
5. The same assembly steps should be completed for the other side of the printer (only the right side is represented in the pictures below)

Assembling steps

⑥

1. 3D-printed parts will be assembled at the ends of the 9mm belts to serve as fixation and tensioners.
2. Take the 3D-printed part designated for the front bed arms and install four M3 inserts as shown.
3. Install the brass inserts by heating them and pressing them into their designated holes. Using a soldering iron is an effective way to accomplish this.
4. Fold end 'a' of the belt (refer to the previous page to identify end 'a') and insert it into the 3D-printed part.
5. Push the folded belt until it comes out on the other side and reaches the indicated edges.
6. Insert a DIN 912 M3x16mm screw from the side to secure the belt in place.
7. Preassemble two M3x25mm screws, tightening them only until they reach the other side of the 3D-printed part, as shown in the marking in the picture below.

⑦

1. Pull the belt upwards until the folded end 'a' with the 3D-printed part on it reaches the inside of the back bed arm.
2. Secure the 3D-printed part using DIN 912 M3x8mm screws from the sides, a 2.5mm Allen key will be needed. When tightening the belt, these screws must first be loosened.

4.8 Z-Axis Belts

Assembling steps

8

1. 3D-printed parts will be assembled at the ends of the 9mm belts to serve as fixation.
2. Take the 3D-printed part designated for the front bed arms and install two M3 inserts as **Fold end 'b' of the belt.** shown.
3. Install the brass inserts by heating them and pressing them into their designated holes. Using a soldering iron is an effective way to accomplish this.
4. Make the fold as close as possible to the final belt length. The fold should be approximately 13mm away from the hole in the bed arm where the fixation will be applied.
5. Insert the folded belt it into the 3D-printed part and push it until it comes out on the other side and reaches the indicated edges.
6. Insert a DIN 912 M3x16mm screw from the side to secure the belt in place..

9

1. Pull the belt upwards until the folded end 'b' with the 3D-printed part on it reaches the inside of the back bed arm.
2. Secure the 3D-printed part using DIN 912 M3x8mm screws from the sides; a 2.5mm Allen key will be needed.
3. If the belt is too loose, then loosen the screws holding end 'a.'
4. Gradually and symmetrically tighten the DIN 912 M3x25mm screws from below until the belt is properly tensioned. DO NOT OVERTIGHTEN the belt. Then, retighten the screws holding end 'a.'

4.8 Z-Axis Belts

Assembling steps

10

1. Flip the printer onto one side.
2. Go to one of the Z-motors and turn the GT2 pulley and the large GT2 wheel until the flat surface of the D-shaft is positioned beneath one of the screws on the GT2 pulley for the Z-axis belt.
3. Tighten both screws securing the GT2 pulleys on the Z-axis belt.
4. Repeat this process for the remaining two Z-motors.

5. Panels

The **Xplorer** features a clean and functional enclosure system, designed to be both **easy to assemble** and visually distinctive.

- **Simple Installation:** All panels are designed for a straightforward fit — no complicated brackets or custom fasteners required. Assembly is intuitive and tool-friendly.
- **Natural Aesthetic:** For the side panels, we've chosen **bamboo** — a renewable, lightweight, and durable material.
  This choice introduces a **unique, natural look** that sets the Xplorer apart from the usual enclosures for 3d rinters.
- **Functional Design:** The panels contribute to thermal stability and noise reduction, and can be easily removed for maintenance or upgrades.

5.1 Front Door Magnets

Necessary parts

1x Assembly progress up to Chapter 4.8

2x 3d printed part *'02_27__XP__Fix_Front_Door_Magnet___V#.#'*

2x Door Magnet

2x M5 T-Nut

4x Self-tapping screw 10mm

2x ISO7380 M5x10 screw

Assembling steps

1

1. Assemble two sets with door magnets as shown in the adjacent picture.
2. Ensure the M5x10 screw and M5 T-Nut remain loose for now.

Result

2

1. Rotate the door magnets as indicated and position them in the middle of the upper and lower aluminum profiles.
2. Tighten the M5 bolt using a 3mm Allen key.

5.2 Top door bumpers

Necessary parts

1x Assembly progress up to Chapter 5.1

6x M5 T-Nut

6x ISO7380 M5x10 screw

2x 3d printed part *'02_61__XP__Corners__Top_Door___V#.#*

2x 3d printed part *'02_29__XP_Bumper_Upper_Door___V#.#*

Result

Assembling steps

1

1. Assemble the printed parts with M5 screws and T-nuts as shown in the pictures below.
2. Ensure the M5x10 screw and M5 T-Nut remain loose for now.

2

1. Place the bumpers in their designated positions.
2. Proceed the same for the both sides of the printer.
3. Tighten the M5 bolt using a 3mm Allen key.

5.3 Brackets piano wire

Necessary parts

1x Assembly progress up to Chapter 5.2

1x Single extruder config.
2x Dual Gantry setups
3d printed part
*'02_60__XP__Fix_Cable_Frame_**A**__V#.#*

1x IDEX config.
2x IQEX config
3d printed part
*'02_63__XP__Fix_Cable_Frame_**B**__V#.#*

2x Single extruder config
4x Dual extruder config
8x IQEX config
M3 Brass insert

2x Single extruder config
4x Dual extruder config
8x IQEX config
ISO7380 M3x8 screw

1x Single extruder config
2x Dual extruder config
4x IQEX config
ISO7380 M5x10 screw

1x Single extruder config
2x Dual extruder config
4x IQEX config
M5 T-Nut

Result

Assembling steps

1

1. Install the brass inserts by heating them and pressing them into their designated holes. Using a soldering iron is an effective way to accomplish this.
2. Pre-assemble the M3x8 screws, but **DO NOT tighten them yet**. They will be tightened later when securing the piano wire that holds the toolhead cable.
3. Preassemble the ISO 7380 M5x10 screws and M5 T-nuts.

5.3 Brackets piano wire

Assembling steps

②

1. Place the brackets in their designated positions on the printer frame.
2. At the back of the printer, they should be set directly at the edge flange where the Y-axis steppers are mounted.
3. At the front of the printer, the brackets should be positioned 65 mm above the idlers for the Z-axis belts. (only in IQEX config there are brackets placed in printer front)
4. Once the brackets are properly positioned, tighten the M5 screws using a 3 mm Allen key.

5.4 Bracket cable chain print bed

Necessary parts

1x Assembly progress up to Chapter 5.3

1x 3d printed part *'02_58__XP__Bracket_Cable_Chain_Bed____V#.#'*

2x M3 Brass insert

2x ISO7380 M3x12 screw

Assembling steps

① 1. Install the brass inserts by heating them and pressing them into their designated holes. Using a soldering iron is an effective way to accomplish this.

Result

②

1. Assemble the bracket for the cable chain onto the bed arm as shown, using two M3x12 screws.
2. Tighten the screws using a 2 mm Allen key.

5.5 Tool offsets probe

Necessary parts

1x Assembly progress up to Chapter 5.4

1x Tool offsets probe

2x DIN912 M3x20mm screw

Result

Assembling steps

1

1. Assemble the tool offsets probe onto the bed arm as shown, using two DIN912 M3x20 screws.
2. Tighten the screws using a 2,5 mm Allen key.

5.6 Floor panels

Necessary parts

1x Assembly progress up to Chapter 5.5

1x Floor Panel A

1x Floor Panel B

18x ISO7380 M5x10 screw

18x M5 T-Nut

Result

Assembling steps

1

1. Preassemble the ISO 7380 M5x10 screws and M5 T-nuts in both floor panels as shown.
2. Place the panels one after the other inside the printer.
3. Tighten the screws on one of the panels, but DO NOT OVERTIGHTEN as this may damage the panels.
4. Push the second panel against the first so that the edges align and there is no gap between them.
5. Now tighten the screws on the second panel, again being careful not to overtighten.

