Alu-X-ends Installation Guide

The Alu-X-ends are designed to be a replacement for the stock plastic x-ends supplied on some 3D Printers. The material properties of the aluminium components should offer several benefits including additional stability and increased mounting point strength.

Instructions

This procedure should be followed to ensure your Alu-X-ends installation goes smoothly.
Please read all of the instructions before starting! Please make sure you have all tools and parts ready before starting!
The installation can be tricky, and there is a risk of breaking parts of your 3D printer. Please proceed cautiously, especially where instructions are marked: ⚠

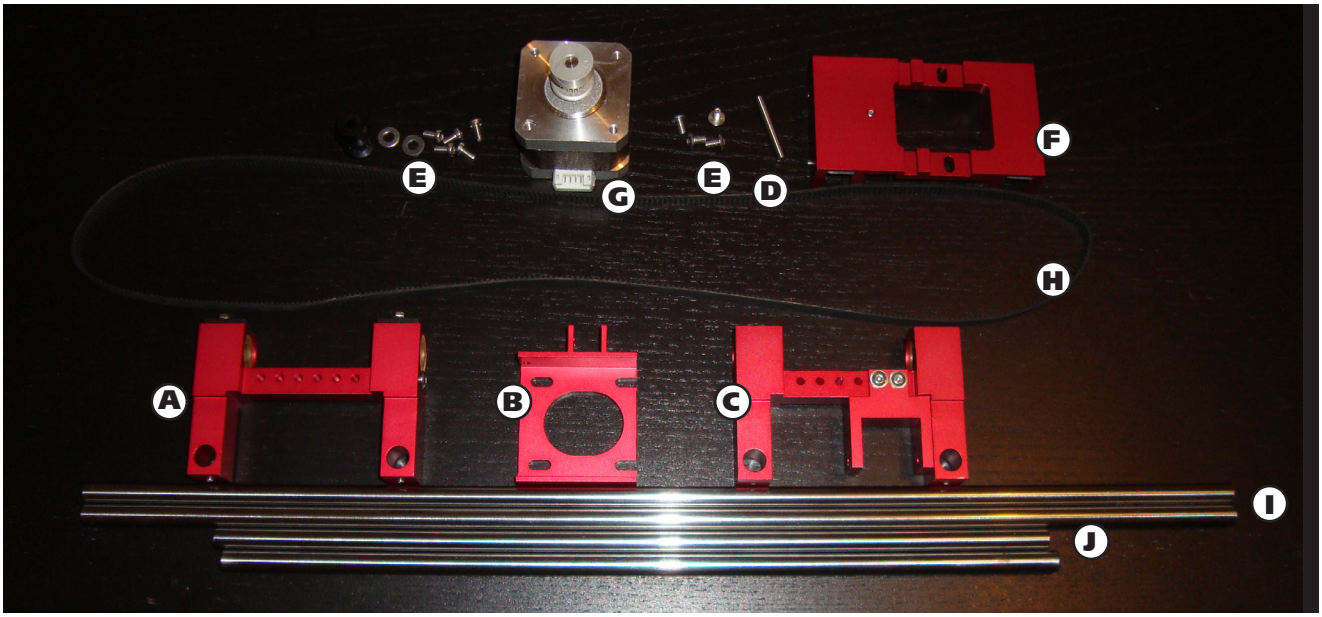
Warning

Do not proceed with this installation before reading the disclaimer at the end of this document.

Components

PLEASE NOTE

The design of the Alu-X-ends from May 2015 features additional holes for weight reduction, and a pulley idler option. The installation procedure remains the same. Anodising colours may vary across different batches of Alu-X-ends.



Components supplied:
A.) Right Alu-X-end (Stepper Motor side)
B.) Stepper Motor Bracket
C.) Left Alu-X-end (Pulley side)
D.) Pulley Idler Hub
E.) Screws & Washers
Nylon Mounting Pad (not pictured)

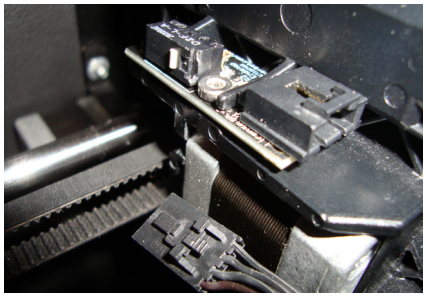
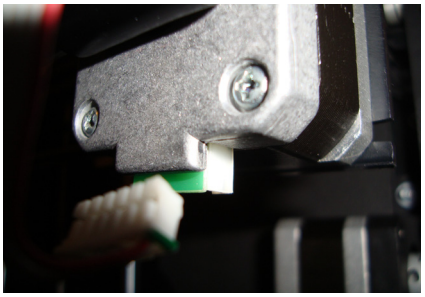
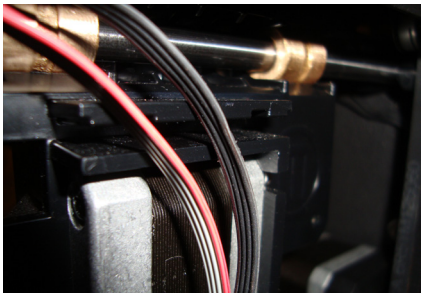
You need (not supplied)
1.) 5.5mm Spanner
2.) 7mm Spanner
3.) Set of Allen keys

You will also work with (from your printer)
F.) Extruder Carriage - AluCarriage or Stock
G.) Stepper Motor
H.) Timing Belt
I.) X-axis Rods
J.) Y-axis Rods

STEP 1: PREPARE & DISCONNECT WIRING

Detach extruder mechanism from the carriage and place safely aside. Move the z-axis to the lowest position. Disconnect power.

