ORTUR

Laser Master 2 Pro

FC CE FDA RoHS ☒ ♻

Optional Upgrades

Manual Z-Height

Offline Controller

3 Safety Peotections	Flame Detector	Emergency Stop Button	32-Bits Motherboard	Fast Engraving Speed	Enhanced GrayScale	High Precision	2nd Generation FAC	400×400mm Engraving Area	24V Electric System

User Manual

V1.0 - 01 June 2021

MADE IN CHINA

FC CE FDA RoHS ☒ ♻

Welcome

Thank you for choosing the **Ortur Laser Master 2 Pro!**

This manual will guide you through the steps required to assemble, fine tune and operate your **Ortur Laser Master 2 Pro** safely and productively.
Please do not skip the Security and Safety Guidelines, and refer back to this manual Troubleshooting Section if you encounter any problem.

If this manual does not address an issue you are having, please see below all the contacts on which you could get in touch with our Support Team.

For the most expedite resolution of your problems we ask you to give priority to contacting our Support Team via our ticketing system at https://ortur.tech/support

We strongly recommend joining our Official User Group at Facebook. In This group you will find a community of over 15000 users that are always willing to help and share ideas, tips and trick. https://www.facebook.com/groups/orturusergroup

Online Presence - Links

Description	Link/URL
Laser Master 2 Pro Product Page	https://ortur.tech/olm2pro/
Ortur Knowledge Base/FAQ	https://ortur.tech/kb/docs/
Ortur Customer Support	https://ortur.tech/support/
Ortur User Feedback	https://ortur.tech/feedback/
Ortur Firmware Repository	https://ortur.tech/latest-firmware/
Ortur Product Advisory	https://ortur.tech/product-advisories/
Facebook Page	https://www.facebook.com/realortur
Facebook User Group	https://www.facebook.com/groups/orturusergroup
Youtube	https://www.youtube.com/channel/UCvfgW64XBwJH7yd0E79s8Dg
Instagram	https://www.instagram.com/orturofficial/
Twitter	https://twitter.com/OrturOfficial

QR Codes

OLM2 Pro Product	Customer Support	Facebook-group	Facebook	Youtube_orturfactory	Instagram	Twitter

Contents

WIP

Security & Safety Guidelines

Basic Information

The **Ortur Laser Master 2 Pro** engraves and cuts materials by the means of a high-energy diode laser beam.
The hazards associated with a high-energy diode laser beam include the possibility of **fires**, generation of hazardous and/or irritating **toxic fumes**, but more importantly **damage to eyes and skin**.

International Classifications

Laser engravers are divided into several internationally valid classes based on their performance and the risk of injury. For the scope of this guide we will focus on the American FDA classification, even though there are similar other classification tables.

Laser class	Class Definition
Class I	Class I laser radiation is not considered hazardous.
Class IIa	Class IIa laser radiation is not considered hazardous if viewed for any period of time less than or equal to 1x103 seconds, but is considered a chronic viewing hazard for any period of time greater than 1x103 seconds.
Class IIa	Class II laser radiation is considered a chronic viewing hazard.
Class II	Class IIIa laser radiation is, depending upon the irradiance, either an acute in-trabeam viewing hazard or chronic viewing hazard. If viewed directly with optical instruments, Class IIIa laser radiation is classified as an acute viewing hazard.
Class IIIb	Direct Class IIIb laser radiation is considered an acute hazard to the skin and eyes.
Class IV	Class IV laser radiation is considered an acute hazard to the skin and eyes from both direct and scattered radiation.

The **Ortur Laser Master 2 Pro** falls into the Class IV (Class 4 IEC standard) as it's an open, non-enclosed laser engraver, therefore Personal Protective Equipment (PPE) should be worn at all times – by everyone in the proximity of the machine, when operating the **Ortur Laser Mater 2 Pro**.
*If you enclose your **Ortur Laser Master 2 Pro**, make sure the enclosure follows the above classification guidelines and complies with the international standards.*

Hazards and Precautions

Laser Light

The high energy laser beam can cause severe eye damage, including blindness and serious skin burns.

Improper use of the controls and modification of the safety features may cause serious eye injury and burns.

It is recommended to select a room to operate the **Ortur Laser Master 2 Pro** where access can be controlled by means of a solid door. No direct view to the laser beam should be possible from the outside. When possible, a signs should be used to indicate the **Ortur Laser Master 2 Pro** is in Operation**.**

- **DO NOT** look directly into the laser beam;
- **DO NOT** aim the laser beam at reflective surfaces;
- **DO NOT** operate the laser without PPE protection for all persons nearby in the proximity of the **Ortur Laser Master 2 Pro**
- **DO NOT** allow unsupervised access to the **Ortur Laser Master 2 Pro** to children;
- **DO NOT** allow access near the **Ortur Laser Master 2 Pro** to pets;
- **DO NOT** modify or disable any safety features of the laser system;
- **DO NOT** touch the high energy laser beam;

Personal Protection Equipment (PPE)

Laser Safety glasses are mandatory at all times when adjusting and operating the **Ortur Laser Master 2 Pro**. These should be worn by the user and any person in the proximity of the **Ortur Laser Master 2 Pro.**

- Safety Glasses are designed to filter specific ranges of laser wavelength. The **Ortur Laser Master 2 Pro** Safety Glasses provided are specific for Ortur Laser Module;
- If you wish to purchase additional Safety Glasses, these must be applicable to the **Ortur Laser Master 2 Pro** Laser Module (wavelength and optical density);

Ortur Laser Master 2 Pro Laser Module has a wavelength of **445nm** – the Rating of the Safety Glasses should be no less than **O.D. 4**;

Note: the tint/colour of the Safety glasses is not an indication of their specification

Fire Hazard

The high-energy diode laser beam can produce extremely high temperatures and significant amounts of heat as the substrate material is burned away while engraving and cutting. Some materials are prone to catch fire during cutting operations creating flame, fumes and smoke.

Although the **Ortur Laser Master 2 Pro** has a built in flame sensor, this technology **should NOT be considered 100% accurate and should be seen only as a warning system.**

The flame sensor does not have the ability to extinguish flames. The sensor can only alert the user for the possibility of a flame on the machine. Do not ignore the Flame sensor Alarm!

It is recommended to select a room to operate the **Ortur Laser Master 2 Pro** where access to good ventilation is available as well as make the working area as fire proof as possible. It is important that user remain with the laser during operation to ensure that any flare ups/ flame are properly contained and extinguished.

It is strongly recommended that a Fire Extinguisher should be located within close proximity to the **Ortur Laser Master 2 Pro**. Extinguishers should be halogen or multi-purpose dry chemical. Alternatively or in conjunction with the Fire Extinguisher it is recommended a "Fire Extinguisher Ball" is positioned beside the **Ortur Laser Master 2 Pro.**

- **DO NOT** use materials that are highly flammable, explosive or produce toxic by-products;
- **DO NOT** remove material from the cutting bed before it has cooled;
- **DO NOT** leave the **Ortur Laser Master 2 Pro** operating unattended;
- **ALWAYS** clean up clutter, debris and flammable materials in the laser **Ortur Laser Master 2 Pro** bed after use;
- **ALWAYS** keep a properly maintained fire extinguisher nearby;
- **DO NOT** allow the USB cable to come in contact with the laser Beam;
- **DO NOT** allow the 24v power cable to come in contact with the laser Beam;

Laser Generated Air Contaminants

Laser engraving or cutting will generate fumes, vapours and particulates from the substrate material that can be highly toxic. Is recommended to select a room to operate the **Ortur Laser Master 2 Pro** where access to good ventilation is available and proper ventilation is maintained at all times when the **Ortur Laser Master 2 Pro** is in operation.

Although most of the recommended materials for engraving on the **Ortur Laser Master 2 Pro** are safe, the user should seek information each time a new material is used.

Some materials, specially plastic based, will generate highly toxic fumes that are - not only - very health hazardous but can also damage and corrode your Ortur Laser Master 2 Pro metal frame.

Below a list of some of the most known hazardous materials that the user **SHOULD NOT** attempt to engrave or cut on. If a material is not in this list, do not consider it to be safe to use. Obtain the Safety Data Sheet (SDS) from the material's manufacturer when handling unknown materials.

Material	Reason to avoid engraving / cutting it
PVC (Poly Vinyl Chloride)	PVC will emit Chlorine gas when laser cut or laser engraved. This toxic gas can ruin the optics and motion control system of the laser engraver, In fact, engraving or cutting PVC is a sure way of voiding the warranty of your laser engraver
Lexan / Thick Poly-carbonate	Lexan not only cuts poorly but it also catches on fire very easily. The window of the laser engraving machine is usually made from polycarbonate because it does a very good job of attracting infrared radiation., which is the frequency of light the engraver uses when cutting and engraving materials. This makes the laser cutter quite ineffective in cutting polycarbonate materials
ABS	ABS melts upon exposure to a laser beam as opposed to vaporizing which would be the ideal reaction needed for laser engraving. Instead of leaving a crisp image, ABS will melt and leave a gooey deposit on the surface.
HDPE	HDPE melts and catches on fire pretty easily upon exposure to a laser beam.
Polystyrene Foam	Only very thin pieces can be laser cut but for the most part, polystyrene catches on fire and melts when exposed to a laser beam
Fiberglass	Fiberglass is made from two materials; glass and epoxy resin. The best method of marking glass is etching while epoxy resin can emit toxic fumes upon laser engraving. These two reasons make fiberglass a bad choice for a laser engraving material
Polypropylene	polypropylene melts and catches on fire easily and then the melted material continues to burn thereby forming pebble-like drips that harden on the surface
Coated Carbon Fiber	Coated carbon fiber emits noxious fumes. Additionally, carbon fiber can be cut albeit with some fraying but this is not the case when it is coated.

Specifications

Description	Values
Mechanics	
Working Area	400x400 mm (15.75x15.75 In)
Z-Height Clearance	45mm
Min Engraving Speed	40 mm/min
Max Engraving Speed	10000 mm/min
Frame materials	Aluminium Extrusion V-slot 20x20
	Powder Coated Steel Frame
End-Stops - Limit Switches	Mechanical X and Y Limit switches
Drag Chain - Cable Management	Y Axis Drag Chain - Zip Ties
Timing Belt	GT2 6mm, 2mm Pitch (60cm)
Stepper Motors	Nema 17HS Series
	X-axis 42mmx38mm - 30mm D Shaft
	Y-axis 42mmx29mm - 24mm D Shaft
Sprocket	16mm - 20 Tooth
Y Axis Synchronization Shaft	5mm Stainless Steel
Wheels	D Type POM Wheels (Polyoxymethylene)
	Linear Bearing - 24mmx10.4mm
Laser Module	
Technology	Diode Laser
Wavelength	445nm
Power Input	24v 2Amp
Optical Output (W)	0.5W - 10W (Depending on LU2 model)
Laser Control Mode	PWM 5V 1khz Duty Cycle
S-Value Range	S0-S1000 (0%-100%)
Focus Type	Fixed Focus - 50mm Focal Range
Dot Size at optimal Focus	0.08x0.15mm (Depending on LU2 model)
Laser Class	FDA Class IV; Class 4 IEC standard
Dimensions and Weight	
Packaging Size	66x25x11 cm
Packaging Weight	4.60kg
Machine Size Assembled	57x60x14cm (22.44x23.62x5.51 In)
Machine Weight Assembled	3.8kg
Electricity, Power, Ambient Conditions	
Power Adapter Input Voltage (AC)	110-220v 50-60Hz Single Fase
Power Adapter Output Voltage (DC)	24v 2Amp
Power Consumption	48w
Operating Temperature	-20ºc - 50ºc
Humidity	40% to max. 70% not condensing

Description	Values
Features	
Micro Controller	OLM-Pro-V10 32Bit Micro Controller
Safety Features	Active Motion Protection
	Exposure Duration Detection and Limitation
	Laser Beam Safety Guard
	Flame Detection Sensor
	Emergency Stop Button
	Connection Loss Guard
Software - Operating System	
Micro Controller Firmware	Core GRBL 1.1h
Interface Hardware	USB Serial Com (UART)
	Baud Rate (115200 - 921600) - Default 115200
	Wifi (Optional Add-on)
	BlueTooth (Optional Add-on)
Compatible Operating Systems	Windows XP, Vista, 7, 8 10; MacOs; Linux
	Note: Chrome OS not compatible
Compatible Recommended Software	**Windows:** LaserGrbl, LightBurn
	Mac: LightBurn
	Linux: LightBurn

Diagrams
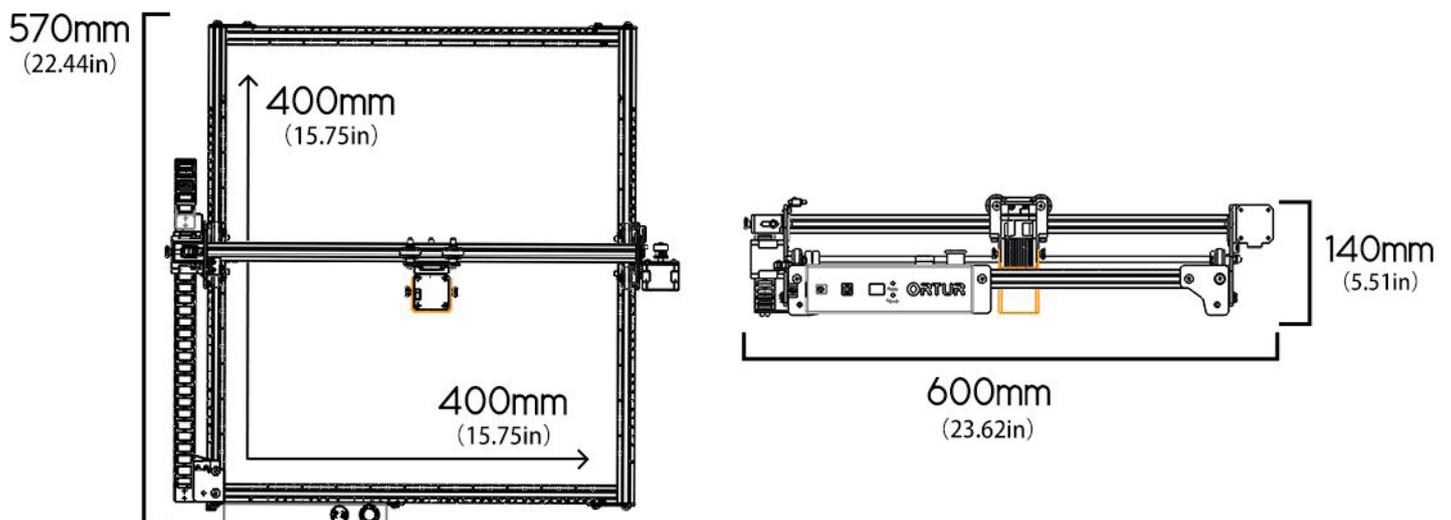
Operational Recommendations and Safety Checks

The **Ortur Laser Master 2 Pro** has built in technology and algorithms to keep its users and the surrounding environment safe. This said its important to understand the **Ortur Laser Master 2 Pro** is not a toy and should be operated with care and respect.

Below a few items in Check List form for your consideration:

WIP

Warranty Periods

The **Ortur Laser Master 2 Pro** has an One-year International Limited Manufacturer warranty. The Ortur warranty is valid from the date of original purchase by the original purchaser.

A manufacturing defect is defined as any fault in the **Ortur Laser Master 2 Pro** parts or workmanship, which is present at time of receipt or during the one year period.

Please note the following warranty terms. One-year International Limited Manufacturer Warranty means that **Ortur** will provide the following free warranty services:

- Diagnostics and Evaluation;
- Technical Support;
- Replacement Parts under Warranty terms;
- Shipping of Replacement Parts under Warranty terms;

The following services are not included but can be provided along side with One-year International Limited warranty:

- Expedite Shipping Service for Replacement Parts under Warranty;
- Terminal Remote access and diagnostics;

How to handle a warranty case

Any warranty case must be submitted to our official support channels (ticketing system or email). In case the product was bought from a reseller, contact us first so that we can help you diagnose the problem, then turn to your reseller for spare parts if needed.