5.7 Endstops Z-Axis

Necessary parts

1x Assembly progress up to Chapter 5.5

1x 3d printed part *'02_53__XP__Fix_Optical_Sensor_Z___V#.#'*

6x ISO7380 M3x20 screw

3x Optical sensor

Result

Assembling steps

①

1. Connect the wire to the optical sensor.
2. Ensure the connector of the optical sensor is oriented as shown in the pictures.
3. Assemble the optical sensor with the 3D-printed part using M3x20 screws. A 2mm Allen key is needed to tighten the screws.
4. Push the wire down thru the hole in the floor
5. Repeat the process for all three sensors.

5.7 Endstops Z-Axis

Assembling steps

2

1. Drive the bed arms down one by one and check if the Z-axis limiter is properly aligned with the optical sensor.
2. If necessary, loosen the screw holding the limiter and adjust its position accordingly.

5.8 Chamber fans

Necessary parts

1x 3d printed part *'02_23__XP__Hepa_Filter_Housing___V#.#'*

2x Fan 60x20mm

1x PCB Chamber fans supply

12x M3 Brass insert

2x Self-tapping screw 10mm

8x ISO7380 M3x25 screw

1x Filter

Result

Assembling steps

1

1. Take the 3D-printed case for the filter for the chamber ventilation and install the M3 inserts as shown.
2. Install the brass inserts by heating them and pressing them into their designated holes—using a soldering iron is an effective way to do this.
3. Attach the small PCB with ISO 14585C ST2.9x9.5 screws.
4. Secure the 6020 fans with ISO 7380 M3x25 screws.
5. A 2.5mm Allen key is needed to tighten the M3 screws, and a T10 Torx for the ST2.9x9.5 screws.
6. Place the filter inside the case.

5.9 Back panel

Necessary parts

1x Assembly progress up to Chapter 5.7

1x Chamber fans and filter assembled in Chapter 5.8

1x Back panel A

1x Back panel B

19x M5 T-Nut

19x ISO7380 M5x10 screw

4x ISO 7380 M3x8 screw

Result

Assembling steps

1

1. The chamber fans and filter case must be assembled onto the back panel.
2. First, ensure the panel is oriented correctly: the row of small cutouts should be on the left side of the printer. These cutouts allow cable ties to be threaded through to secure electrical cables.
3. Attach the chamber fans to the panel with four ISO 7380 M3x8 screws, using a 2mm Allen key.
4. On both back panels A and B, preassemble the ISO 7380 M5x10 screws and M5 T-nuts as shown in the pictures below.

5.9 Back panel

Assembling steps

2

1. Turn the printer and lay it on its front side.
2. Place the panels one after the other on the back of the printer
3. Tighten the screws on one of the panels, but DO NOT OVERTIGHTEN as this may damage the panels.
4. Push the second panel against the first so that the edges align and there is no gap between them.
5. Now tighten the screws on the second panel, again being careful not to overtighten.

5.10 Side panels

Necessary parts

2x Side panel

4x 3d printed part
'02_32__XP_Filament_Tunel___V#.#'

4x 3d printed part
'02_26__XP__Fix_Door_Magnet___V#.#'

3d printed part
'02_24__XP__PTFE_Holder_Case___V#.#'
1x - for single extrusion
2x - for dual extrusion
4x - 4 extruder config

3d printed part
'02_25__XP__PTFE_Holder_Exterior___V#.#'
1x - for single extrusion
2x - for dual extrusion
4x - 4 extruder config

3d printed part
'02_51__XP__PTFE_Hole_Cover____V#.#'
3x - for single extrusion
2x - for dual extrusion
0x - 4 extruder config

16x Self-tapping screw 10mm

11x ISO7380 M5x10 screw

11x M5 T-Nut

4x Door magnet catcher

Assembling steps

x2

1. Assemble the 3D-printed parts and door magnets using ISO 14585C ST2.9x9.5 screws as shown below. A Torx T10 key will be required.
2. Preassemble the ISO 7380 M5x10 screws and M5 T-nuts.
3. For the second panel, follow the same assembly steps. The only difference is that the parts are assembled on the opposite side compared to the first panel. When placed face to face, the final assembled panels should appear mirrored.

Result

5.11 Side panels on frame

Necessary parts

1x Assembly progress up to Chapter 5.9

1x Side panel LEFT Assembled in Chapter 5.4

1x Side panel RIGHT Assembled in Chapter 5.4

Result

Assembling steps

1

1. Turn the printer and lay it on one side.
2. Place the corresponding side panel on the frame of the printer.
3. Ensure you select the correct panel corresponding to the side you are assembling. When viewing the panel, the distance from the filament entrance to the back of the printer should be shorter than the distance to the front of the printer.
4. Tighten the screws on the panels, but DO NOT OVERTIGHTEN as this may damage the panels.
5. Now, turn the printer to the other side and proceed in the same way with the second panel by tightening the screws. Be careful not to overtighten.

5.12 Case Handles

Necessary parts

1x Assembly progress up to Chapter 5.11

4x 3d printed part *'02_42__XP__Case_Handle___V#.#*

4x ISO 7380 M8x16 Screw

4x ISO 7380 M6x18 Screw

4x M6 T-Nut

Result

Assembling steps

1

1. Pre-assemble four handles using screws and T-nuts, as shown in the adjacent picture

2

1. Place the handles, one in each corner.
2. First, tighten the M8x16 screws using a 5mm Allen key.
3. Finally, tighten the M6x18 screws using a 4mm Allen key..

6. Skirt

The **Xplorer's base skirt** is a practical and easy-to-install and adds both function and visual polish to the machine.

- **Modular Design:** Made from **3D printed segments**, the skirt is simple to produce and install, with no complex mounting required.
- It neatly **conceals wiring and electronics**, helping maintain a clean and professional appearance.
- Adds a layer of **protection for sensitive components** like the mainboard, power supply, and drivers by keeping them shielded from dust, debris, and accidental contact.

Functional, protective, and easy to work with — the base skirt contributes to the Xplorer's clean build and user-friendly serviceability

6.1 Skirt

Necessary parts

1x Assembly progress up to Chapter 5.5

1x 3d printed part *'02_19__XP__Skirt_Base_Vivedino___V#.#'*

1x 3d printed part *'02_20__XP__Skirt_Base_Xplorer___V#.#*

1x 3d printed part *'02_18__XP__PITFT50_Display___V#.#'*

1x 3d printed part *'02_17__XP__Skirt_Base_MB___V#.#'*

1x 3d printed part *'02_16__XP__Skirt_Base_AC_Inlet___V#.#*

7x 3d printed part *'02_15__XP__Skirt_Base___V#.#'*

24x ISO7380 M5x10 screw

24x M5 T-Nut

16x M3 Brass insert

2x ISO 7380 M3x8 screw

1x ON/OFF Button

1x Power inlet filtered

1x Push button

Result

Assembling steps

1

1. In all 3D-printed parts for the base skirt, install one M3 brass insert on the underside of the base skirt, as shown.
2. In the 3D-printed part for the HDMI Display install two M3 brass inserts as indicated. Detail A
3. In the 3D-printed part for power inlet install two M3 brass inserts as indicated. Detail B
4. Using a soldering iron is an effective way to install the M3 brass inserts.

6.1 Skirt

Assembling steps

2

1. Preassemble the ISO 7380 M5x10 screws and M5 T-nuts on all the 3d printed parts that are forming the base skirt.

3

1. Stick the ON/OFF button in its designated place, as indicated.
2. Secure the power inlet with two ISO 7380 M3x8 screws. A 2mm Allen key will be required.

4

1. Stick the push button into its designated place and secure it from the back using the fastening nut, as shown.
2. Use pliers to tighten the fastening nut.

5

1. Turn the printer and lay it on its right side.
2. On the front side of the printer and its left side, place the 3D-printed parts from the skirt in their designated order and tighten the M5 screws and T-nuts with a 3mm Allen key.
3. Pay close attention to the pictures below to position each 3D-printed part correctly.
4. Turn the printer and lay it on its left side.
5. On the back side of the printer and its right side, place the 3D-printed parts from the skirt in their designated order and tighten the M5 screws and T-nuts with a 3mm Allen key.
6. Place and secure the 3D-printed part on the middle aluminium profile so that the middle hole aligns with the edge of the floor panel. See detail A.

7. Hardware components

The **Xplorer** is built with a philosophy of **accessibility and ease of maintenance**, using **widely available, off-the-shelf components** wherever possible.

- **Electronics:** The printer uses **standard 3D printer electronics** — mainboards, stepper drivers, sensors, and power supply that are commonly available and well-supported by the Klipper firmware ecosystem. This ensures easy replacement, upgrades, or troubleshooting **without being locked into proprietary systems.**
- **Hardware:** Structural and mounting hardware is made up of **standard screws, nuts, and fasteners**, along with some **3D printed brackets and holders**. These printed parts are easy to reproduce, modify, or replace.

By relying on **commonly used parts** and avoiding custom or obscure components, the Xplorer stays **repairable, upgradeable, and user-friendly** — whether you're building your first printer or maintaining a print farm.

7.1 PSU

Necessary parts

1x Assembly progress up to Chapter 6.1

6x ISO7380 M4x8 screw

1x PSU

2x 3d printed part *'02_31__XP_Fix_Cables_Base___V#.#'*

Result

Assembling steps

1

1. Place the PSU under the base, ensuring the connection ports are oriented as shown in the pictures below.
2. Secure the PSU from above using M4x10 screws.
3. Tighten the screws with a 2.5mm Allen key.

2

1. On each side of the PSU, secure the wire fixations (3d printed part) using M4x10 screws

7.2 Power Module

Necessary parts

1x Assembly progress up to Chapter 7.1

4x ISO7380 M3x8 screw

1x Power Modul

1x 3d printed part *'02_31__XP_Fix_Cables_Base___V#.#'*

4x Spacer M3x10

4x M3 Nut

1x Self tread screw

Result

Assembling steps

1

1. Secure the M3 Spacers from above using M3x8 screws.
2. Place the Power Module under the base on the spacers, ensuring the connection ports are oriented as shown in the pictures below.
3. Tighten the Power Module using M3 nuts..

2

1. Sideways from the power module, secure the wire fixation (3D-printed part) using a self-tapping screw that comes from above the printer floor.
2. Ensure the fixation is slightly inclined to prevent it from colliding with the power module.

7.3 SSR Relay

Necessary parts

1x Assembly progress up to Chapter 7.2

2x ISO 7380 M4x12 screw

2x M4 Nut

1x SSR Relay

Result

Assembling steps

1

1. Place the power module under the base, ensuring the high-voltage connection ports are oriented as shown in the pictures below.
2. Tighten the SSR relay using M4x12 screws, inserting them from above into the floor- and tighten the M4 nuts.
3. A 3mm Allen key and a 7mm wrench will be needed to secure the assembly.

7.4 Mainboard

Necessary parts

1x Assembly progress up to Chapter 7.3

4x ISO7380 M3x8 screw

4x M3 Nut

1x BigTreeTech Manta M8P Board

4x Spacer M3x40

Result

Assembling steps

1

1. Secure the M3 Spacers from above using M3x8 screws.
2. Place the mainboard under the base on the spacers, ensuring the connection ports are oriented as shown in the pictures below.
3. Tighten the Mainboard using M3 nuts..

7.5 Multi purpose bracket

Necessary parts

1x Assembly progress up to Chapter 7.4

4x ISO7380 M3x8 screw

1x 3d printed part *'02_43__XP__Under_Floor_Fixture___V#.#'*

2x Blower 10x40mm– **for SINGLE gantry setup**
3x Blower 10x40mm– **for DUAL gantry setup**

16x Self-tapping screw 10mm – **for SINGLE gantry setup**
20x Self-tapping screw 10mm – **for DUAL gantry setup**

8x M3 Brass insert

4x ISO7380 M3x8 screw – **for SINGLE gantry setup**
8x ISO7380 M3x8 screw – **for DUAL gantry setup**

1x BigTreeTech EXP Module – **ONLY for DUAL gantry setup**

4x Spacer M3x40

1x USB-HUB

2x SPL 82 universal compact splitter

4x Spacer M3x10 – **ONLY for DUAL gantry setup**

Result

Assembling steps

1

1. Install the brass inserts by heating them and pressing them into their designated holes—using a soldering iron is an effective way to do this.

7.5 Multi purpose bracket

Assembling steps

2

1. Underneath the bracket, secure the SPL 82 splitters using self-tapping screws as shown.
2. Make sure that the splitters are oriented correctly. Pay attention to the image below!

3

1. Using self-tapping screws, assemble two fan blowers side by side as indicated.
2. For dual gantry setups, a third blower will be necessary:
    1. Install four M3x10 spacers on the bracket.
    2. Secure the blower in place using an M3x8 screw.

4

1. Thread the wires from the blowers through the holes in the bracket and connect them to the SPL 82 splitter

7.5 Multi purpose bracket

Assembling steps

⑤

1. This step is only relevant for dual gantry setups.
2. Place the expansion module in the middle of the bracket, ensuring it is oriented as shown in the pictures below.
3. Secure the module in place using self-tapping screws

ONLY for DUAL gantry setup

⑥

1. This step is only relevant for dual gantry setups.
2. Install jumpers on the highlighted pins as shown

⑦

1. Install the USB hub by pushing it through the openings on the upper side of the bracket.
2. Ensure it is oriented correctly

7.5 Multi purpose bracket

Assembling steps

⑧

1. From below, attach M3x40mm spacers to the bracket as indicated.

⑨

1. Place the multi purpose bracket under the base, ensuring that is oriented correctly.
2. Secure it from above using M3x8 screws.

7.6 Cable fixtures below floor

Necessary parts

1x Assembly progress up to Chapter 7.5

6x 3d printed part *'02_31__XP_Fix_Cables_Base___V#.#'*

6x Self-tapping screws 10mm

Result

Assembling steps

1

1. Place the fixtures for the cables beneath the floor and secure them from above using self-tapping screws.
2. Pay attention to the orientation.

7.7 Cable fixtures below floor

Necessary parts

1x Assembly progress up to Chapter 7.6

1x BTT HDMI5 Screen

1x 3d printed part *'02_33__XP_BTT_HDMI5_v1.2_Case___V#.#*

1x 3d printed part *'02_34__XP_Holder_L_Case_BTT_HDMI5_v1.2___V#.#*

1x 3d printed part *'02_35__Holder_R_Case_BTT_HDMI5_v1.2___V#.#'*

6x ISO7380 M3x8 screw

Result

Assembling steps

1

1. Place the HDMI screen inside the case and secure it from behind using M3x8 screws.
2. Attach the corresponding 3D-printed parts from the sides.
3. Ensure that the screen is correctly oriented: the control buttons must face downward.
4. Using two M3x8mm screws, mount the screen onto the 3D printer skirt. Once again, pay attention to the orientation.