Documentation needed for a warranty case:

1. The number of the original invoice containing the product (and the product's serial number if available).
2. A brief description of the problem along with the clear evidence of its presence (e.g., photos or videos)
3. On the initial contact for Customer Support further tests and diagnostic steps might be required to identify the root cause of the problem.

Limited warranty on consumables

Some parts of the **Ortur Laser Master 2 Pro** inevitably "get used up" over time. For these parts, specific conditions apply, unless failure has occurred due to a defect in materials or workmanship.

Part	Warranty Limitation
Linear Bearing Wheels	Warranty does not apply on normal wear and tear
GT2 6mm - 2mm Pitch Belts	Warranty does not apply on normal wear and tear
Powder-coated Aluminium Extrusion	Warranty does not apply on normal wear and tear
Cables & Drag Chain	Warranty does not apply on normal wear and tear
Cables Ties	Warranty does not apply on normal wear and tear
Cosmetic Appearance & Logos	Warranty does not apply on normal wear and tear

⚠️ **The warranty does not cover normal, expected wear and tear caused by using the Ortur Laser Master 2 Pro for its intended purpose.**

⚠️ **In case we have provided a free replacement part, the warranty does not reset. The original warranty period still applies.**

This warranty is voided by:

- Any damages caused by improper assembly of the product.
- Any damage caused by improper use, maintenance or operation of the printer.
- Any damage caused by long-term lack of maintenance.
- Using the **Ortur Laser Master 2 Pro** in improper conditions (temperature, dustiness...).
- Upgrades, modifications or add-ons that are not officially supported.

ℹ️ Rest assured that our Technical Support Team is always available to help you out under any circumstances, even if the issue is not covered under warranty.
Feel free to contact us with any questions or inquiries in the contact links available at the 1st page of this Manual

Packaging Contents

Please ensure that all parts listed below are included in your **Ortur Laser Master 2 Pro** retail package. If any part is missing, please contact customer support.

Description	Quantity	Label
Main Chassis		
X-Axis Assembly	1	1
Y Aluminium 2020 Profile - 540mm	2	2
X Aluminium 2020 Profile - 460mm	2	3
OLM2 Pro Motherboard Assembly	1	4
Metal Frame Legs	3	5
Metal Y Limit Switch Assembly	1	6
Drag Chain Y Axis Bracket	1	7
Drag Chain Motherboard Bracket	1	8
Drag Chain & Cable Loom Assembly	1	9
Timing Belt - GT2 6mm, 2mm Pitch (60cm length)	2	10
LU2 Laser Module & Safety Cover (Might vary to Specification)	1	11
Laser Cable	1	12
Focal Gauge Holder	1	13
Focal Gauge (50mm)	1	14
Nuts & Bolts		
M5 x 25mm	4	15
M5 x 8mm	14	16
M3 x 5mm	2	17
M3 x 6mm Flat Head	4	18
Profile Corner Bracket	4	19
M5 Profile Nut	6	20
M5 T-Nut	3	21
M5 Washer	4	22
M5 Nut	1	23
Accessories		
24v Power Adapter (Might vary according to Region)	1	24
USB Cables	1	25
445nm Safety Laser Glasses	1	26
2.0mm Hexagon Wrench	1	27
2.5mm Hexagon Wrench	1	28
Nut Wrench	1	29
2mm Cable Ties	8	30
Anodize Aluminium Focal Plate	1	31
Cleaning Brush	1	32
Engraving Sample Materials		
Plywood Business Card Samples	4	33
Black Acrylic Sample	1	34

Ortur Laser Mater 2 Pro Unboxing

Using the table on the previous page, please verify that each part of your **Ortur Laser master 2 Pro** is accounted for in the Product Package.

The box visual aspect, as well as its content layout can be seen in the images above.

The Label column on the table on the previous page can be used to visually identify each component by its number.

The next page will give you a printable, to scale, helper for easier identify each of the bolts and components for assembly. If you wish to print this page, please select Current page only and "Actual Size" on Page sizing options.

Helper Printable Page

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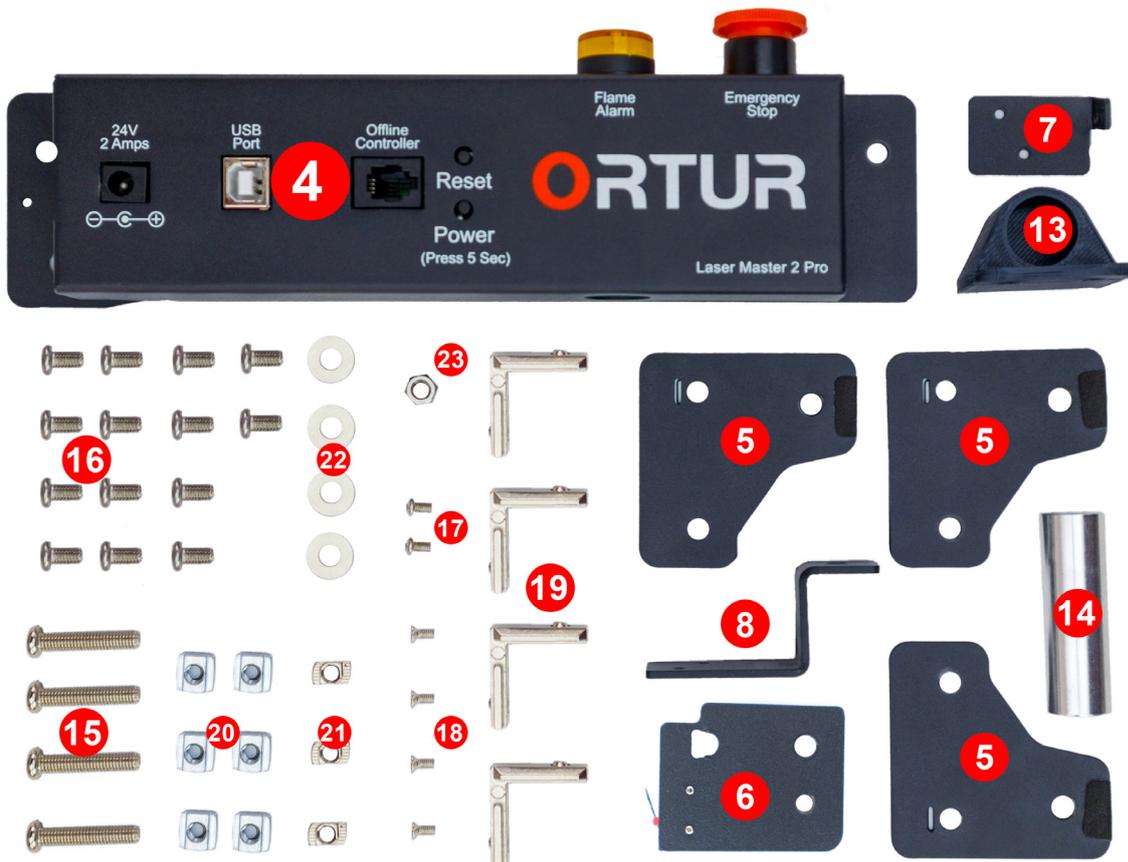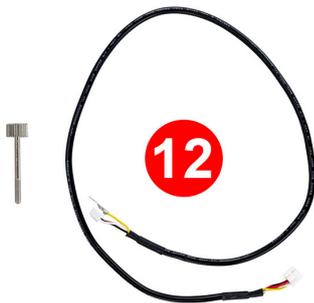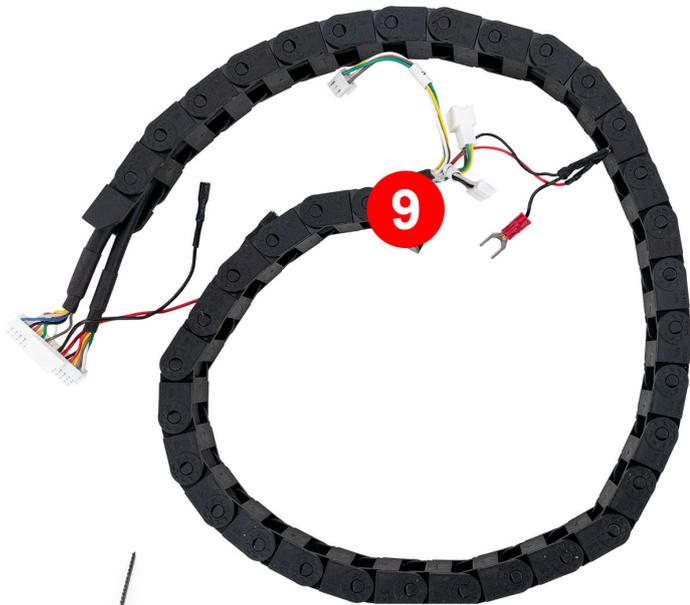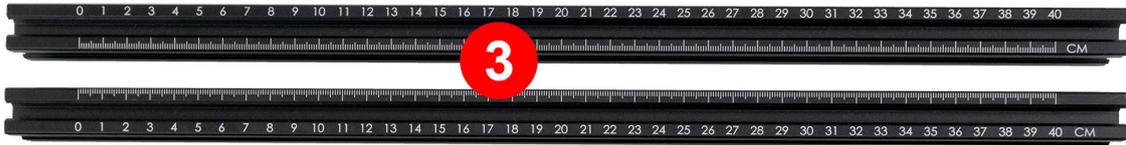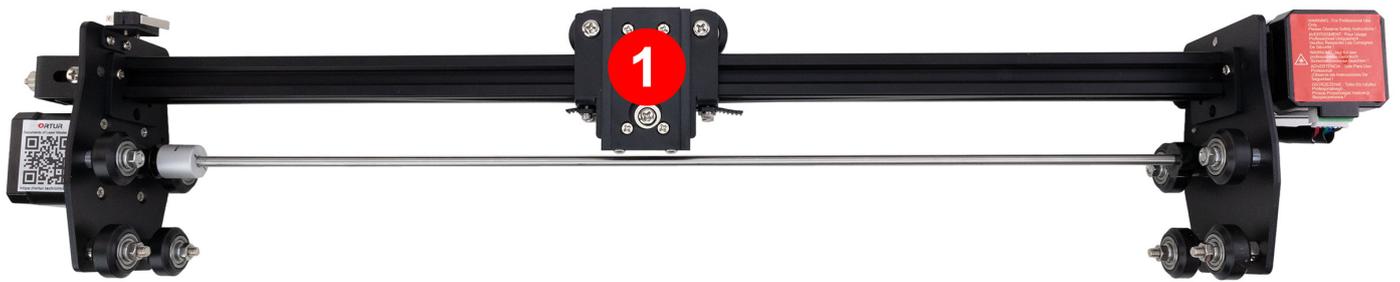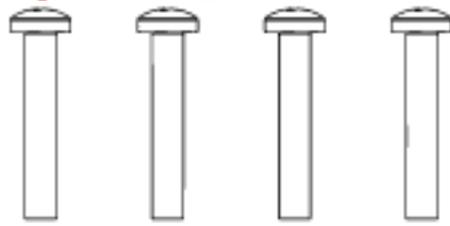
M5x25mm Screws (x4)

M5 Profile Nuts (x6)
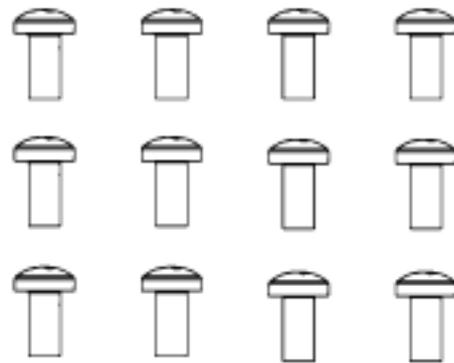
M5 T-Nuts (x3)

M5x8mm Screws (x14)

M5 Washers (x4)

M3x6mm Flat Screws (x4)

M3x5mm (x2)

M5 Nut
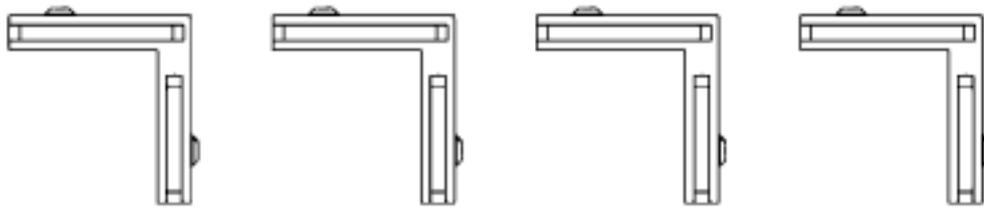
Aluminium Profile Corner Brackets (x4)
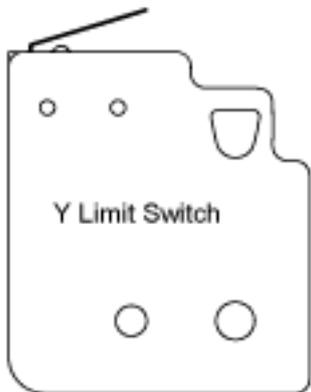
Y Limit Switch
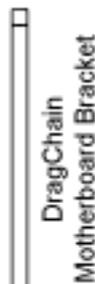
DragChain Motherboard Bracket

Frame Leg

OLM2 PRO MotherBoard
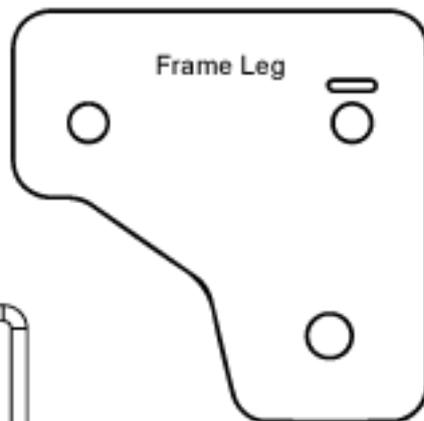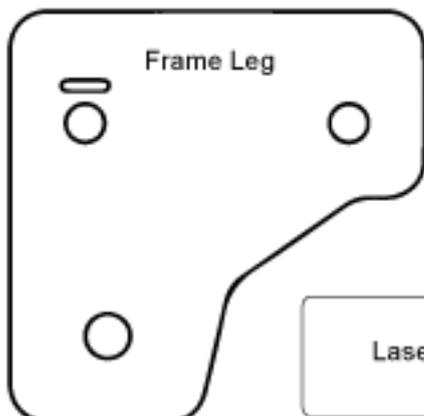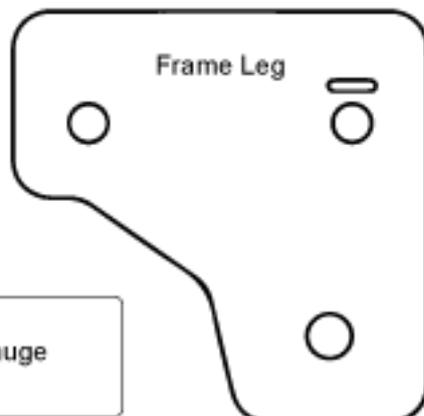
Frame Leg

Frame Leg

Laser Focus Gauge
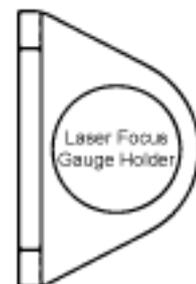
Laser Focus Gauge Holder

Drag Chain Y Axis Bracket

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Ortur Laser Mater 2 Assembly

Required Tools

Besides the included Hexagon Wrenchs and Nut wrench, there will be required a few other tools:

- Phillips Screw driver (needed)
- Cable Cutter (recommended)
- Ruler (nice to have)

Frame Assembly

Step 1

From your parts please select:

Y Aluminium 2020 Profile 540mm x 2 - Label 2
X Aluminium 2020 Profile 460mm x 2 - Label 3
Profile Corner Brackets - x4 - Label 19
M5 x 25mm Screws - x4 - Label 15
Frame Nuts - x4 - Label 20

Tools Required:

Philips Screw Driver
2.5mm Hexagon Wrench

Step 2

This might be one of the **most important** steps of the whole Assembly of your **Ortur Laser Master 2 Pro**. Please pay close attention to the image below and the following Highlights to sure you orient your Rails in the correct way.