7.8 Chamber Camera

Necessary parts

1x Assembly progress up to Chapter 7.7

1x Camera module

1x 3d printed part *'02_62__XP__Chamber_Camera_Body_A___V#.#*

1x 3d printed part *'02_62__XP__Chamber_Camera_Body_B___V#.#*

1x 3d printed part *'02_57__XP__Caps_Alu_ ___V#.#'*

2x Self-tapping screws 6.5mm

2x ISO7380 M5x10 screw

2x M5 T-Nut

Result

Assembling steps

1

1. Place the camera module inside the case and secure it from behind using 6.5mm self-tapping screws.
2. Attach the corresponding 3D-printed parts from the sides
3. Through the opening on the side of the 3D-printed part, push the small cable connector until it connects with the camera module. Perform this operation carefully to avoid damaging the contacts.
4. The cable must first be threaded from below the floor upwards.!

7.8 Chamber Camera

Assembling steps

②

1. Snap together the printed parts to form the camera body

③

1. Preassemble the M5 T-nuts and M5 screws.

④

1. Place the camera onto the aluminum profile.
2. Tighten the M5 screws securely

⑤

1. Thread the camera cable inside the aluminum profile channel.
2. Place the plastic caps over the channel in the aluminum profile to prevent the cable from escaping.
3. If a dual gantry setup is built, execute step 2 after Chapter 8.11.

7.9 LED Strips Chamber

Necessary parts

1x Assembly progress up to Chapter 7.8

2x LED Strips

4x M3 T-Nut

4x ISO7380 M3x10 screw

Assembling steps

①

x2

1. Preassemble the M3 T-nuts and M3 screws.

Result

②

1. Place the LED strips underneath the aluminum profile, centred, with the wires oriented toward the back of the printer.
2. Tighten the M3 screws to secure the LED strips.

7.10 Cable fixations back pillar

Necessary parts

1x Assembly progress up to Chapter 7.9

6x 3d printed part *'02_30__XP__Clip_Cables_Alu___V#.#*

Result

Assembling steps

①

1. On each pillar at the back of the printer, three clips must be assembled, evenly spaced from each other.
2. Push the clip into the channel in the aluminum frame ① and then rotate it 180° ②.
3. Pre-assemble the cable ties in the clips by threading them through the holes.

7.11 Cable chain Print bed

Necessary parts

1x Assembly progress up to Chapter 7.10

1x Cable Chain

1x M3 T-Nut

3x ISO7380 M3x10 screw

Assembling steps

①

1. Preassemble the M3 T-nuts and M3 screws.

Result

②

1. Place the cable chain parallel to the middle back pillar.
2. Insert the M3 T-nut into the aluminum profile channel, then tighten the screw.
3. Secure the upper end of the cable chain to the bracket on the bed arm using two M3 screws.
4. A 2mm Allen key is required to tighten the screws

7.12 Spool Holders

Necessary parts

1x Assembly progress up to Chapter 8.12

2x Single extruder config
4x Dual extruder config
8x IQEX config
M5 T-Nut

2x Single extruder config
4x Dual extruder config
8x IQEX config
ISO7380 M5x18 screw

1x Single extruder config
2x Dual extruder config
4x IQEX config
3d printed part
'02_22__XP__Spool_Holder_Roll___V#.#

1x Single extruder config
2x Dual extruder config
4x IQEX config
3d printed part
'02_21__XP__Spool_Holder_Body_A___V#.#

1x Single extruder config
2x Dual extruder config
4x IQEX config
3d printed part
'02_21__XP__Spool_Holder_Body_B___V#.#

2x Single extruder config
4x Dual extruder config
8x IQEX config
Bearing 688

2x Single extruder config
4x Dual extruder config
8x IQEX config
Pin

Result

Assembling steps

x1 / x2 / x4

1

1. Place the pins on the sides of the roll, then attach the 688 ball bearings.
2. Assemble the two printed parts together as described.
3. Pre-assemble the M5 screws and M5 T-nuts

7.12 Spool Holders

②

1. Place the spool holder in its designated position.
2. Tighten the M5 screws.
3. Repeat the steps above for each spool holder.
4. A 3mm Allen key will be needed to tighten the screws.

8. Electrical connections

Wiring the **Xplorer** follows the same general approach as most DIY 3D printer kits — no surprises or exotic setups.

- **Familiar Layout:** The wiring scheme is consistent with standard 3D printers, so anyone with basic kit-building experience will feel right at home.
- **Guided Process:** With a bit of **patience** and careful attention to the **step-by-step instructions** in the assembly manual, wiring the Xplorer is straightforward and approachable.

If you take your time and follow the guide, **success is guaranteed** — no advanced electronics knowledge required.

8.1 220V Wires

8.2 24V Supply

8.3 Fans mainboard

8.4 Start Button

8.5 Chamber Fans

①

②

1. Thread the wire through the hol the floor and pull it up parallel to back pillar

③

1. Pre-install cable ties in the indicated places.
2. Leave them loose so that wires can be threaded underneath.
3. Thread the wire for the chamber fans through the cable ties.
4. Do NOT tighten the cable ties yet, as more wires are still to come.

④

1. Thread the wire through the hole in the back panel, then plug the connector into the distribution board

8.6 Temperature sensor chamber

①

②

1. Thread the wire through the hol
   the floor and pull it up parallel to
   back pillar

③

1. Thread the wire for the temperature sensor through the cable ties.
2. Fixate the temperature sensor as indicated with a cable tie
3. Tighten the cable ties holding the wires.

8.7 LED Strips Chamber

①

②

1. Thread the wire through the hole in the floor and pull it up parallel to the back pillar

③

1. Thread the wires from the LED strips through the channels inside the aluminum profiles.
2. Use caps to secure the wires within the channel.
3. Use the Y-adapter to connect the wires from the LED strips to the wire coming from below.

8.8 Z-axis motors

8.9 Z-axis End-stops

8.10 Y-axis motors

8.10 Y-axis motors

①

1. Thread the wire through the hole in the floor and pull it up parallel to the back pillar
2. Connect the wires to the corresponding stepper motor

8.11 Y-axis End-stops

8.11 Y-axis End-stops

①

1. Thread the wire through the hole in the floor and pull it up parallel to the back pillar
2. Connect the wire to the End-stop

②

1. Thread the wire through the hole in the aluminium plate and pull it up parallel to the front pillar
2. Connect the wire to the End-stop
3. Place the plastic caps over the channel in the aluminum profile to prevent the wires from escaping. (see also chapter 7.7)

8.12 USB-HUB

①

1. Plug the USB-Adapter into indicated port from the Mainboard
2. Connect the USB-HUB to the USB-adapter

8.13 Chamber Camera

①

1. Plug the USB-Cable from the camera into a free slot in the USB-HUB

Necessary parts

1x Assembly progress up to Chapter 8.13

4x Single extruder config
8x Dual extruder config
16x IQEX config
M3 Brass insert

6x Single extruder config
12x Dual extruder config
24x IQEX config
ISO7380 M3x8 screw

1x Single extruder config
2x Dual extruder config
4x IQEX config
3d printed part
'02_59__XP__PHead_KBL_Duct___V#.#

1x Singl
2x Dual extruder config
4x IQEX config
3d printed part
'02_59__XP__PHead_KBL_Duct_Clamp___V#.#

Result

Assembling steps

①

1. Install the brass inserts by heating them and pressing them into their designated holes—using a soldering iron is an effective way to do this.

x1 / x2 / x4

Assembling steps

x1 / x2 / x4

②

1. Pre-assemble the M3 screws as indicated.
2. Leave them loose, DO NOT tighten them!

③

1. Place the wires inside the cable duct and secure them by tightening the clamp with M3 screws, as shown.

x1 / x2 / x4

④

1. Behind each toolhead, secure the cable duct with M3 screws as shown.
2. Be careful not to pinch any wires coming from below.
3. LEAVE the USB cable disconnected for now.
4. Connect the power cable to the EBB36 board.
5. Connect the cable to the X-axis motor.

x1 / x2 / x4

8.14 Tools

Necessary parts

1x Assembly progress up to Chapter 8.13

1x Single extruder config
2x Dual extruder config
4x IQEX config
1mm x 800mm piano wire

Result

* The picture is slightly inaccurate for this state of the assembly as it also shows the PTFE tube and a fully covered toolhead.

Assembling steps

①

1. Insert one end of the piano wire into the bracket on the frame.
2. Tighten the two screws securing the piano wire.
3. Insert the other end of the piano wire into the cable duct from the toolhead.
4. Tighten the two screws securing the piano wire.
5. Repeat these steps for each toolhead

8.14 Tools

①

1. Between the last fixation point on the frame and the toolhead, the cable runs parallel to the piano wire and is secured to it with cable ties.
2. See the attached pictures to understand how the cable to the toolboard should look like, depending on the configuration built.

1. Lay the cable downward, parallel to the back pillar.
2. Thread it through the hole in the floor.
3. If you are not building an IQEX, secure the cables to the pillar at the indicated spots with cable ties.

TOOL 0

TOOL 0

Gather the excess cable length from the tool into a loop and secure it with cable ties.
Finally, place it in a convenient location.

8.14 Tools

1. Lay the cable downward, parallel to the back pillar.
2. Thread it through the hole in the floor.
3. If you are not building an IQEX, secure the cables to the pillar at the indicated spots with cable ties.

TOOL 1

TOOL 1

Gather the excess cable length from the tool into a loop and secure it with cable ties.
Finally, place it in a convenient location.

8.14 Tools

1. Lay the cable coming from Tool 2 parallel to the side wall.
2. Secure the cable to the side wall using cable ties.
3. Lay the cable downward, parallel to the back pillar.
4. Thread it through the hole in the floor.

TOOL 2

Gather the excess cable length from the tool into a loop and secure it with cable ties.
Finally, place it in a convenient location.

1

1. Lay the cable coming from Tool 3 parallel to the side wall.
2. Secure the cable to the side wall using cable ties.
3. Lay the cable downward, parallel to the back pillar.
4. Thread it through the hole in the floor.

TOOL 3

TOOL 3

Gather the excess cable length from the tool into a loop and secure it with cable ties.
Finally, place it in a convenient location.

8.15 HDMI-Display

1

1. Connect the USB and HDMI cables to the display.
2. Thread them through the hole in the part behind the display.
3. Connect the USB cable to a free port on the USB hub.
4. Thread the HDMI cable through the hole in the plastic part as indicated.
5. Connect the HDMI cable to the designated HDMI port.

9. Print Bed

The **Xplorer's print bed** is built for durability, even heating, and excellent first-layer adhesion — all critical for high-quality, reliable printing.

- **Material:** Made from a flat, stress-relieved **8 mm cast aluminium plate** to ensure long-term thermal and mechanical stability.
- **Heater:** Equipped with a **1000W silicone heating pad**, powered by **220V or 110V** AC (region dependent), providing fast and uniform heat distribution across the entire surface.
- **Print Surface:** Finished with a **PEI-coated** top layer, offering excellent adhesion for a wide range of materials while allowing easy part removal once cooled.

This setup ensures **consistent print quality**, excellent thermal performance, and minimal maintenance — even during long or high-volume print sessions.

9.1 Print bed plate

Necessary parts

1x Assembly progress up to Chapter 8.15

1x Bed plate

2x Nozzle brush

1x Magnetic Pad

1x PEI Plate

1x Heating Pad

4x DIN912 M3x12 screw

2x DIN912 M3x8 screw

3x DIN7991 M5x30 screw

3x M5 Hex Nut

3x Spacer

Result

Assembling steps

①

1. The upper side of the bed plate is the one with the chamfered holes.
2. Remove the protective foil from the magnetic pad and attach it to the upper surface of the bed plate.
3. Ensure proper alignment of the magnetic pad with the various holes in the bed plate.
4. On the underside of the bed plate, the heating pad must be attached.
5. Remove the protective foil from the heating pad and then attach it to the plate.

9.2 Print bed assembly

Assembling steps

1

1. Assemble the nozzle brushes using M3x12 screws as indicated.
2. Install M3x8 screws on each side.
3. A 2.5mm Allen key is required to tighten the screws

3

1. Place the PEI print surface in position.
2. The PEI plate self-centres using the heads of the M3 screws on the back of the print bed.

2

1. Bring all three print bed arms to approximately the same height.
2. Place the print bed plate on the bed arms.
3. Secure the bed plate to each print bed arm using an M5 screw, a spacer, and an M5 nut, as shown in the pictures below.
4. A 3.5mm Allen key and a wrench are required to tighten the screws.

9.3 Print bed Wiring

Assembling steps

①

1. Connect the nozzle probe.
2. Lay the wires along the side of the bed arm as shown.
3. Route the wire bundle abc bracket and then inside the cabl

②

1. Open the caps on each segment of the cable chain.
2. Thread the wire bundle through the cable chain.
3. Secure the wire bundle to the bracket with a cable tie as shown.
4. Close the caps on the cable chain.

③

1. Thread the cable bundle through the hole in the floor
2. Make the electrical connections as indicated in the picture below

10. Doors

The **Xplorer** features a full set of enclosure doors designed for **easy assembly** and functionality.

- **Front and Top Door:** Made from **transparent plexiglass**, these doors provide clear visibility into the build chamber, making it easy to monitor prints without opening the enclosure.
- **Side Doors:** made from **bamboo**, matching the side panels for a natural, cohesive look that sets the Xplorer apart from typical industrial enclosures.

All doors follow a **minimalist and intuitive design**, making them quick to install and easy to open or remove when needed.

10.1 Side Doors

Necessary parts

1x Assembly progress up to Chapter 9.3

2x Side Door

4x Hinges

4x Offset plate

2x Thumb Nut M4

4x Magnet catcher

16x ISO7380 M6x18 screw

8x M6 T-Nut

8x M6 Hex Nut

8x ISO7380 M3x8 screw

8x M3 Hex Nut

2x ISO7380 M4x8 screw

Result

Assembling steps

① **x2**

1. Assemble the magnet catchers using M3 screws and M3 hex nuts. Use a 2mm Allen key and a wrench.
2. Assemble the thumb nut with an M4 screw. Use a 2.5mm Allen key.
3. Attach the hinges to the doors using M6 screws and M6 hex nuts. Use a 4mm Allen key and a wrench.
4. Pre-assemble the M6 T-nuts together with the offset plates onto the hinges using M6 screws.

10.1 Side Doors

Assembling steps

②

1. Place the door in its designated position by sliding the T-nuts into the channel of the aluminum frame.
2. Ensure proper alignment with the panel above and the printer frame.
3. Tighten the M6 screws.
4. Repeat the steps above for the door on the other side of the printer.