- Highlight Image #1 - Notice both rails show scale X 0cm and Y 0cm;
- Highlight Image #2 - Notice orientation of the pre drilled hole in the frame;
- Highlight Image #3 - Notice when in their correct orientation, ALL rails will display in the inner side a scale, and the outer side display numbers. If this is not correct on all 4 rails, please review your rail orientation;
- Highlight Image #4 - Notice both rails show scale X 40cm and Y 40cm;
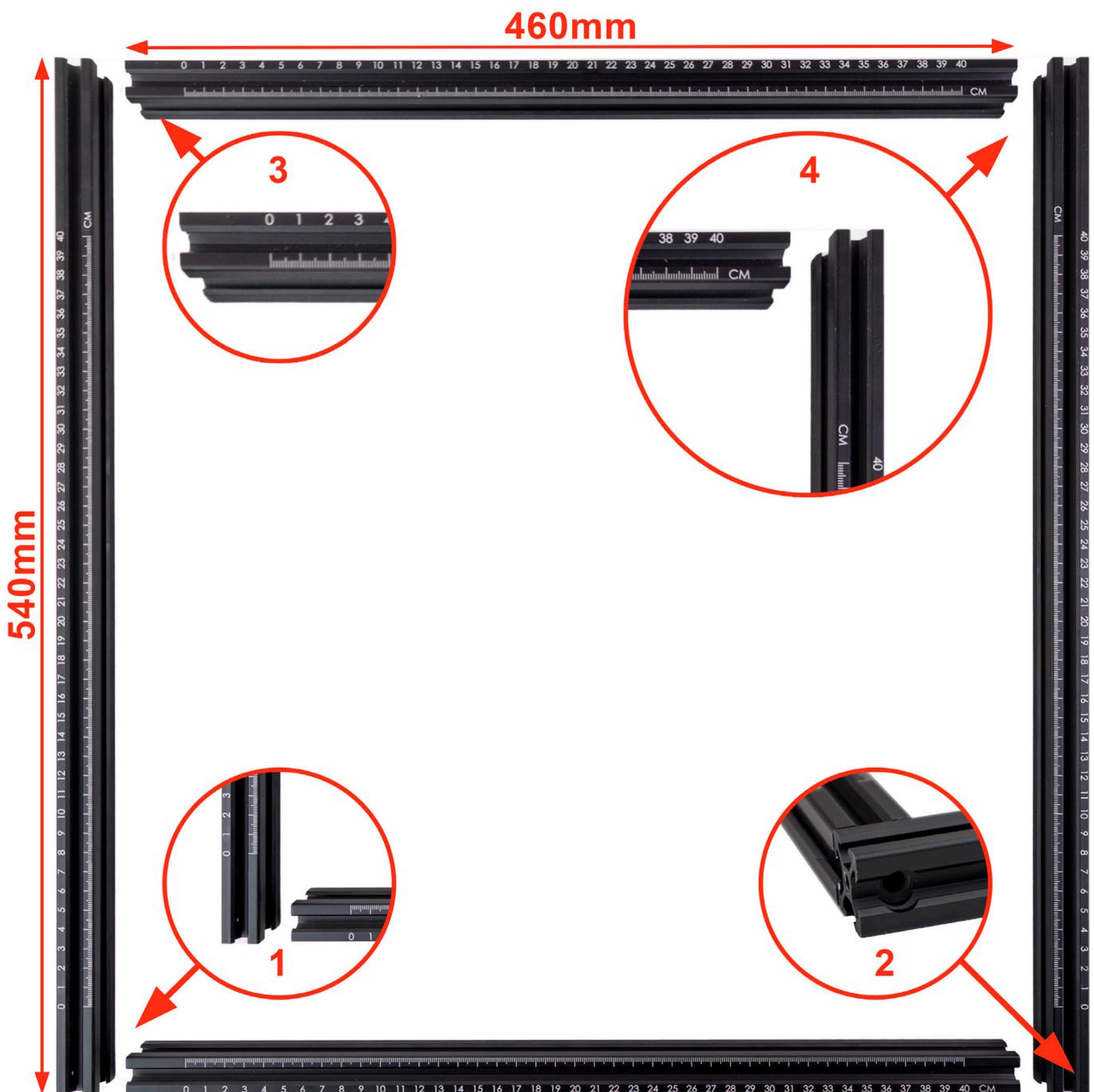
Step 3

1. Slide 2x(two) M5 Profile Nuts into the outer edge - the face showing numbers - of the X axis 460mm rails (Highlight #1 and Highlight #2). **Important step!** Profile nuts will be required at a later step in assembly.

2. Slide 4x Profile Corner Brackets into the joining corners of all rails. Do note, as shown on Highlights #3 #4 #5 and #6 each corner will require a specific orientation of the Profile Corner Bracket. If sliding the Corner Brackets seems difficult, use the 2.5mm Hexagon Wrench to adjust the tightening bolt. Do not tighten the Profile Corner Brackets at this step.
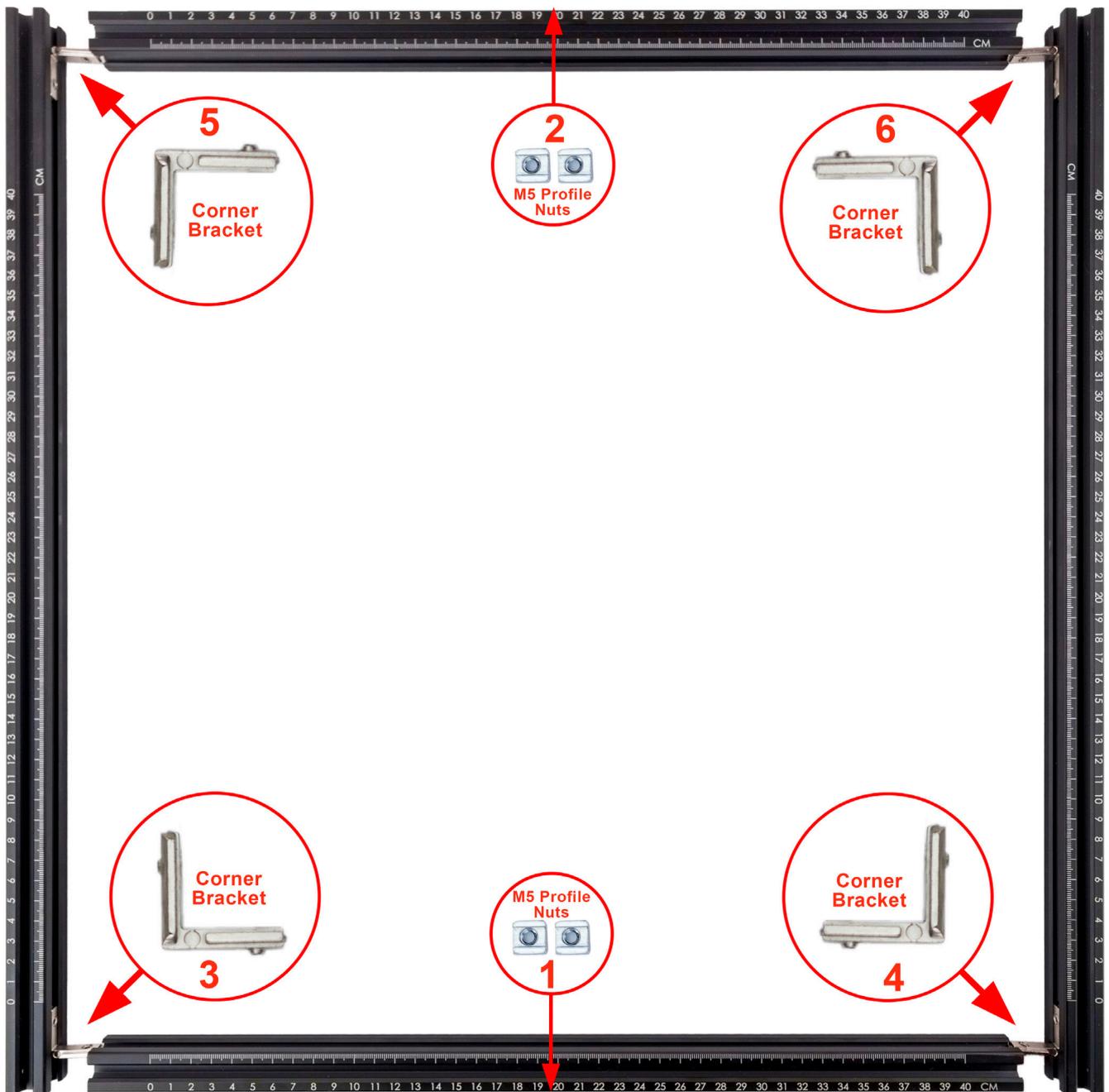
Step 4

1. Slide one M5-25mm screw on each corner of your frame finger tightening them in place. (Highlights #1,#2, #4 and #4)
2. With your Phillips Screw Driver gently tighten the M5-25mm screws so the frame is held together firmly but not fully tightened
3. Before final tightening of the bolts, lay your frame flat on a table, confirming all rails are aligned correctly one last time.
4. Using the 2.5mm Hexagon Wrench tight the 2 screws on each side of all four Profile Corner Bracket.
5. Tighten the M5-25mm firmly with the Phillips Screw Driver.

M5x25mm

Step 4.2   Step 4.4   Step 4.5

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Front Assembly

Step 1

From your parts please select:

OLM2 Pro Motherboard - Label 4
Metal Frame Legs 1x - Label 5
Focal Gauge Holder - Label 13
M5 x 8mm x6 - Label 16
M5 T-Nut x2 - Label 21
M5 Washer x1 - Label 22

Tools Required:

Philips Screw Driver
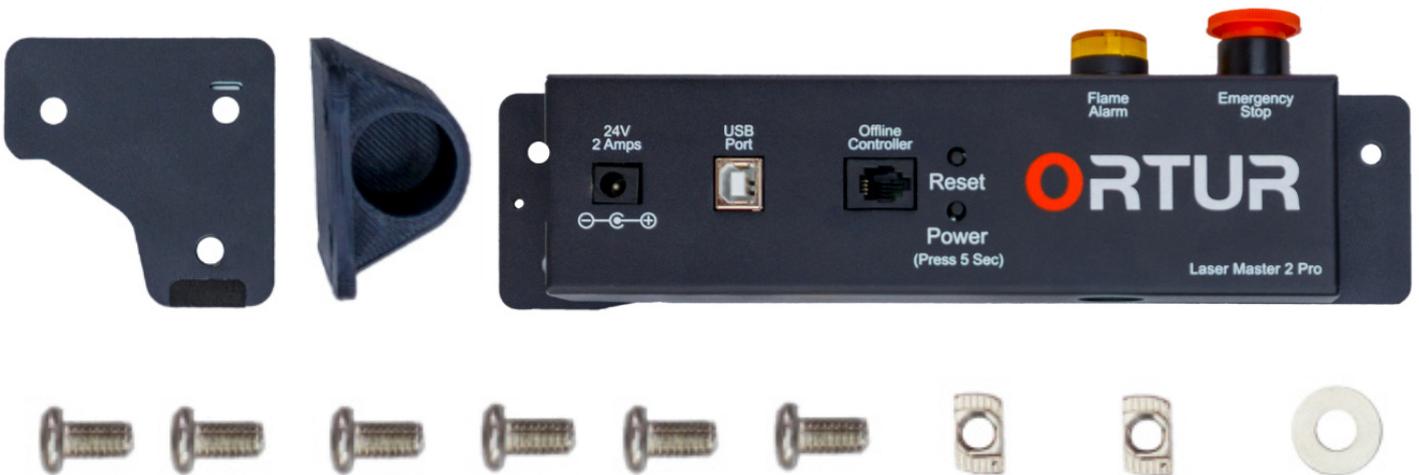
Step 2

After assembling the frame, is important to identify the FRONT - LEFT corner of the machine.

This will be the future Home position or machine origin of your **Ortur Laser Master 2 Pro.**

Note how both scales show 0 CM as start point. No other corner of your machine will show this so you can be certain you have identified your Home/Origin corner.
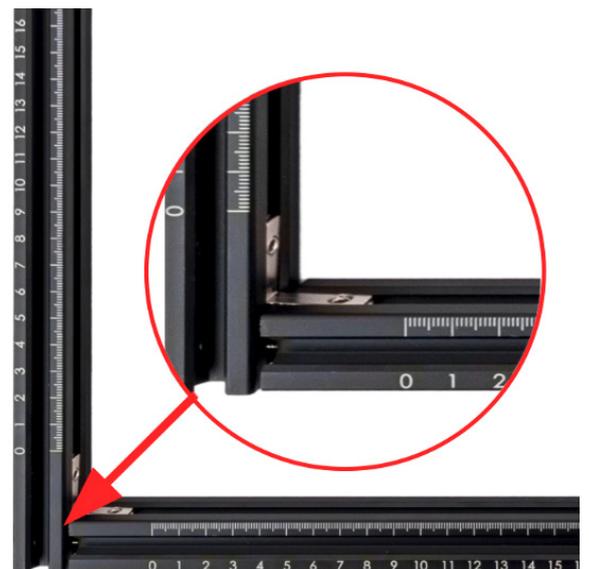
Home Location - X0,Y0

Step 3

Move the left most M5 Profile Nut to the 17cm mark on the frame rail. Align the Ortur Laser Master 2 Pro Motherboard for confirmation

Step 4

Align both holes in the Motherboard plate with the frame so you can finger tight the M5 x 8mm Screws into the M5 Profile nut the V-Slot top threaded hole.

Step 5

Using your Phillips Screw Driver, firmly tighten both M5 x 8mm Screws making sure the left side of the Motherboard Plate aligns Vertically with the Y 540mm Rail

Step 6

Move the right most M5 Profile Nut to the middle of the 40 and the CM mark on the frame rail. Align the Metal Frame Leg for confirmation placement

Step 7

Align both holes in the Metal Frame Leg with the frame so you can finger tight the M5 x 8mm Screw into the M5 Profile nut. On the right side slide a M5 Washer on the M5 x 8mm Screw and **finger tight** the screw into the V-Slot top threaded hole.

Step 8

Using your Phillips Screw Driver, firmly tighten the LEFT M5 x 8mm into the M5 Frame Nut.

The Right M5 x 8mm with a M5 Washer please leave finger tight at this stage of assembly.

Step 9

Slide a M5 x 8mm screw into each hole of the Focal Gauge Holder.

On the back of each M5 x 8mm, screw in a M5 T-Nut in order for the T-Nuts to be horizontally aligned.

Step 10

Slide Laser Gauge Holder Assembly into the Front face of the rail. Notice the M5 T-Nuts will slide into the rail without issues if they are horizontally Aligned. The Laser Gauge Holder should stay in place.

Step 11

Using your Phillips Screw Driver, tighten both M5 x 8mm Screws. This action will rotate the M5 T-Nuts and lock them in place.

Caution: Being this a 3D Printer Part, please do not apply too much torque.

The location of the Laser Gauge Holder is at the user full discretion along Rail.

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DragChain Motherboard Bracket Assembly

Step 1

From your parts please select:

Drag Chain Motherboard Bracket - Label 8
M5 x 8mm x1 - Label 16
M5 T-Nut x1 - Label 21
M5 Washer x1 - Label 22

Tools Required:

Philips Screw Driver

Step 2

Carefully Flip the **Ortur Laser Master 2 Pro** in order to access the underside of the frame.
Make sure no force or pressure is applied to the buttons at the top location of the Motherboard Assembly.

Step 3

Slide a M5 x 8mm screw into short side of the DragChain Bracket.
On the back of each M5 x 8mm, screw in a M5 T-Nut in order for the T-Nuts to be horizontally aligned.

Step 4

Slide DragChain Bracket into the Bottom face of the rail. Notice the M5 T-Nuts will slide into the rail without issues if it is horizontally aligned. The DragChain Bracket should stay in place.

Step 5

Using your Phillips Screw Driver, tighten the M5 x 8mm Screw. This action will rotate the M5 T-Nut and lock it in place. Tight the Screw firmly, confirming the DragChain bracket is firmly secured square against the back of the Motherboard plate and square with the frame.