10.2 Front Doors

Necessary parts

1x Assembly progress up to Chapter 10.1

2x Front Door

6x Hinges

6x Offset plate

2x Thumb Nut M4

4x Magnet catcher front door

24x ISO7380 M6x18 screw

12x M6 T-Nut

12x M6 Hex Nut

8x ISO7380 M3x8 screw

8x M3 Hex Nut

2x ISO7380 M4x8 screw

Result

Assembling steps

① **x2**

1. Assemble the magnet catchers using M3 screws and M3 hex nuts. Use a 2mm Allen key and a wrench.
2. Assemble the thumb nut with an M4 screw. Use a 2.5mm Allen key.
3. Attach the hinges to the doors using M6 screws and M6 hex nuts. Use a 4mm Allen key and a wrench.
4. Pre-assemble the M6 T-nuts onto the hinges using M6 screws.

10.2 Front Doors

Assembling steps

②

1. Place the door in its designated position by sliding the T-nuts into the channel of the aluminum frame.
2. Ensure proper alignment to each other and the printer frame.
3. Tighten the M6 screws.
4. Repeat the steps above for the second door.

10.3 Top Door

Necessary parts

1x Assembly progress up to Chapter 10.2

1x Front Door

2x Hinges

1x Thumb Nut M4

1x ISO7380 M4x8 screw

8x ISO7380 M6x18 screw

4x M6 T-Nut

4x M6 Hex Nut

Result

Assembling steps

①

1. Assemble the thumb nut with an M4 screw. Use a 2.5mm Allen key.
2. Attach the hinges to the doors using M6 screws and M6 hex nuts. Use a 4mm Allen key and a wrench.
3. Pre-assemble the M6 T-nuts onto the hinges using M6 screws.

10.3 Top Door

Assembling steps

②

1. Place the door in its designated position by sliding the T-nuts into the channel of the aluminum frame.
2. Ensure proper alignment to each other and the printer frame.
3. Tighten the M6 screws.

II. Setup

Getting the **Xplorer** up and running is a straightforward process, designed to get you printing high-quality parts with minimal effort.

- **System Image:** The first step is to **burn the provided system image** onto a microSD card. This image contains the full preconfigured software stack, including Klipper and all necessary components.
- **Boot & Configuration:** Once the microSD card is inserted into the mainboard and the printer is powered on, the system will boot automatically.
- **Guided Setup:** From there, you'll be guided through a few **easy-to-follow steps** to configure basic settings like motion calibration, Z offset, and probe alignment, etc.

These initial steps are important — and once completed, your Xplorer will be **ready to deliver clean, accurate, high-quality prints**.

11.1 System Image

① Download the latest system image from here:
https://github.com/FORMBOT/Xplorer/releases
Xplorer is delivered with a BTT CB2 unit, so use the system image for the CB2.

***A system image for the older BTT CB1 unit is also available, in case you need it.

② Make sure you have a good quality and fresh micro-SD-Card.
Choose a quality A1 rated card:

③ Flash the image on the SD-Card it using *'Raspberry Pi Imager'* or '*BalenaEtcher*' or anything similar.
https://www.raspberrypi.com/software/
https://etcher.balena.io/

Raspberry Pi balena

③ Insert the Micro-SD card into the designated slot on the mainboard:

④ Plug the power cord into the inlet and turn on the printer:

11.2 Connect to the printer

①

1. Connect the printer to your router using a LAN cable.
2. Find the printer's IP address by checking your router's interface.
3. Enter this IP address in your browser to access the Mainsail interface of your printer.

11.3 Transfer the system onto eMMC

1

1. This chapter is optional but strongly recommended, as Klipper has a tendency to wear down SD cards.
2. Since the CB2 module has eMMC we can easily transfer the system onto it and get rid of the SD-Card

2

1. Access your 3D-printer via SSH
   login: biqu
   password: biqu
2. Execute the following command: *nand-sata-install*

3

1. Select option 2 from the Menu

4

1. Select "*Yes*" to start erasing and writing the system onto the eMMC

5

1. Choose the filesystem "*1 ext4*" and then select "*OK*".

6

1. Wait for the writing process to complete

7

1. Upon completion, you will be prompted whether to power off. Select "*Power off*" to shut down the system.
2. After the system has powered down, disconnect the power supply, remove the MicroSD card, and then reconnect power. The system should now boot from the eMMC

Source: BTT CB2 User Manual

11.4 Setup ‘printer.cfg’

1

1. Navigate to the folder *'02_Printer_cfg'* and open the *.cfg* file corresponding to your printer configuration.
2. Copy its entire contents.

2

1. Navigate back to the '*config*' folder.
2. Open *'printer.cfg'*.
3. Delete its contents.
4. Paste the content previously copied in Step 1.
5. Click *'SAVE & RESTART'*.

11.5 Connect to the MCUs

① 1. Navigate to the folder '*02_Boards_Serials*' and open the '*Mainboard_serial.cfg*'.

② 1. Open Menu '*DEVICES*'
2. Select '*SERIAL*'
3. Click '*REFRESH*'
4. Copy the '*path by ID*'
5. Paste it after '*serial:*' as indicated
6. Hit '*SAVE & RESTART*'

③ 1. Turn OFF the printer using the button on the back.
2. Connect the USB cable to the tool board.
3. Turn the printer ON.
4. Open '*Tool0_serialcfg*'.
5. Follow the same steps as described in the previous step ②.
6. Make sure to copy the serial ID of the devices that have newly appeared in the list.
7. Repeat this process for each tool your printer has.

④ 1. Finally, all the MCUs must be listed under '*System Loads*', and Klipper should be able to start.

11.6 Setup Mainsail interface

1

1. Navigate to the folder *'07_Mainsail_Settings*' and download the latest Mainsail config
2. Open the ''*Interface Settings*'' menu from Mainsail interface
3. Choose '*Restore*' and then select the file that was previously downloaded

11.7 WIFI Setup from Display

① 1. On the HDMI display, open the '*More*' option from the Main Menu.

② 1. Open the '*Network*' menu.

③ 1. Click the arrow next to the network you want to connect to.

④ 1. Type the password and click '*Save*'.
2. Turn the printer OFF
3. Unplug the LAN-Cable
4. Turn the printer ON
5. Now the printer should connect to your WIFI
6. The IP can be seen in 'Network' menu. See step ③

11.8 WIFI Setup from Mainsail Interface

①

1. Go to the Macros Group '*System*' and use '*Setup WIFI*' to input your WIFI credentials
2. If you changed the default system password ('biqu'), you will first have to run the '*System Password*' macro. This needs to be done only when the system password has been changed. The macros inside the '*System*' group require the password to execute properly
3. If your SSID or password contains spaces, you will need to use quotes.(ex. 'this is my password')
4. Disconnect the LAN cable
5. Swich OFF the printer and start it again
6. The printer will connect to your WIFI now
7. The IP can be seen in 'Network' menu. See step ③ from the previous chapter

11.9 Update Klipper components

1. In the Mainsail interface, open the '*MACHINE*' sub-menu.
2. Click the refresh icon in the '*Update Manager*'.
3. Upgrade all components that have the '*UPGRADE*' button activated.

11.10 Flash MCUs

1. Ideally all the MCUs should have the same Version of Klipper as the host (*in the image below MCUs have an older Klipper Version as HOST*)
2. Go to the Macros Group '*System*' and use '*Flash Mainboard*'
3. If you changed the default system password ('biqu'), you will first have to run the 'System Password' macro. This needs to be done only when the system password has been changed. The macros inside the 'System' group require the password to execute properly.
4. The whole MCU flashing process will take about 2 minutes and Klipper will restart at the end of it.
5. Turn the printer OFF then back ON
6. If everything went fine, MCU and HOST will show the same version of Klipper
7. Do exactly the same for the tools by clicking '*FLASH TOOL**'

I2. Rest assembly

Some components of the **Xplorer** are **intentionally left unassembled** during the initial build. This approach ensures that nothing obstructs access during the printer **setup**.
Once the initial configuration is completed and the printer is functioning as expected:

- You can proceed to install the **remaining components**.
- This final assembly step is quick and straightforward, requiring only basic tools and minimal effort.