X-Axis Assembly

Step 1

From your parts please select:

    X-Axis Assembly - Label 1
    M3 x 5mm - x2 - Label 17
    Frame Nuts - x2 - Label 20

Tools Required:

    Philips Screw Driver

M3x5mm

Step 2

Slide the two M3 x 5mm screws into the Drag Chain Y Axis Bracket small metal fold

Note the two holes on the larger plate are not to be used at this stage of assembly

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Step 3

On the left side of the X-Axis Assembly, locate the 2 small holes just above the Y stepper motor. Finger tighten the two M3x5mm screws into the pre tapped holes. *Given the tight area using the Phillips screw driver might help align the screws into position.*

Step 4

Using your Phillips Screw Driver, tighten both M3 x 5mm screws firmly Confirming the Drag Chain Y Axis Bracket is firmly secure and in the orientation presented in the image.

Step 5

Rotate your **Ortur Laser Mater 2 Pro** frame so it faces up again.
Rotate it again so the back side of the machine is facing you and the motherboard is facing the back.

Step 6

Slide 2x(two) M5 Profile Nuts into the top face of the Y axis 540mm right side rail. The same side where the Motherboard Assembly is located.
Important step! M5 Profile Nuts will be required at a later step in assembly.

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Step 7

Slide the 2x(two) M5 Profile Nuts along the right side 540mm Y axis rail until both are at the end, right against the Motherboard Assembly bracket.

Step 8

Align the X-Axis Assembly with the back of the Frame.

Note rotation of the X-Axis Assembly:
- The screws should be visible to the back;
- The X Axis Stepper Motor facing **LEFT**;
- The X Belt tensioner the **RIGHT**;
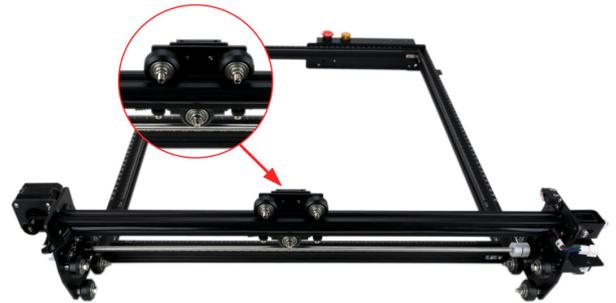
Step 9

Carefully lift the Frame and guide it between the left and right set of wheels.
Notes:
- Make sure the wheels align with the frame V-slot.
- Only a small amount of force should be required to slide X-Axis Assembly.

Step 10

Slide the X-Axis Assembly fully into the frame until all four wheels per side are covering the frame.
Take one last moment to confirm:
- All 8 wheels are sliding smoothly along the V-slot of both Y-Axis rails;
- The X-Axis Assembly Rotation is correct as per image and description of Step 6;

Timing Belts

> ⓘ **The Ortur Laser Mater 2 Pro** uses GT2-6mm, 2mm tooth pitch timing belts. The X-Axis belt comes pre-assembled.

Details about Timing Belts

The **Ortur Laser Mater 2 Pro** uses stepper motors to drive the sprocket, which in turn use the timing belts to create the motion on the X-Axis and Y-Axis.
Notice the image to the right how:
a) Flat side of belt always faces up;
b) Tooth Side of belt always faces down;

Flat Side

Tooth Side
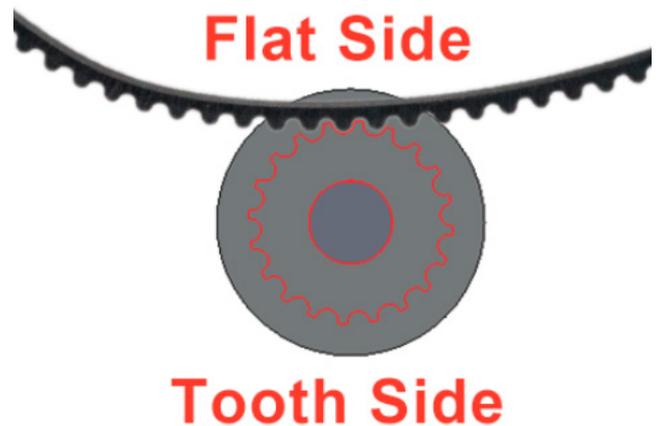
> ⓘ **Timing Belts** settle in with use and expand slightly in the firsts weeks of use. Therefore checking the tension of your belts should be part of the periodic Maintenance of your **Ortur Laser Mater 2 Pro.**

Timing Belts Y-Axis Routing

In the images below you can see a cross section cut of the Y-Axis Sprocket and wheels. As it can be seen the Timing belt is routed with the tooth facing down in the following way: **Under Wheel -> Over Sprocket -> Under Wheel**

ORTUR
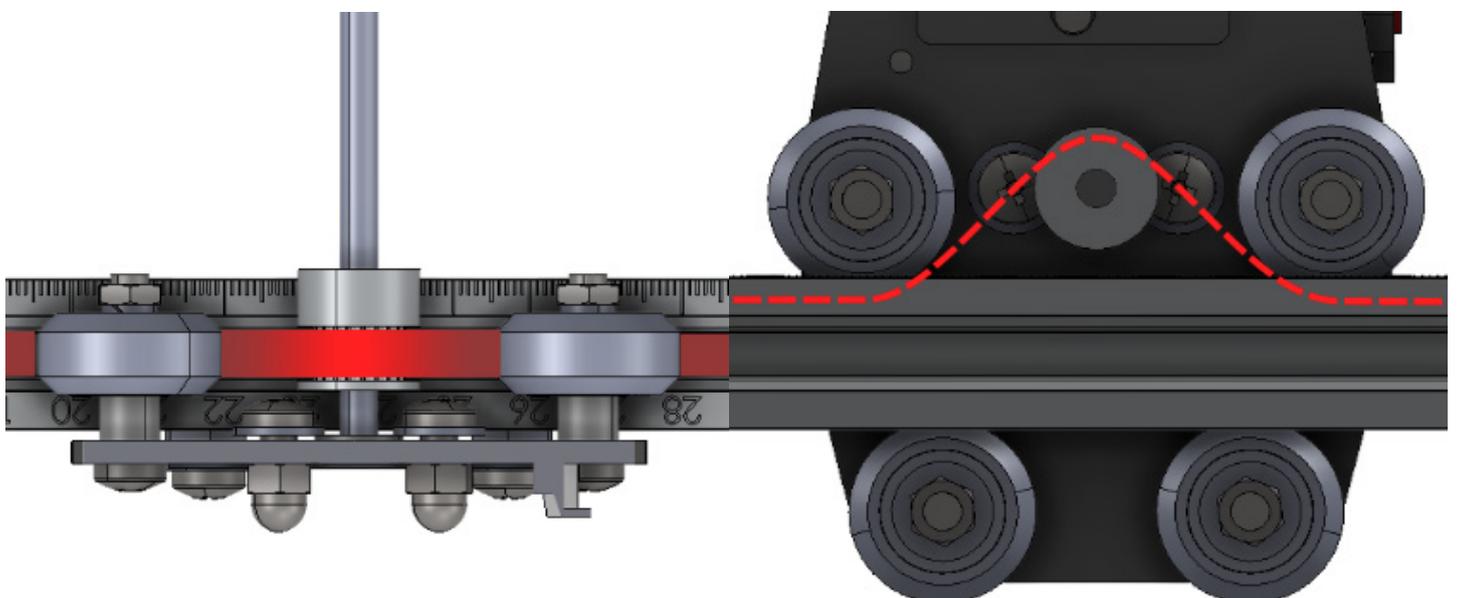
Timing Belts - Y Axis

Step 1

Carefully guide the Timing Belt with tooth facing down over the sprocket and under the left side wheel, sliding it inside and along the V-Slot of the Y rail.
Slide the belt until the end of the belt reaches and goes past the left side end of the rail by about 6 cm.

Step 2

Holding the opposite end of the Timing Belt, making sure there is no twist on it, guide the Belt with tooth facing down over the sprocket and under right side the wheel, sliding it inside and along the V-Slot of the Y rail. Slide the belt until the end of the belt reaches and goes past the right side end of the rail by about 3 cm.

Step 3

Once this process is done the belt can be left slightly loose at this stage of assembly and should resemble the image to the right. Make sure once more the tooth side of the Timing Belt is facing Down against the sprocket and the flat side is facing up.

Timing Belts - Y Axis - Stepper Motor Side

Step 1

Carefully guide the Timing Belt with tooth facing down over the sprocket and under the left side wheel, sliding it inside and along the V-Slot of the Y rail.
Slide the belt until the end of the belt reaches and goes past the left side end of the rail by about 6 cm.

Step 2

Holding the opposite end of the Timing Belt, making sure there is no twist on it, guide the Belt with tooth facing down over the sprocket and under right side the wheel, sliding it inside and along the V-Slot of the Y rail. Slide the belt until the end of the belt reaches and goes past the right side end of the rail by about 3 cm.

Step 3

Once this process is done the belt can be left slightly loose at this stage of assembly and should resemble the image to the right. Make sure once more the tooth side of the Timing Belt is facing Down against the sprocket and the flat side is facing up.

Timing Belts Tightening - Front Side

After both left and right side Y-Axis Timing belts are assembled your **Ortur Laser Mater 2 Pro** should look similar to the image below. Note the belts excess will be mostly extended on the back of the machine.
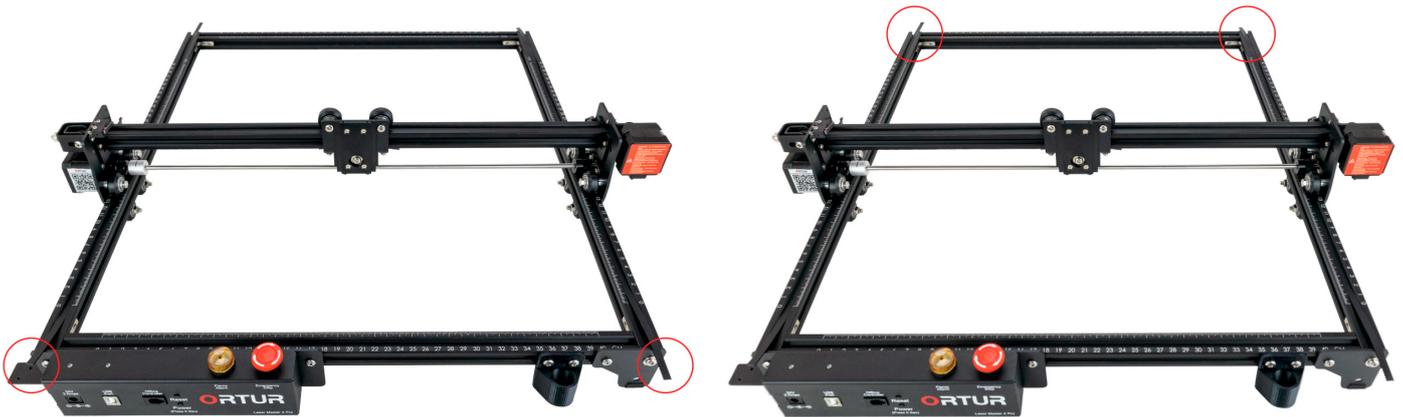
Step 1

Using your Phillips screw driver, remove the M5 x 8mm Screw and M5 Washer from the front right Metal Frame Leg.
Slide the belt through the Timing Belt slit in the Metal Frame Leg.

Step 2

Slide the belt further through the belt slit in the Metal Frame Leg . Roughly 2.5cm of Timing Belt is required on the outside.
Note: This measurement does not need to be exact but should be enough length to easily hold the belt with your fingers.
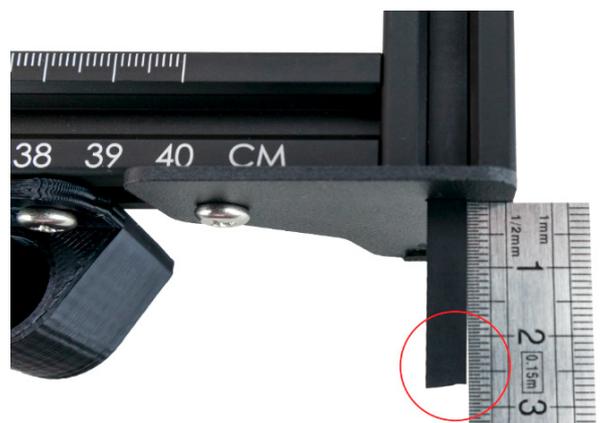
Step 3

Bend the belt upwards, leaving exposed just 2.5cm of Timing Belt.

Note: Confirm at this point that in fact the Tooth side of the belt is facing down and towards you as you bend the belt.

Step 4

Slide the earlier removed M5 x 8mm Screw with a M5 Washer into the right side hole of the Metal Frame Leg, pinching the Timing belt.

Using your Phillips Screw Driver firmly tighten the M5 x 8mm Screw.
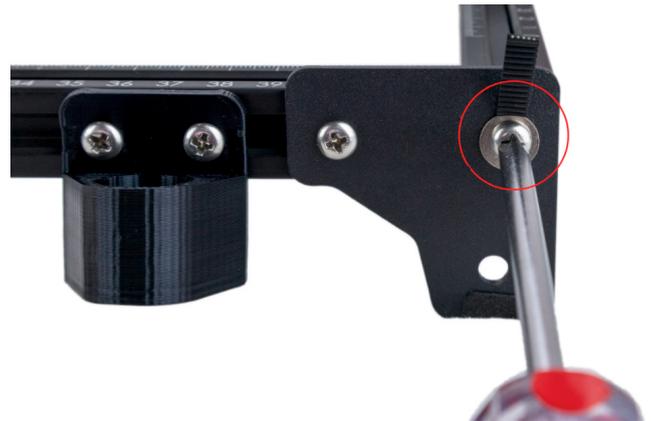
Step 5

Locate the Left - Front corner of your **Ortur Laser Mater 2 Pro** and slide the belt back so just roughly 1cm of belt is past the Y-Axis rail.

Locate from your parts:

Metal Y Limit Switch Assembly - Label 6
M5 x 8mm x2 - Label 16
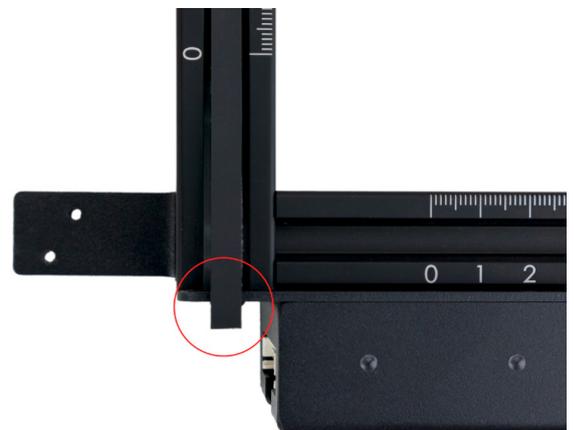
Step 6

Hold the Metal Y Limit Switch Assembly and slide from underneath the Timing Belt into the D shape pre-drilled hole as shown in the illustration.

Note: No more than 2.5 Cm of Timing Belt is necessary on the top side of the Metal Y Limit Switch Assembly.

Step 7

Holding the Metal Y Limit Switch Assembly and the Timing Belt pinched tightly as in the image, slide the two M5 x 8mm Screws into the pre-drilled holes highlighted in the image.

Step 8

Using the Metal Y Limit Switch Assembly, position it besides the Y-Axis rail to align the two M5 Profile Nuts installed previously to the M5 x 8mm Screws inserted in the previous step.

Step 9

Align and finger tighten the M5 x 8mm Screws into the M5 Profile Nuts.
Once the Metal Y Limit Switch Assembly is secure in place slide it into the Motherboard Assembly so no gap is present

Step 10

Using your Phillips Screw Driver firmly tighten both M5 x 8mm Screw into the M5 Profile Nuts.
Make sure there is no space/gap between the Metal Y Limit Switch Assembly and the motherboard Assembly
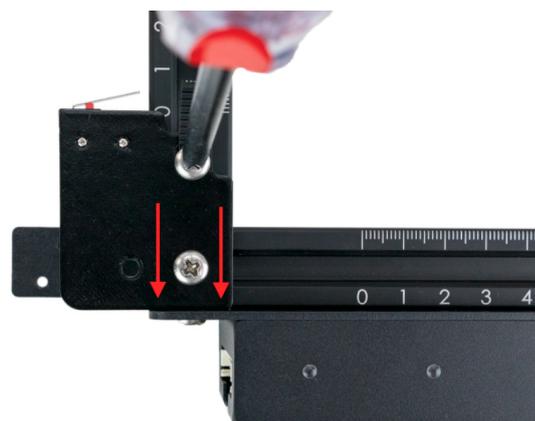
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Timing Belts Tightening - Back Side

Rotate your **Ortur Laser Mater 2 Pro** in order to access the back side of the machine more easily.