By delaying the installation of non-critical parts until after setup, the build process remains **clean, manageable, and frustration-free**, especially for first-time users.

12.1 Cover Toolheads

Necessary parts

1x Assembly progress up to Chapter 10.3

1x Single extruder config
2x Dual extruder config
4x IQEX config
3d printed part
'02_09_XP__Cover_Print_Head_Front___V#.#

1x 3d printed part
'02_11__XP__Text_Plate_T0___V#.#

1x 3d printed part
'02_12__XP__Text_Plate_T1___V#.#
Only in IDEX, Dual Gantry and IQEX

1x 3d printed part
'02_13__XP__Text_Plate_T2___V#.#
Only in and IQEX

1x 3d printed part
'02_14__XP__Text_Plate_T3___V#.#
Only in and IQEX

1x Single extruder config
2x Dual extruder config
4x IQEX config
3d printed part
'02_10__XP__Cover_Print_Head_Back___V#.#

2x Single extruder config
4x Dual extruder config
8x IQEX config
ISO7380 M3x8 screw

Result

Assembling steps

1. On each toolhead front cover, add the corresponding inscription (T0, T1, T2, T3).
2. Place the cover on the back of the toolhead carriage and secure it with M3 screws.
3. Snap the front cover into place by aligning it with the slots from the back. cover

12.2 Panel below

Necessary parts

1x Assembly progress up to Chapter 12.1

1x Pane below

7x ISO7380 M3x8 screw

Result

Assembling steps

1

1. Flip the printer onto one side.
2. Secure the panel in place with M3 screws as shown.

12.3 PTFE-Tubes

Necessary parts

1x Assembly progress up to Chapter 12.2

1x Single extruder config
2x Dual extruder config
4x IQEX config
3x4mm PTFE Tube (1200mm long)

Assembling steps

1

1. Insert the PTFE tube into the extruder.
2. Thread the other end through the channel from the side wall.

2

1. The PTFE tube must be parallel to the umbilical cable going to the print head
2. .Ensure there are no bends that could obstruct the free movement of the filament inside the tube.
3. Insert the end of the PTFE tube into the bracket above the filament spool support.

3

1. In two convenient spots, secure the PTFE tube together with the umbilical cable using cable ties, as shown.
2. DO NOT overtighten the cable ties; the filament's movement must not be restricted.
3. Use the same assembly process described above for each toolhead.

13. Calibration

Once the **Xplorer** is fully assembled and set up, it's ready for **calibration** — the final step before starting your first print. Calibration can be performed using a series of **dedicated macros** that guide you through each step (Z offset, bed mesh, toolhead alignment, etc.), **or** you can use a **single automated macro** that performs all essential calibrations in one go.

13.1 Tools Z-Offset calibration

1

1. This chapter is relevant only for multi-tool setups.
2. Before starting, ensure that the nozzles of all tools are perfectly clean
3. Home all axes
4. Select T0.
5. From the Mainsail interface, move the axes to X210, Y220, and Z0.
6. Place a piece of paper between the nozzle and the bed.
7. Lower Z in small increments until the nozzle grips the paper.
8. Note the Z value at which the paper was grabbed.
9. Move Z to Z10.
10. Park T0.
11. Select T1 and move it to the same position (X210, Y220, Z0) as T0 was.
12. Repeat the Z calibration process (lower Z until the nozzle grips the paper) and note the Z value.
13. If T2 and T3 are installed, repeat the process for each tool.
14. After measuring all tools, identify the one with the highest Z value (closest to the bed).For example, if the Z values are:
    - T0 = -0.180
    - T1 = -0.150
    - T2 = -0.190
    - T3 = -0.210

    T1 is the closest to the bed, meaning T0, T2, and T3 must be adjusted to match its height.
15. Select T0 and move to X210, Y220, and Z0.
16. Place a piece of paper between the nozzle and the bed.
17. Lower Z to match the Z-offset of the closest tool (in this example, T1 = -0.150).
18. Ensure the hotend fan is OFF.
19. Insert a 2mm Allen Key through the fan opening and loosen the screw holding the melt zone.
20. Push the melt zone down until the nozzle grips the paper.
21. Tighten the screw securing the melt zone.
22. Move Z to Z10.
23. Repeat this process for all tools that need adjustment.

13.2 Printer calibration

1 To fully calibrate the printer, all calibration macros must be run before starting a print. They can be executed individually or by selecting *'PRINTER CALIBRATE'*, which runs the entire calibration process automatically.

Does the entire calibration process and execute all the calibration macros automatically in sequence.
It takes 45 minutes or more, depending on the printer configuration, so please be patient.

Macro for automatically calibrating the bed probe offset

Present only in multi-tool setups
Macro for automatically calibrating tool offsets

Macro for calibrating the bed probe offset using the 'paper' method

Bed mesh levelling

Macros for PID tuning of the Tools and Bed

Input shaper calibration

Present only in multi-tool setups
Input shaper calibration for special printing modes (Copy and Mirror mode)

Macro that resets the tool offsets

13.3 Time Zone

1

1. Open the Mainsail Interface of your printer
2. Go to the Macros Group 'System' and use 'Setup Time Zone'
3. If you changed the default system password ('biqu'), you will first have to run the 'System Password' macro. This needs to be done only when the system password has been changed. The macros inside the 'System' group require the password to execute properly.
4. From 'Setup Time Zone' input the Continent and City corresponding to your location (ex: Europe / Berlin)
5. List with all the time zones in the world: https://en.wikipedia.org/wiki/List_of_tz_database_time_zones
6. The printer has to be switched OFF and then ON for the change to take effect

14. Slicer

For preparing your prints, the **Xplorer** comes with ready-to-use slicing profiles tailored for **OrcaSlicer**. The profiles ensure excellent print quality and importing hem into OrcaSlicer is **quick and simple**, requiring just a few clicks. You'll be ready to slice and print in minutes.

With a clean interface and intuitive tools, **OrcaSlicer** is a perfect match for both new users and experienced makers.

These profiles help you unlock the full potential of the Xplorer, minimizing setup time and maximizing results.

14.1 Orca Slicer

①

1. Install the latest Orca Slicer - *https://orca-slicer.com/*
2. Download the Slicer profiles for Xplorer from here: *https://github.com/FORMBOT/Xplorer_UpdateManager*
3. Or take them directly from the Mainsail interface of your printer from '*0_Xplorer*' out of the folder '*04_Slicer_Profiles*'
4. After opening OrcaSlicer go to '*File*' then select '*Import*' and after that '*Import Configs*'.
5. Choose to import the configs you just downloaded previously
6. Choose the Printer profile corresponding to your configuration (SINGLE, IDEX, 2xGantry or IQEX)
7. Click on the WIFI-icon and then in window that just opened write the IP of your printer.

TIP:
For tools that will not be used during the print, select the filament profile '*NOT_USED*'. This will prevent them from being preheated and purged.

15. Useful things to know

While most aspects of the **Xplorer** are covered in the previous chapters, there are always a few extra details that might not be immediately obvious — or simply they where not mentioned before.
If you're looking to get the most out of your **Xplorer**, this is the chapter you'll want to read all the way through.

15.1 Printing Modes

1 Multi-tool setups also have special printing modes:

- IDEX & Dual Gantry: *Copy Mode* and *Mirror Mode*
- IQEX: *Currently under development...*

2

1. For IDEX and Dual Gantry setups, the following special printing modes are available: *COPY* and *MIRROR*.
2. To select the printing mode for the next print, go to the *'SET PRINT MODE'* menu, enter the desired mode (e.g., *COPY*), and then press '*SEND*'.
3. After the printer finishes a print, the printing mode is automatically reset to '*PRIMARY*'.
4. The same occurs if the print is interrupted.
5. By selecting '*QUERY PRINTING MODE*', the current printing mode of the printer will be displayed in the console.

15.2 Print job take over

1 When using multi-tool setups, it is possible to configure the system so that if one toolhead runs out of filament, another toolhead can take over and continue the print. This is a very useful feature for fully utilizing nearly depleted filament spools or for handling long print jobs:

- IDEX & Dual Gantry: Tool0 can take over the print from Tool1, or vice versa.
- IQEX: Currently under development...

2
1. To select strategy for print job, take over for the next print, go to the '*SET TOOLHEAD TAKEOVER*' menu, enter the desired mode (e.g., *Tool1*), and then press '*SEND*'.
2. After the printer finishes a print, the take over strategy is automatically reset to '*None*'.
3. The same occurs if the print is interrupted.
4. By selecting '*QUERY TOOLHEAD TAKEOVER* ', the current take over strategy will be displayed in the console.

3
1. For a successful print takeover, IT IS MANDATORY that the printed part is positioned on the print bed so that both toolheads can fully access it.
2. If this condition is not met, a '*Move out of range*' error will be triggered by Klipper, and the print job will be automatically cancelled.

15.3 Power Supply after print end

1 The power strategy after the end of the print can be set from the Mainsail interface

2
1. The following modes are available: *ON* and *OFF*.
2. To select mode, go to the *'SET POWERSUPPLY ENDPRINT'* menu, enter the desired mode (e.g., *ON*), and then press '*SEND*'.
3. By selecting *POWERSUPPLY ENDPRINT* ', the current mode will be displayed in the console.

15.4 Folder '*0_Xplorer*'

Variants of '*printer.cfg*' for different Printer configurations

Official MODs from Formbot

Default Klipper configs. They are read-only

Slicer Profiles

STEP files of from the 3D-printed parts

This manual

Mainsail Settings

15.5 File ‘*variables.cfg*’

```
[Variables]
bp_zoff = 0.85
h_brush = 0.0
mesh_tmp = 85
pmode = 0
pwrendp = 1
shaper_freq_xidexcp = 50.8
shaper_freq_xidexmr = 61.6
shaper_freq_xt0 = 98.8
shaper_freq_xt1 = 55.0
shaper_freq_xt2 = 56.6
shaper_freq_xt3 = 56.6
shaper_freq_yidexcp = 45.4
shaper_freq_yidexmr = 45.6
shaper_freq_yt0 = 44.2
shaper_freq_yt1 = 69.2
shaper_freq_yt2 = 43.2
shaper_freq_yt3 = 43.2
shaper_type_xidexcp = 'mzv'
shaper_type_xidexmr = 'mzv'
shaper_type_xt0 = '3hump_ei'
shaper_type_xt1 = 'mzv'
shaper_type_xt2 = 'mzv'
shaper_type_xt3 = 'mzv'
shaper_type_yidexcp = 'mzv'
shaper_type_yidexmr = 'mzv'
shaper_type_yt0 = 'mzv'
shaper_type_yt1 = '2hump_ei
shaper_type_yt2 = 'mzv'
shaper_type_yt3 = 'mzv'
tprobe = 170
ttovr = 0
x1offset = 1.114887
x2offset = 0.0
x3offset = 0.0
y1offset = 0.38809
y2offset = 0.0
y3offset = 0.0
z1offset = 0.0375
z2offset = 0.0
z3offset = 0.0
```

Correction coefficient for automatic probe offset detection. Increasing the coefficient moves the nozzle closer to the bed; decreasing the coefficient moves the nozzle higher from the bed.

Z-axis position when brushing the nozzles.

Preheat temp of the bed for bed levelling

Current Printing mode (0=Primary, 1=Copy, 2=Mirror)

Current Power supply at end print (0=power off, 1=power on)

Input shaper settings for different tools and printing modes.

Preheat temp of the nozzles for automatic nozzle offset detection.

Current print take over strategy (0=None, 1=Tool0, 2=Tool1.

Nozzle offsets.

TIP: A value close to zero indicates a well-calibrated Z-offset for the nozzles (see Chapter 12.1).

15.6 Measure resonances

1. When executing the resonance calibration macros, the results of the resonance measurements are saved as PNG files inside the *'/config/03_Resonances_Measurements'* directory.

15.7 Feeding filament from outside

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1. **Inside the printer, only 1kg filament spools or smaller can be accommodated.**
2. For larger spools, or if preferred, filament can also be fed from outside.
3. To feed filament from outside, insert the end of the PTF-Tube into the slot on the side wall -**(see detail A)**
4. Guide the filament through the opening in the side wall.
5. If needed, the folder '*05_STEP_files*' in '*0_Xplorer*' contains a model of a filament spool holder that can be used outside the printer to accommodate different spool sizes. Look for '*400_30__Spool_Holder_Outside__asmbl___V1.0*'.

⚠⚠⚠

A heavy spool requires greater force to pull the filament, which can trigger the 'Filament Tangle Detection' and pause the printing process.

400_30__Spool_Holder_Outside__asmbl___V1.0

15.8 Z-Axis Motors when Power is lost

⚠⚠⚠

When power to the motors is cut (due to a power outage, Klipper restart, M84 G-code, etc.), the print bed will not hold its position and will begin to descend. This effect is most noticeable on the rear Z motor, as it bears the largest share of the bed's weight.

This behaviour has no impact on print quality or performance whatsoever.
It also does not interfere with eventually a future Klipper's power loss recovery feature, since the Z-axis homes at the bottom of the printer (Z-max).

To avoid unnecessary cost and added assembly complexity, it was decided not to include brakes on the Z motors, as the overall benefit to the user is minimal.

15.9 Weight of the printer

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This printer weighs around 35kg — if powerlifting isn't your hobby, we strongly recommend not lifting it alone !!

15.10 Flickering lights

1. In some cases—such as buildings with old electrical wiring or slightly undersized installations—when the print bed regulates its temperature, small voltage drops may cause the lights to flicker.
2. This phenomenon can also occur with other household appliances and is not exclusive to 3D printers.
3. You can eliminate or significantly reduce this effect by uncommenting the '*pwm_cycle_time*' setting for the '*heater_bed*' in the '*printer.cfg*' file.
4. Make sure to use the value that corresponds to the power grid frequency in your country:
    1. For EU countries (50 Hz), use 0.02
    2. For the US and Canada (60 Hz), use 0.0166

This setting synchronizes the bed heater's PWM cycle with your power line frequency, minimizing interference and reducing light flicker

```
120  ##########################################################################################
121  # PID Configs                                                                            #
122  ##########################################################################################
123
124  [extruder]
125  #control: pid
126  #pid_Kp: 24.452
127  #pid_Ki: 2.397
128  #pid_Kd: 62.353
129
130  [extruder1]
131  control: pid
132  pid_Kp: 24.614
133  pid_Ki: 2.413
134  pid_Kd: 62.767
135
136  [heater_bed]
137  #control: pid
138  #pid_Kp:58.857
139  #pid_Ki:2.616
140  #pid_Kd:331.070
141  pwm_cycle_time: 0.02 # use this value for 50Hz power systems (in EU for example)
142  #pwm_cycle_time: 0.0166 # use this value for 60Hz power systems (in USA and Canada for example)
143
```

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Xplorer

Happy printing!

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