Step 1

From your parts please select:

M5 x 8mm x4 - Label 16
M5 Washer x2 - Label 22
Metal Frame Legs x2 - Label 5

Tools Required:

Philips Screw Driver
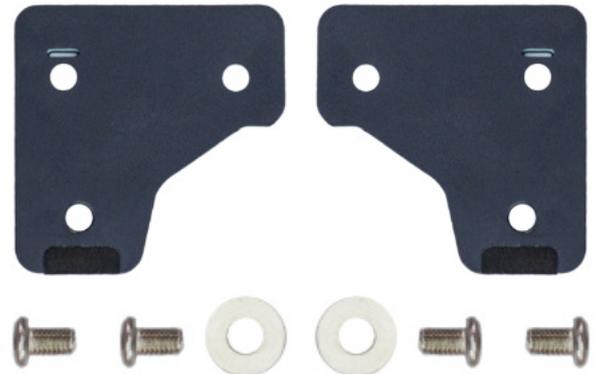
Step 2

Locate the left side of the back of your machine. Align the M5 Frame Nut and position it roughly between the 40 and the CM mark on the rail.

Step 3

Hold the Metal Frame Legs as in the illustration and slide the Timing Belt from the back into the Slit pre-drilled hole.
Note: Pull all the belt until there is no loose belt inside the Y-Axis Rail.

Step 4

Using the Phillips Screw Driver, guide and tight loosely a M5 X 8mm Screw into M5 Frame Nut.
Note: At this stage of assembly don't fully tighten this bolt.

Step 5

Hold the Timing Belt firmly, pull it as hard as possible - without tools - outwards then bend the Timing Belt up making sure to keep constant firm pressure.

Note: This step might be better executed with someone help.

Step 6

While holding the Timing Belt firmly, slide the M5 x 8mm Screw with a M5 Washer into the left side hole of the Metal Frame Leg, pinching the Timing belt.
Using your Phillips Screw Driver firmly tighten the M5 x 8mm Screw.

Step 7

Using your Phillips Screw Driver, make sure both M5 x 8mm Screws are firmly tight into the frame.
Confirm that the Timing Belt presents proper tension referring to the next page Guide.

Repeat the exact same steps from 1 to 6 on the opposite right side of your **Ortur Laser Mater 2 Pro.**

Once completed your **Ortur Laser Mater 2 Pro** should look as the illustration to the right with the excess of the Timing Belts mostly exposed on the back of the machine.
Please review carefully the next considerations regarding Timing Belt Tension.

Important note regarding Timing Belt tension

Defining with words how tight or loose a Timing belt should be is quite a difficult task. However there are some visual cues and rules of thumb that can be always applied:

- Timing Belts should be, while machine is idle, in full tension;
- Timing Belts should be firm and show no waves or droop into V-slots;
- Timing belts should require no more than the force of your hands to be set in tension. Avoid the use of pliers or other tools to pull on the Timing Belts;
- It would be always preferable to have someone to help when addressing Timing Belts tensioning. One person holds the Timing Belts in tension, the other person slides and tightens the M5 x 8mm and M5 Washer;
- It is possible to Over Tension the Timing Belts. Causing the Stepper Motors to have to work harder than necessary;
- Either Over Tension or Lack of Tension will create visible artefacts on the engraving and cutting final results;

In the illustration below, and just as a visual representation, it can be seen Timing Belts that show themselves Very Loose, Loose and in Perfect Tension.

Very Loose Timing Belt

Loose Timing Belt

Timing Belt in Perfect Tension

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Drag Chain & Cable Loom Assembly Installation

Step 1

From your parts please select:

Drag Chain & Cable Loom Assembly - Label 9
M3 x 6mm Flat Head x4 - Label 18
M5 x 8mm x1 - Label 16
M5 Nut x1 - Label 23

Tools Required:

Philips Screw Driver
Nut Wrench

Step 2

Bring the Drag Chain & cable Loom assembly closer to your **Ortur Laser Master 2 Pro**. Confirm the end of the DragChain with the Big connection is the one used near the Motherboard Assembly.

Step 3

Slide Two M3 x 6mm Flat Head Screws into the DragChain Bracket pre-drilled holes, making sure you hold the cables back to allow access to the Philips screw Driver.

Note: Given the size of the M3 x 6mm screws, this step might be slightly difficult.

Step 4

Using your Phillips Screw driver, guide and start tightening the two M3 x 6mm screws into the Drag Chain Motherboard Bracket pre-drilled holes..

At this step of assembly do not fully tighten the M4 x 6mm screws.

Step 5

Using your Phillips Screw driver tighten the M3 x 6mm screws making sure the DragChain & Cable Loom assembly and the Drag Chain Motherboard Bracket are aligned perfectly.
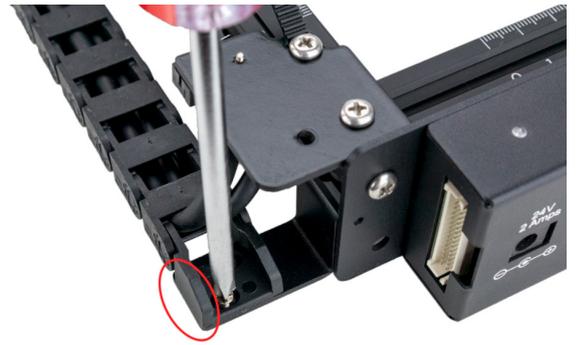
Step 6

Slide Two M3 x 6mm Flat Head Screws into the DragChain Bracket pre-drilled holes, making sure you hold the cables back to allow access to the Philips screw Driver.

Note: Given the size of the M3 x 6mm screws, this step might be slightly difficult.
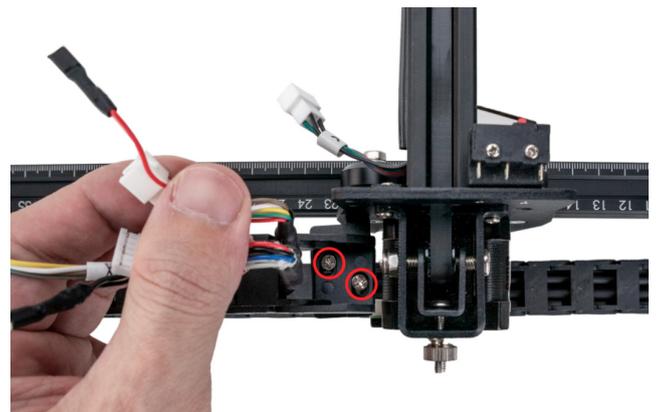
Step 7

Using your Phillips Screw driver, guide and start tightening the two M3 x 6mm screws into the Drag Chain Y Axis Bracket pre-drilled holes..
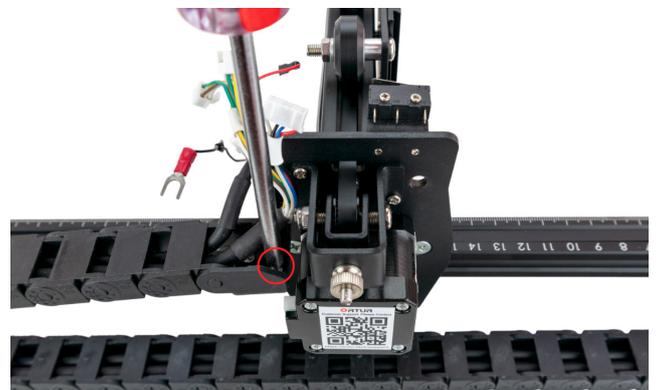
At this step of assembly do not fully tighten the M4 x 6mm screws.

Step 8

Using your Phillips Screw driver tighten the M3 x 6mm screws making sure the DragChain & Cable Loom assembly and the Drag Chain Y Axis Bracket are aligned perfectly.

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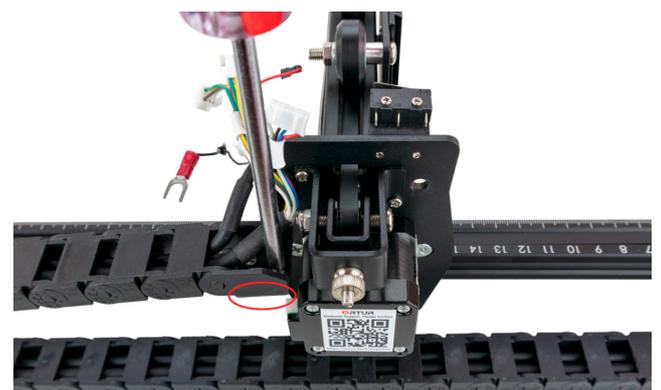
Step 9

Identify the pre-drilled hole in the X-Axis Assembly metal frame highlighted in the illustration to the right.

This is a pre-assemble step and the location will be used in future steps.
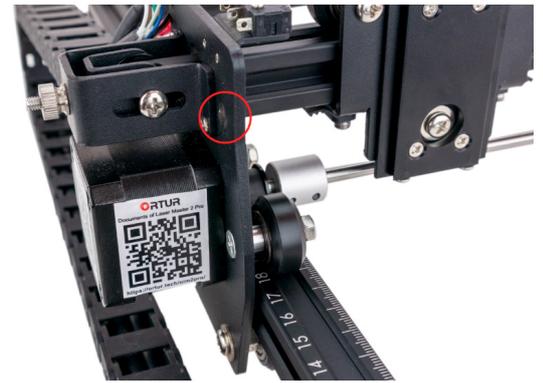
Step 10

Slide the M5 x 8mm Screw through the pre-drilled hole from the left, capping it on the other side - right side - with a M5 Nut.

Note: At this point of assembly leave the M5 x 8mm screw and M5 Nut very loose.
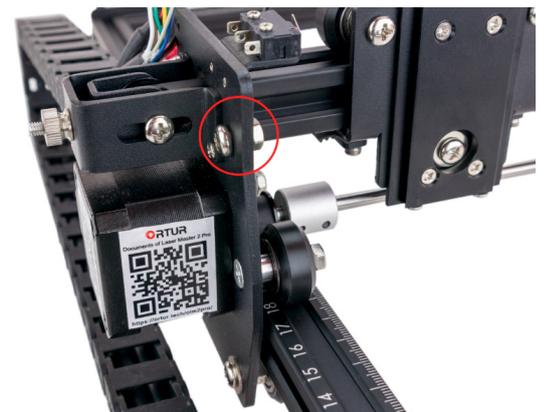
Wiring Installation and Connections

Mechanical Limit Switches

Before starting plugging the wires in your **Ortur Laser Master 2 Pro** its worth pausing for a moment to discuss Mechanical Limit Switches. Your **Ortur Laser Master 2 Pro** uses Mechanical Limit Switches to identify the Home Location or X0,Y0. These switches have 3 wiring posts, however **only two are required to be wired**. In the past many of Ortur Laser Master Series users found difficulties identifying which posts to wire so lets stablish the standard.
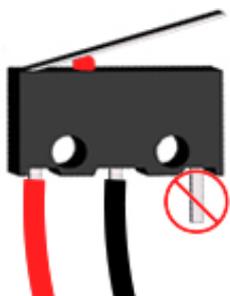
In Technical Terms the **Ortur Laser Master 2 Pro** uses Normally Open Limit switches operations so on both of the limit switches we will only use two posts. The **middle post (3)**, as well as the post **under the Switch Hinge(1)**. The third post(2) will never is to be used.

Step 1

Align and Slide the PHB2.0-32 connector into the Motherboard carefully. Press the connector from both ends with your fingers until this clicks and locks in place.

Note: No force is required to Plug the PHB2.0 connector. If the connector refuses to engage please verify the alignment.
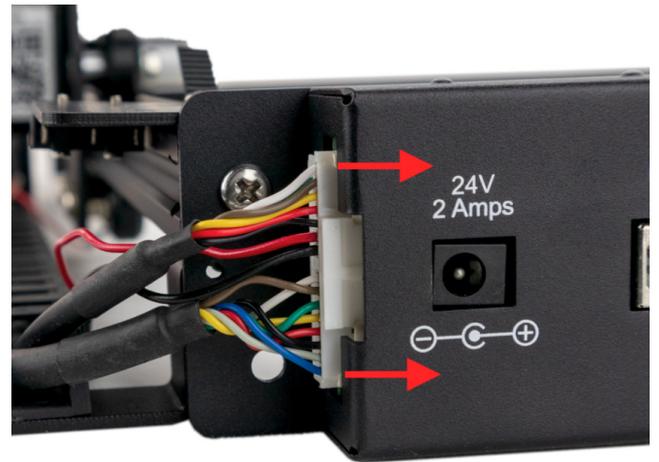
IMPORTANT: Use the following illustration to confirm that the PHB2.0-32 Connector is seated properly into the motherboard. If you notice any angle in the connector please press the connector further with your fingers until it is parallel with the motherboard.

Y-Axis Limit Switch

Step 1

Lift the your Ortur Laser Master 2 Pro in order to have easy access to the underside of the Metal Y Limit Switch Assembly.

Note: Only the left most and centre posts of this Mechanical Limit Switch will be used. Refer back to Mechanical Limit Switch considerations on previous page.
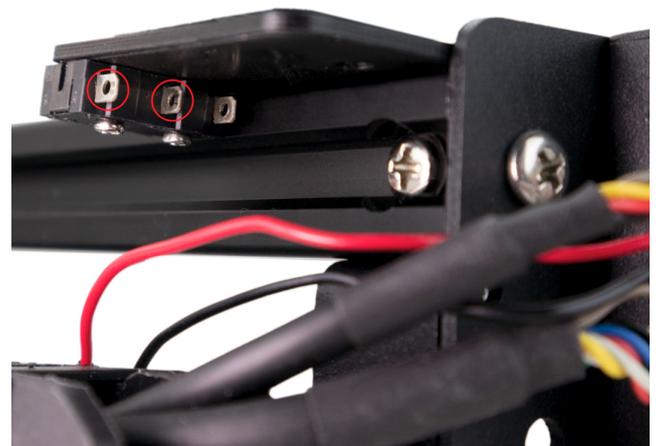
Step 2

Route the crimped terminal with a thin black wire that is bundled with the PHB2.0-32 Pin connector and insert it carefully into the middle post of the Y-Axis Limit Switch.

Step 3

Route the crimped terminal with a thin red wire that is bundled with the PHB2.0-32 Pin connector and insert it carefully into the left post of the Y-Axis Limit Switch.

Y-Axis Limit Switch

Step 1

Route the crimped terminal with a thin black wire that exits the DragChain and insert it carefully into the middle post of the X-Axis Limit Switch.
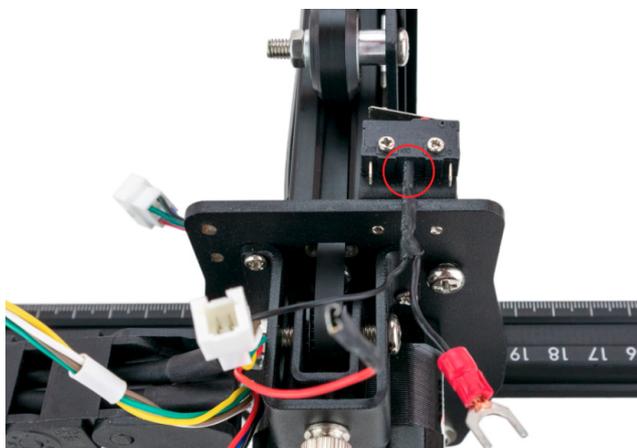
Step 2

Route the crimped terminal with a thin red wire that exits the DragChain and insert it carefully into the right most post of the X-Axis Limit Switch.
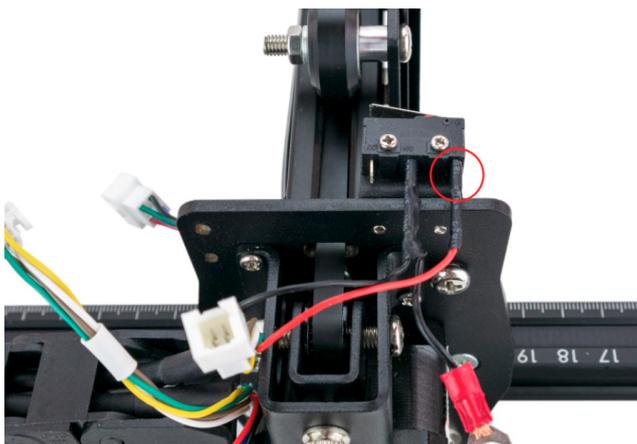
Grounding Wire

Step 1

Route the crimped terminal with a thin black wire and a red plastic ring underneath the M5 x 8mm Screw in the X-Axis Metal structure. If the crimped terminal does not slide easily under the M5 x 8mm Screw, gently loosen the M5 Nut further.
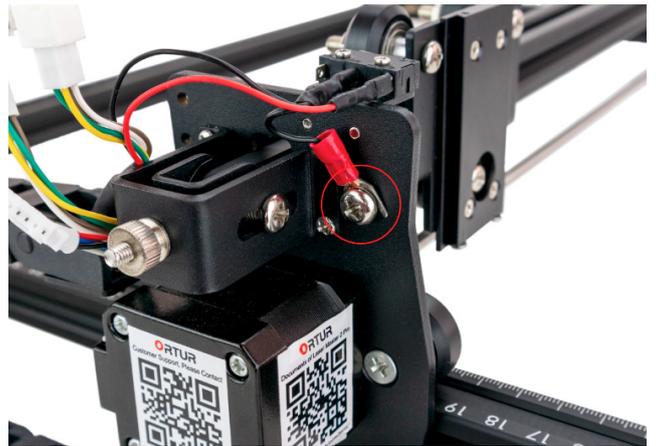
Step 2

Using the Phillips Screw driver and the provided Nut Wrench, tighten fully the M5 x 8mm Screw into the M5 Nut.
This connection needs to be as firm as possible. This is one of the grounding points of your **Ortur Laser Master 2 Pro**.
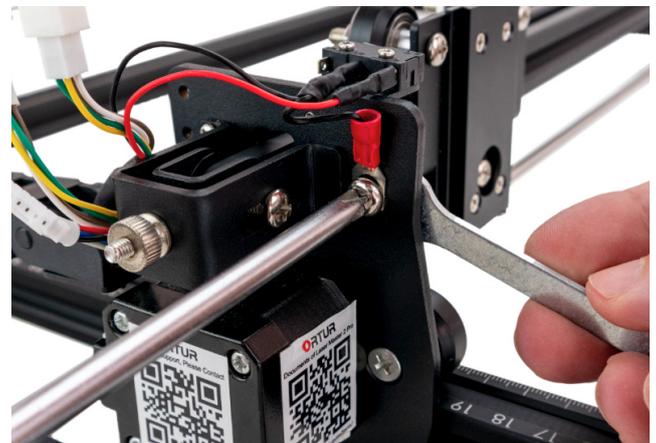
Y-Axis Stepper Motor

Step 1

Route carefully and gently the Y Labelled XH2.54mm 6 pin connector under the DragChain.
Rotate it so it is angled parallel with the Stepper Motor female connector. Gently press it in so it engages fully.

IMPORTANT: Use the following illustration to confirm that the XH2.54mm Connector is seated properly into the Y-Axis Stepper Motor. If you notice any angle in the connector please press the connector further with your fingers until its parallel with the Stepper Motor body.

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X-Axis Stepper Motor Cable Connector & Motor

Locate and route both PH2.0 6 Pin connectors X Labelled. Rotate them so the locking mechanisms on both is aligned. Press both connectors until they lock in place.
Note: These connectors have polarity so they will only slide into each other in the correct rotation and orientation.
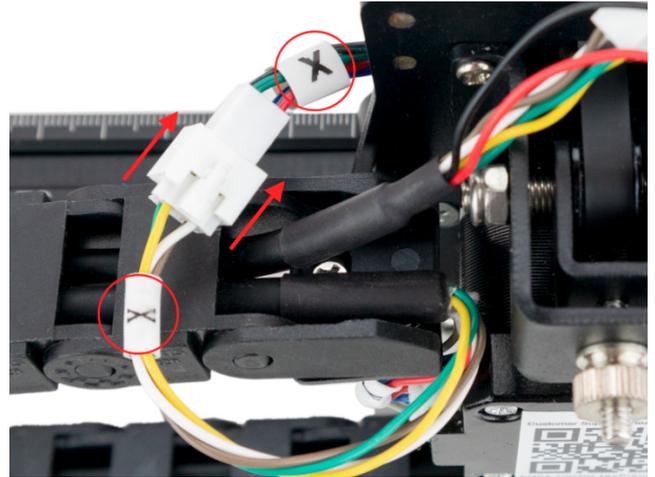
Step 1

Route carefully and gently the Y Labelled XH2.54mm 6 pin connector under the DragChain.
Rotate it so it is angled parallel with the Stepper Motor female connector. Gently press it in so it engages fully.

IMPORTANT: Use the following illustration to confirm that the XH2.54mm Connector is seated properly into the X-Axis Stepper Motor. If you notice any angle in the connector please press the connector further with your fingers until its parallel with the Stepper Motor body.

Laser Module Wire

Locate the Laser Cable (Label 12) and route both PH2.0 4 Pin connectors. Rotate them so the locking mechanisms on both is aligned. Press both connectors until they lock in place.
Note: These connectors have polarity so they will only slide into each other in the correct rotation and orientation.

ORTUR
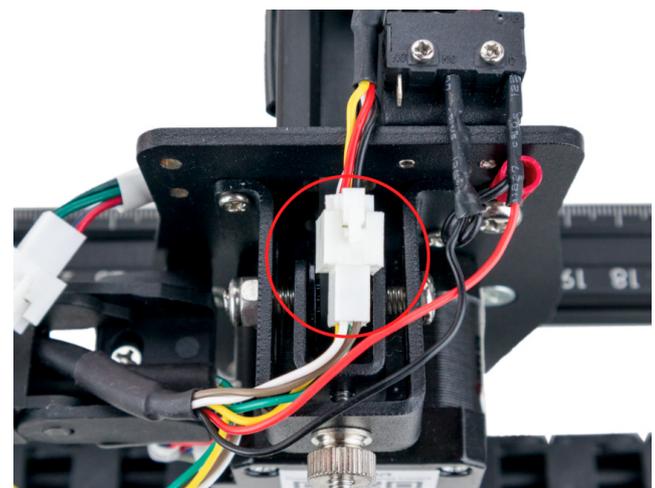
Laser Module Installation

Step 1

From your parts please select:

LU2 Laser Module & Safety Cover - Label 11

Tools Required:

2.0mm Hexagon Wrench

Step 2

Locate the Laser Module Slider Thumb Screw and thread it into the Laser Module Slider Bracket.
Only thread it a few turns as it cannot be fully engaged at this step of assembly
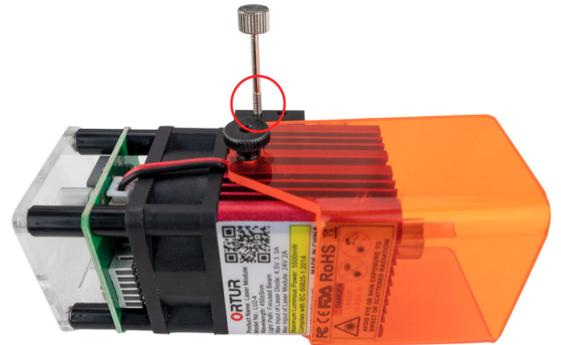
Step 3 (Back View)

Align the Laser Module Slider Rail into the Laser Module Bracket on the X-Axis.
Notice the slider uses a joint to keep the module from having lateral motion. The Module and the X-Axis Laser Module Bracket must be aligned carefully.
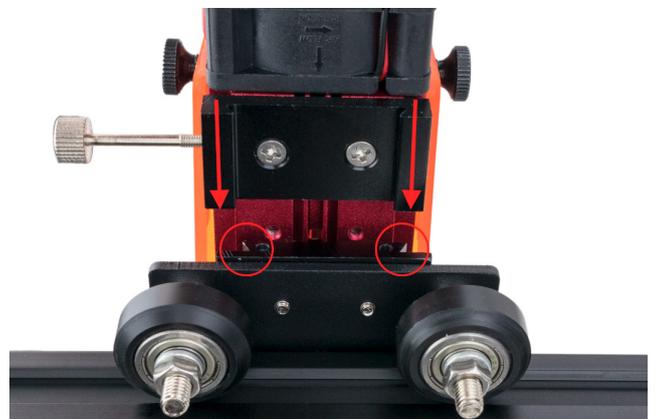
Step 4

Once engaged, slide the Laser Module down the Laser Module Bracket until both sliders are aligned at the tops
Gently tighten the Laser Module Slider Thumb Screw to lock the Laser Module in place.
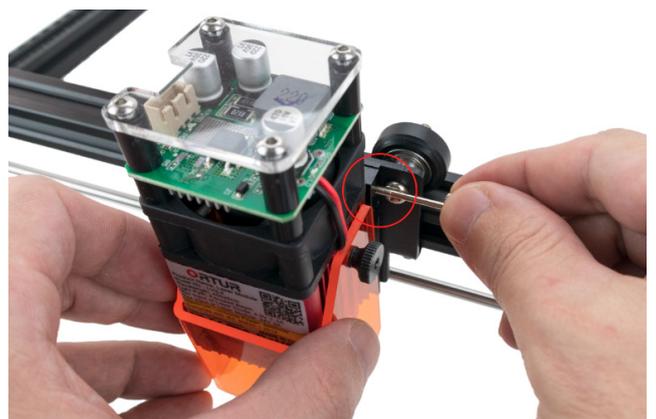
Step 5

Using the 2.0mm Hexagon Wrench, loosen the front left Hex screw from the to plate of the Laser Module. A grounding wire with a crimped terminal will be slid under this Screw, therefore loosen it until a 1mm gap is present under the Screw.
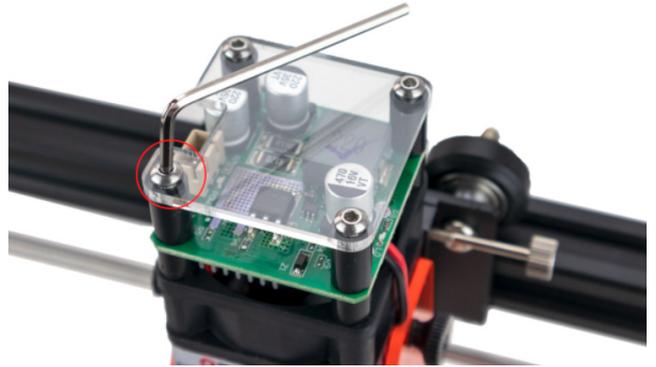
Step 6

Locate the Laser Cable that was previously attached to the **Ortur Laser Master 2 Pro**. Align and press the XH2.54mm 3 pin connector into the Laser Module.
Press the connector firmly in the socket and confirm the white wire is facing front.
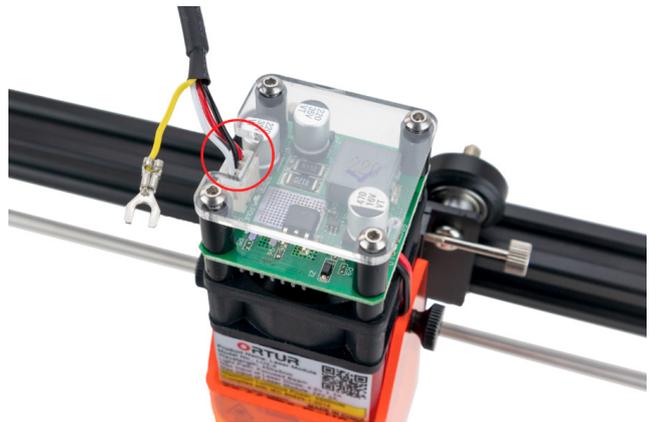
Step 7

Route the crimped terminal under the Hex Screw making sure you guide the back of the crimp terminal towards the back of the Laser Module. If the crimped terminal does not slide easily under the Laser Module Screw, loosen this Screw further.
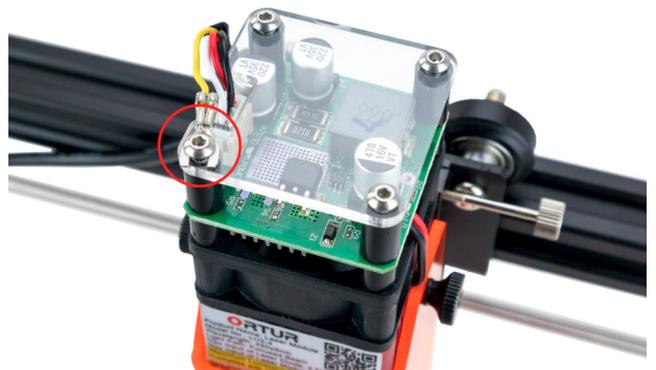
Step 8

Using the 2.0mm Hexagon Wrench, tight the front left Hex screw from the to plate of the Laser Module. This is another ground point of your **Ortur Laser Master 2 Pro.**
Caution: Do not apply too much torque, otherwise the Acrylic Plate might crack.

Wire Management - Strain Relief

The steps ahead are very important for the consistency and longevity of your **Ortur Laser Master 2 Pro** cabling system.

All cables installed in the previous pages need to be cable tied to the frame, securing them in place to avoid:

- Connectors to slip off and come undone by the motions of your Laser Module, X-Axis and Y-axis.
- Protection of the Connectors/terminals by giving Strain Relief to the cables. In other words, any stress cased to the cables from the motions of your machine will not be absorbed by the connectors but by the cable Ties.

Laser Module Cable

Follow the illustration to shape and guide the Laser Module cable.
With Two Cable Ties, use the bottom and top Nylon spacers as platforms to cable tie the Laser Module Cable.
Make sure the Laser Module Cable ends up pointing UP once done.
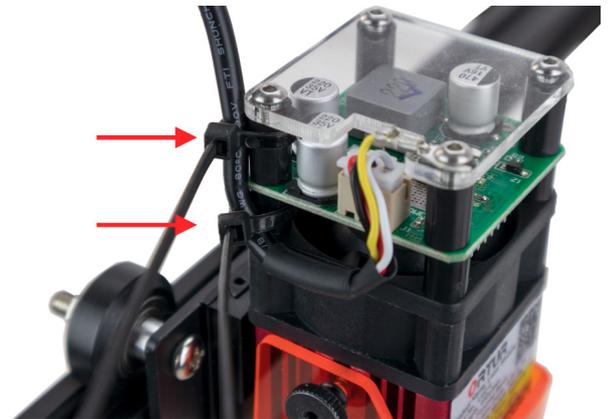
Confirm the Cable Ties are as tight as possible without using any additional tool. With your Flush Cable Cutter trim the Cable Ties so no excess is left.
Note: This step will be necessary on every cable tie applied, illustration will be omitted on the next Steps.
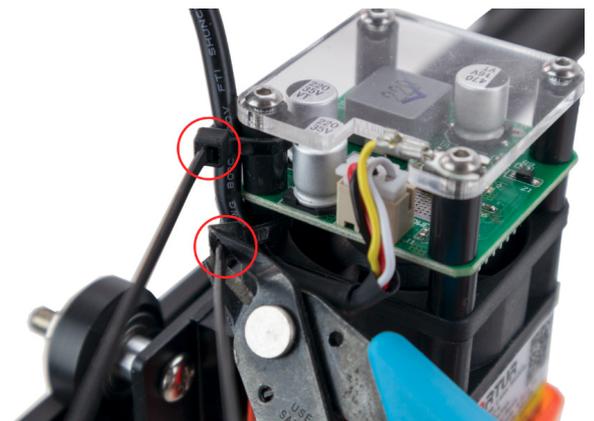
Once completed, your Laser Module Cable should be firmly tied to the laser module and should resemble the illustration to the right.
Again note how the Laser Module Cable is pointing in the Up direction.
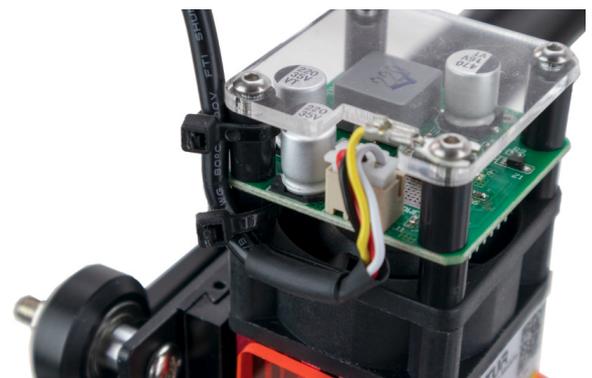
X-Axis Stepper Motor Cable

Slide a cable tie in the pre installed plastic base. Route the X-Axis Stepper Motor Cable and firmly tie down the cable with the cable tie.

Note: The X-Axis Stepper Motor Cable travels across the X-Axis V-slot rail and is held down by a Plastic grommet.

Confirm the Cable Ties are as tight as possible without using any additional tool. With your Flush Cable Cutter trim the Cable Ties so no excess is left.

IMPORTANT: After cable tie, verify the XH2.54mm 6 pin connector is properly connected and did not move.

DragChain - Motherboard Location

Slide a cable tie around the 2 cables and in between a link in the DragChain.

Allow for some cable slack on the right side to avoid a permanent pull on the Motherboard Connector.

Firmly pull tight cable tie so the cables get firmly pressed against the DragChain wall.
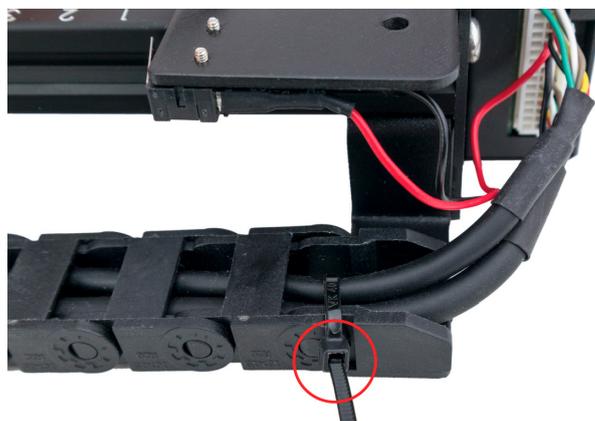
Confirm the Cable Ties are as tight as possible without using any additional tool. With your Flush Cable Cutter trim the Cable Ties so no excess is left.

IMPORTANT: After cable tie, verify the cables have some slack and are not pulling on the Motherboard or Y-Axis Limit Switch.
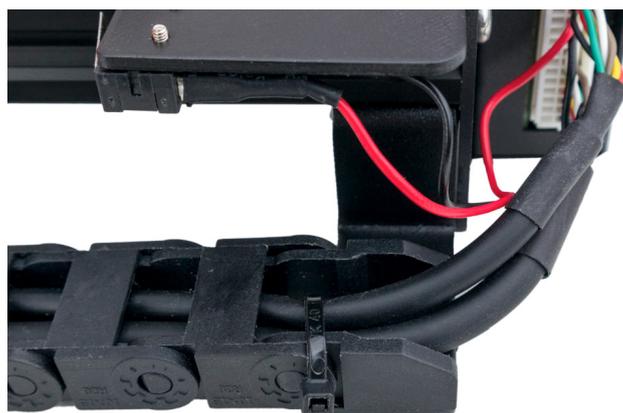
DragChain - X-Axis Assembly Location

Slide a cable tie around the 2 cables and in between a link in the DragChain.
Allow for some cable slack on the right side to avoid a permanent pull on the X-Axis Limit Switch.
Firmly pull tight cable tie so the cables get firmly pressed against the DragChain wall.
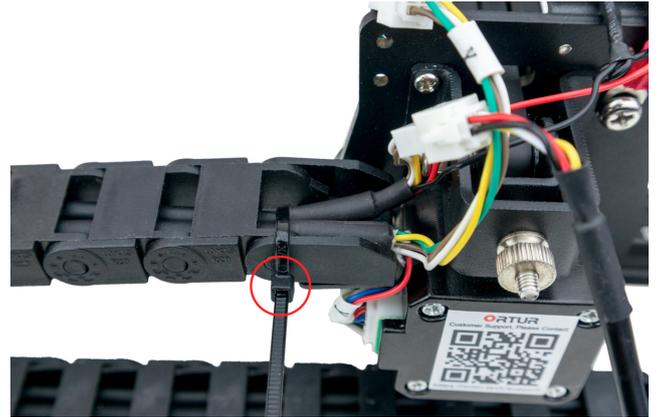
Confirm the Cable Ties are as tight as possible without using any additional tool.
With your Flush Cable Cutter trim the Cable Ties so no excess is left.
IMPORTANT: After cable tie, verify the cables have some slack and are not pulling X-Axis Limit Switch.
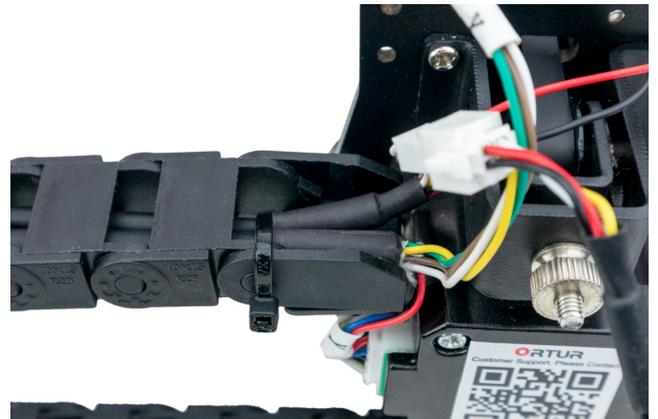
Laser Module Cable - X-Axis Assembly Location

Follow the illustration to shape and guide the Laser Module cable.
With Two Cable Ties, use the pre-drilled holes in the X-Axis Assembly Frame as platforms to cable tie the Laser Module Cable. Make sure the Laser Module Cable ends up pointing UP once done.
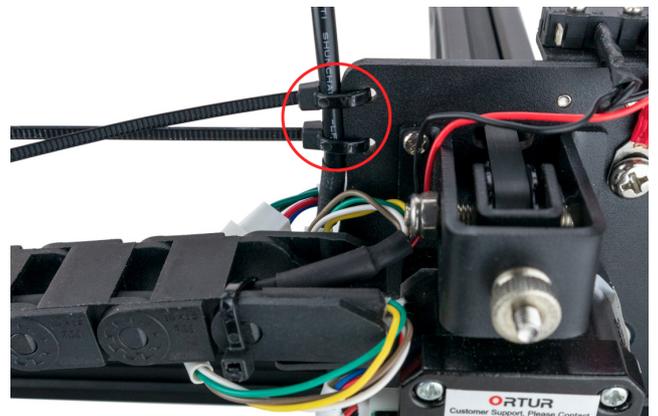
Once completed, your Laser Module Cable should be firmly tied to the X-Axis Assembly Frame and should resemble the illustration to the right.
Again note how the Laser Module Cable is pointing in the Up direction.
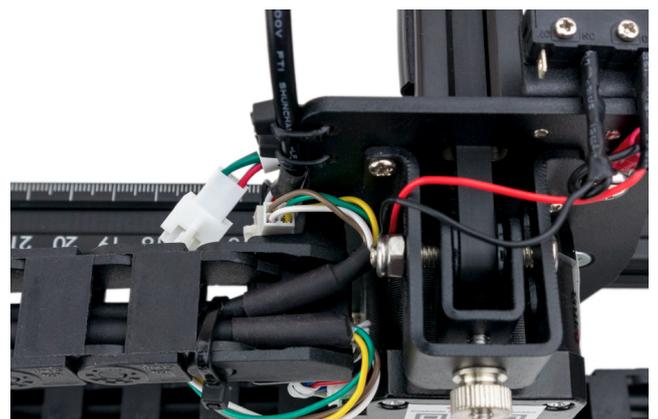
Final Inspection

Once all Cable Ties are applied, your cables should be firmly secure and protected from motion caused disconnections and or strain and metal fatigue damage.

Take a moment for some final considerations

- Give a once over to each and all connectors following the previous discussed steps. Checking that each and all connectors are fully engaged;
- Confirm that no cable is susceptible to be snagged or pulled, which might result in artefacts on your engraving and cuts;

At this stage your **Ortur Laser Master 2 Pro** is ready for its first Power Up. Refer to the illustration below and compare to your own assembly.

If any thing looks different please review all steps of assembly.

First Power Up

Step 1

From your parts please select:

    24v Power Adapter - Label 24

    USB Cable Type A-B - Label 25

Step 2

Locate on your **Ortur Laser Master 2 Pro** motherboard the 24v and USB Labeled Ports.

Untie the USB and 24v Power adapter cables and straighten the cables.

Step 3

Plug your 24v Power Adapter in barrel into the 24v Labeled Port.

Make sure your Power Adapter is properly plugged into your mains electricity socket.

Note: The Power Adapter might vary according to Region (US/UK/EU/AUS)

Step 4

Plug the USB Type B side of your USB Cable into the USB Labeled Port.

At this point we will not connect the **Ortur Laser Master 2 Pro** to your computer. Leave the USB Type A end of the USB Cable unplugged.

Step 5

Locate the Power Labeled button on your **Ortur Laser Master 2 Pro** motherboard and press and hold it for 5 seconds. Your **Ortur Laser Master 2 Pro** should initiate its Homing cycle with the Laser Module moving towards FRONT-LEFT.

Important information regarding your **Ortur Laser Master 2 Pro** 24v power system:

- Never Use a different voltage Power Adapter. The **Ortur Laser Master 2 Pro** requires **24v 2 Amps**;
- When using an alternative Power Adapter, the Voltage should always be 24v, the minimum Amperage output should be 2 Amps. Higher amperage output Power Adapter can be used without risk of damage to your **Ortur Laser Master 2 Pro**;
- On inserting the power barrel into your Motherboard it is possible that a small spark is visible. This is **NOT** hazardous to your machine and is caused by the 24v power inrush. If you prefer to avoid this, connect the power barrel to your motherboard first, then connect your power adapter to the mains electricity plug;
- Once the **Ortur Laser Master 2 Pro** detects 24v present you will see the motherboard emit a light blue glow on the right LED at the top of the Motherboard. This does not mean the your motherboard is powered on just yet.
- If when plugging your Power Adapter barrel to your Motherboard and the Power adapter to mains power a Blue LED does not turn on, please verify your power adapter is receiving Mains Power.

To Turn ON your **Ortur Laser Master 2 Pro** Press and Hold the Power Button for 5 seconds.
To Turn OFF your **Ortur Laser Master 2 Pro** tap once the reset button.

Homing Cycle

The Homing Cycle is an automated process that is triggered at the Motherboard power up. This process uses your stepper motors and Mechanical Limit Switches to seeks your **Ortur Laser Master 2 Pro** origin, also known as Home.

This location becomes a known position, hopefully repeatable and accurate. It is indispensable for getting your **Ortur Laser Master 2 Pro** into a known - error free - state.

Any failure of this Homing Cycle on the power up will result in a alarm state and cause the machine gantry to hit the frame and cause a loud noise.

Although this noise is scary it does not cause any permanent hardware damage.

If your **Ortur Laser Master 2 Pro** moves towards Left and Front but does not stop its motions when touching the Mechanical Limit Switches please verify the Assembly steps regarding wiring the limit switches.

In the hyper-link below you will able to see and specially hear a small video of a Nominal Homing Cycle, in comparison to a Homing Cycle that fails and causes the noise described above.

YOUTUBE: www.placeholder.com

USB Communications

Your **Ortur Laser Master 2 Pro** primarelly communicates with your computer via the USB Serial protocol. This protocol is agnostic of the operating system with exception of android based operating systems. If your computer Operating System is: Windows 7 or newer (either 32bit or 64bit); MacOs 10.11 (El Capitan) or newer and Linux 64Bit the **Ortur Laser Master 2 Pro** should be automatically detected by the operating system of your computer when plugging the USB Cable.

A few important notes regarding USB Serial protocol and USB connection in general:

• Your USB cable will deliver to the **Ortur Laser Master 2 Pro** motherboard 5v, up to 1.5Amps. This power is suficient to power up your motherboard, but not suficient to engage your laser and steppers motors;

• The maximum lenght on a USB 2.0 cable by specifications should not exceed 5 meters, 16 feet;

• When in a very electrical noise envorioment is advisable to upgrade the USB cable for a full shielded cable with ferrite inserts;

• The USB Cable of your **Ortur Laser Master 2 Pro** is a USB 2.0 Type A to B cable (commonly known as a USB Printer Cable);

USB Drivers:

Although rarely necessary, is possible that your Windows Operating system might need instalation of drivers in order for your computer to fully identify the USB connection as a Serial Protocol. In MacOs and Linux this should not be necessary.

Drivers can be downloaded at the following locations:
Windows 10 – Windows 8
STM Micro v1.5 32Bit - DOWNLOAD

STM Micro v1.5 64Bit - DOWNLOAD

Windows 7
STM Micro v1.5 32Bit - DOWNLOAD

STM Micro v1.5 64Bit - DOWNLOAD

Ortur Laser Master 2 PRO Firmware

Your **Ortur Laser Master 2 PRO** firmware is the operating system that resides inside the motherboard and controls all operations of the machine as well as the interactions between the motherboard and the host computer.

In some circumstances, a firmware update is required to improve the **Ortur Laser Master 2 PRO** performance or fix discovered issues. In some less common situations, a firmware upgrade might be required to clear issues caused by user error. Please read the instructions below carefully.

General Recommendations;

When NOT to upgrade or reinstall the firmware

- Not yet contacted support at https://ortur.tech/support to resolve an issue
- **Ortur Laser Master 2 PRO** is working correctly and showing no problems

When TO upgrade the firmware

- Advised to do so by **Ortur** or **Ortur Customer Support**
- A new version of the firmware is posted at https://ortur.tech/latest-firmware advising a firmware update to fix a discovered problem or enhancing **Ortur Laser Master 2 PRO** functionality

Requirements to upgrade the firmware safely

- This guide covers updating procedure on Microsoft Windows (Windows 7 or 10), however similar steps can be taken on MacOs or Linux.
- Direct Connection from the **Ortur Laser Master 2 PRO** to your computer USB port. Note: *Some users reporting the use of USB Hubs may cause problems.*
- Have access to software that allows decompressing a .zip file. (*Note: Windows will natively perform this operation. However we can also recommend 7-Zip or WinRar*)
- Disable temporally any 3rd party Antivirus Software. Although normally not required it is still a recommendation.

Update Procedure - Windows

Step 1 - Retrieve Firmware Files

1. Visit https://ortur.tech/latest-firmware
2. Browse through the web-page until you find **Ortur Laser Master 2 PRO;**
3. Select the Download Tab and click **DOWNLOAD LINK;**
4. Save the .Zip file to your desktop;
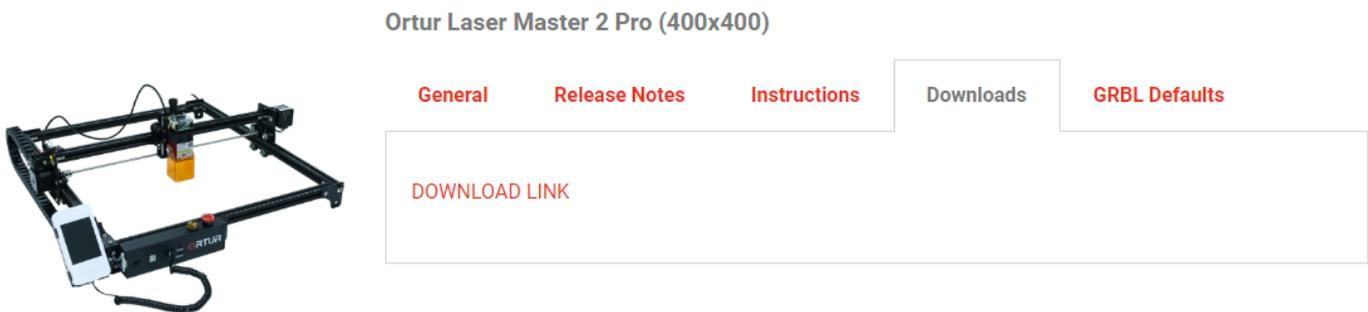
5. Unzip the downloaded file using Windows, WinRar, 7-zip, WinZip or any unpacker program compatible with your computer;
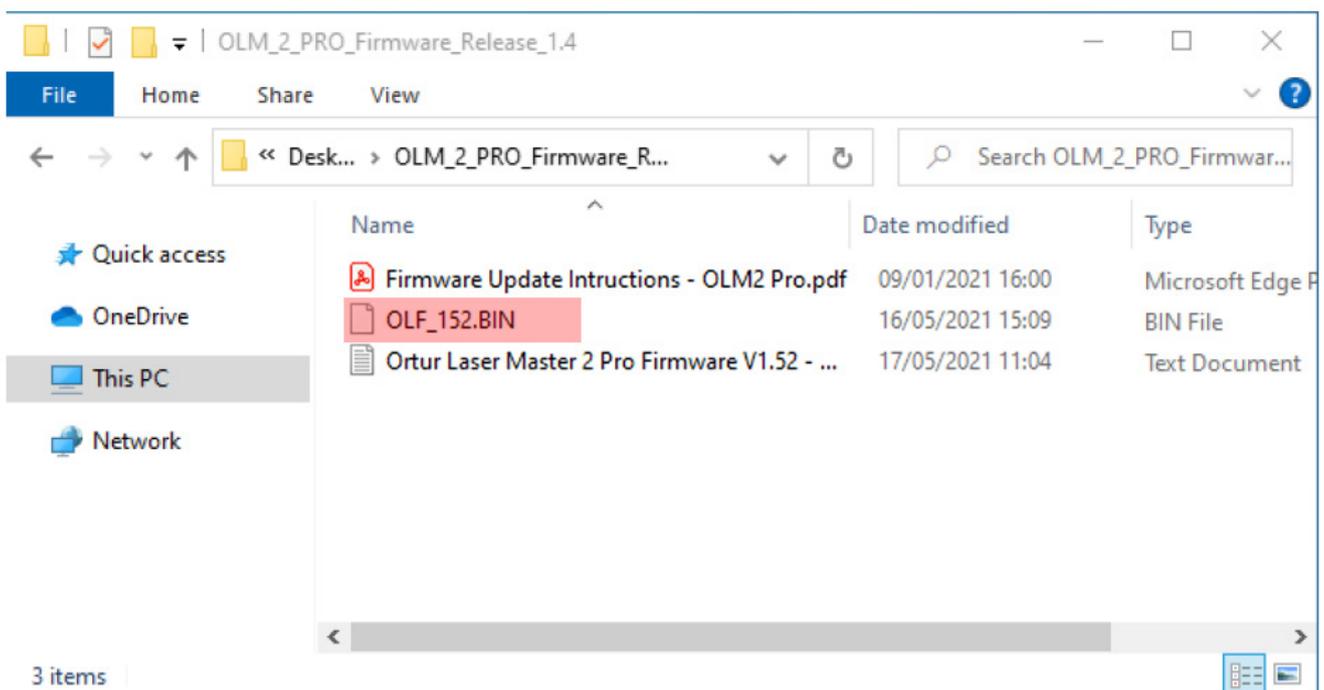
5. From the extracted/unzipped folder drag and drop onto the "ORTUR LASER" drive the file OLF_152.bin. Alternatively, right click the OLF_152.bin file and press copy. Navigate to ORTUR LASER drive and right click and press paste;

Note: *The file will have the version number. At the time of writing of this guide is OLF_152.bin. Any other files included in the ZIP file can be ignored unless advised by Ortur Support otherwise*
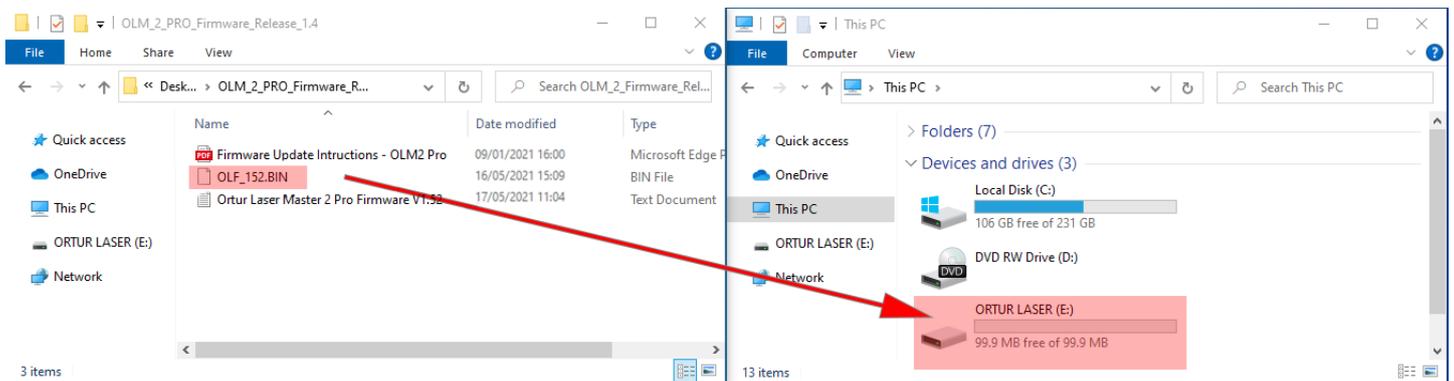
6. Wait a few moments to be sure the file is copied properly;
7. Wait 5 seconds. **Ortur Laser Master 2 PRO** will reboot automatically;
8. Confirm that your Power Adapter is plugged in and its receiving Mains Power;
9. Power on your **Ortur Laser Master 2 PRO** by pressing Power Button for a few seconds;
10. Monitor your **Ortur Laser Master 2 PRO**, making sure it performs the homing cycle correctly.

Step 3 - Confirm Firmware was written correctly

In order to confirm the Firmware was written successfully to your **Ortur Laser Master 2 PRO** Motherboard, is necessary to connect your machine to one of the following software: **LaserGRBL** or **Lightburn**.

Additionally is required to restore Factory Default settings on the Motherboard to clear the EEPROM (Electrically Erasable Programmable Read-Only Memory) - internal motherboard memory.

Important to NOTE: any customization on the GRBL settings will be overwritten.

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LaserGRBL

1. Launch **LaserGRBL** software;
   Note: *We would recommend updating to the latest version as well. LaserGRBL 4.3.0 is the latest version at the time of writing of this guide*
2. Select the appropriate COM port for your **Ortur Laser Master 2 PRO** and press **Connect** button;
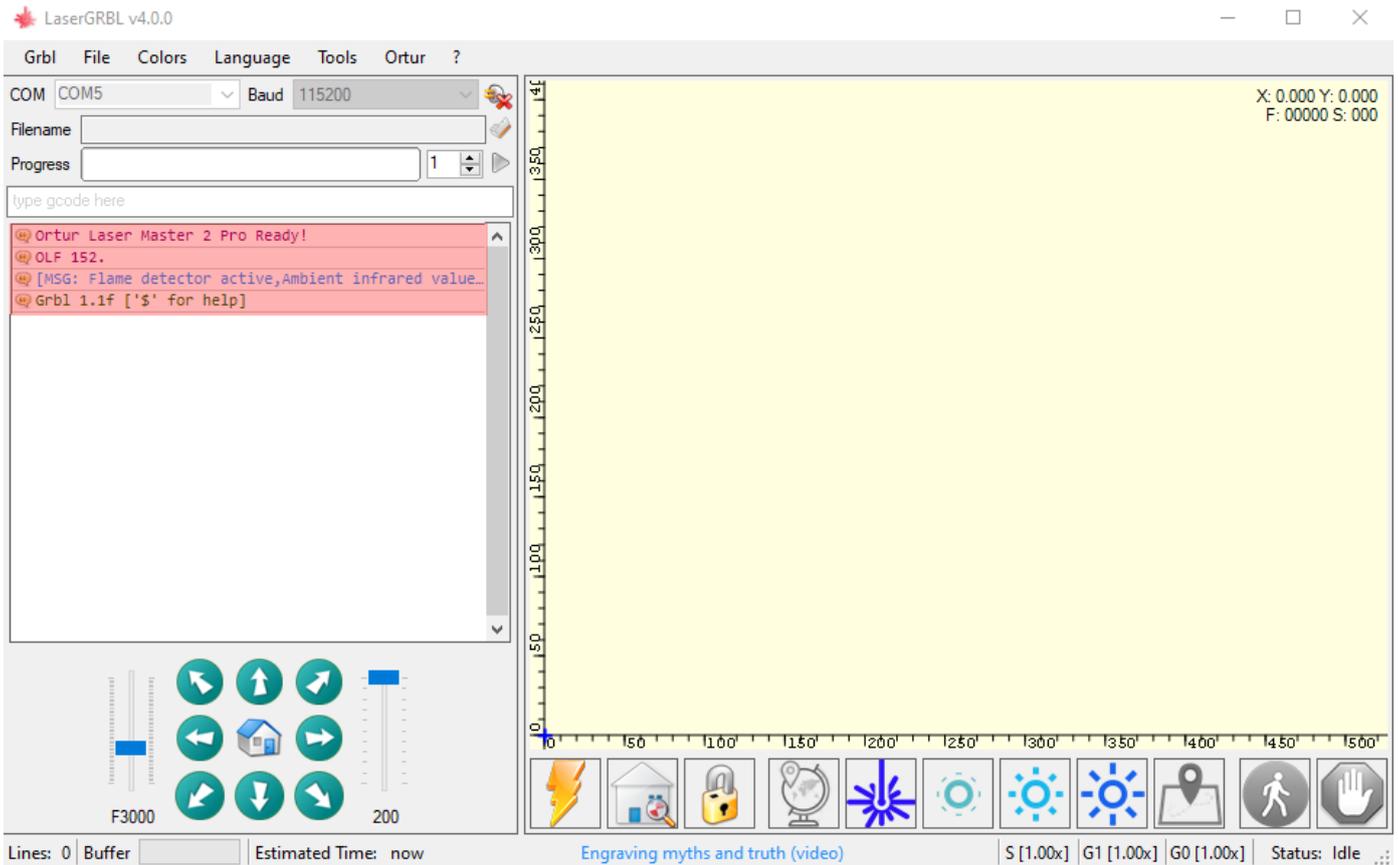
3. Once connection is established, console window will show the welcome message;
4. Confirm that the welcome message shows **OLF 152** as latest firmware. This confirms the update procedure was successful.
5. Although probably not necessary, click the "Padlock" button to clear any possible errors and set the motherboard into listening mode;
6. Above console window, where **LaserGRBL** has a input box saying (Type Gcode Here) enter the following command: **$RST=*** and press the **Enter** key;
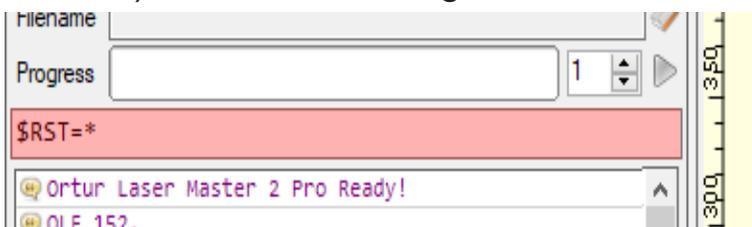
7. A response is given by the **Ortur Laser Master 2 PRO** motherboard, acknowledging the command by sending a **[MSG: Restoring defaults]**

The firmware update procedure is now complete!

The **Ortur Laser Master 2 PRO** is ready to be used normally.

Important Note:

Any customization of the GRBL settings prior to firmware update was overwritten.
If they are necessary by any reason they should be introduced again.
Possible reminders for GRBL settings customizations:

- For the use of the **Ortur YRR** and **Ortur YRR 2.0**
- Installation of a 3rd party Z-axis adjuster (Y Max Travel setting)

LightBurn

1. Launch **LightBurn** software;
   Note: *We would recommend updating to the latest version as well. Lightburn 0.9.24 is the latest version at the time of writing of this guide*
2. Select the appropriate COM port for your **Ortur Laser Master 2 PRO** and wait for the **Connection** status **"READY"**;
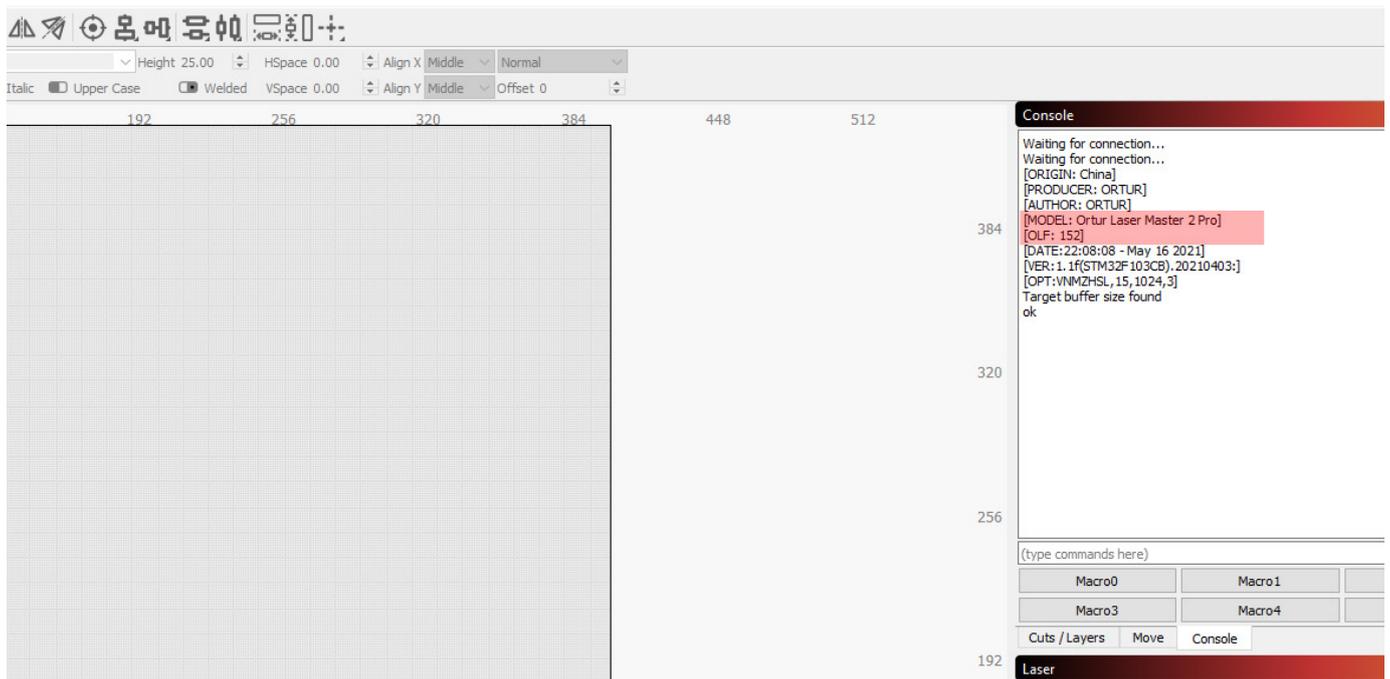
3. Once connection is established, console window will show the welcome message;
4. Confirm that the welcome message shows [**OLF 152**] as latest firmware. This confirms the update procedure was successful.
5. Below console window, where **LightBurn** has a input box saying (type commands here) enter the following command: **$RST=*** and press the **Enter** key;

7. A response is given by the **Ortur Laser Master 2 PRO** motherboard, acknowledging the command by sending a **[MSG: Restoring defaults]**

The firmware update procedure is now complete!

The **Ortur Laser Master 2 PRO** is ready to be used normally.

Important Note:

Any customization of the GRBL settings prior to firmware update was overwritten.

If they are necessary by any reason they should be introduced again.

Possible reminders for GRBL settings customizations:

- For the use of the **Ortur YRR** and **Ortur YRR 2.0**
- Installation of a 3rd party Z-axis adjuster (Y Max Travel setting)