⚠ Carefully disconnect the cable from the endstop and the stepper motor on the right x-end. Remove the retaining pin and wiring harness from the far side of the right x-end.

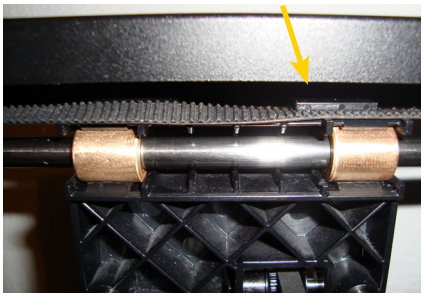
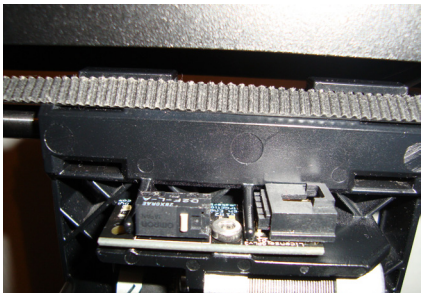




STEP 2: REMOVE PLASTIC PANEL

Remove the plastic panel on the right-hand top of the machine, by removing the two nuts holding the panel in place.

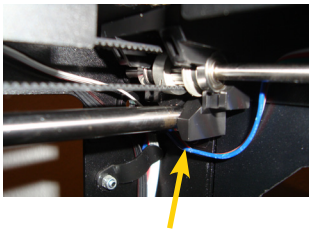
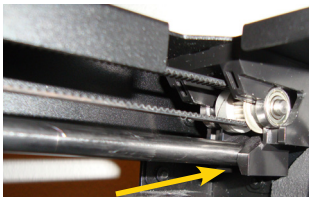
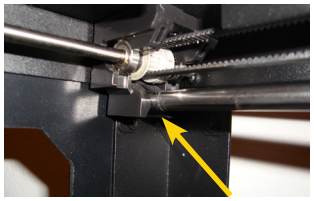
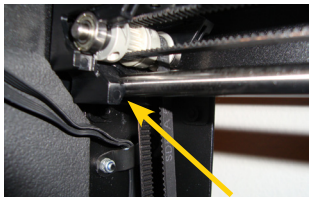
STEP 3: UNCLIP THE Y-AXIS TIMING BELTS

Unclip the y-axis timing belts from both x-ends by pulling the belts forward out of the plastic profile. Rest the loose belts on top of the x-ends.

STEP 4: UNCLIP & REMOVE GANTRY

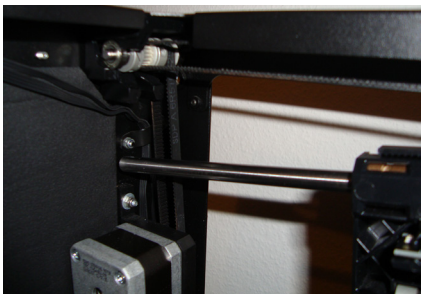
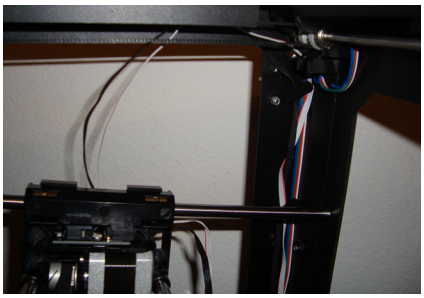
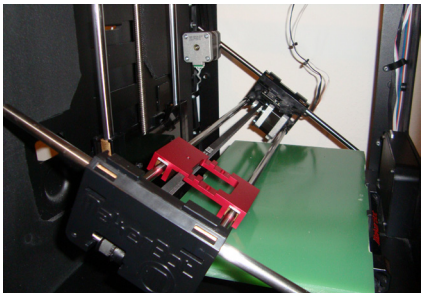
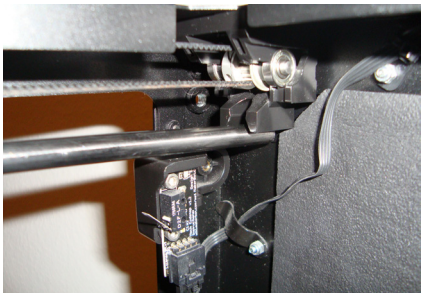
The Y-axis rods are clipped into plastic profiles located in the top corners.

⚠ **Gently press out each corner of the gantry, supporting the gantry as you go along. This is a tricky step - please be careful not to damage any wires, or exert too much force on any of the corners.**

Remove the gantry through the side of the machine, being careful not to damage any wires.

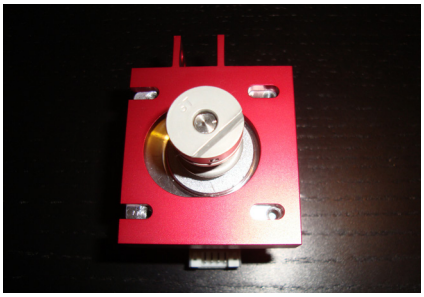
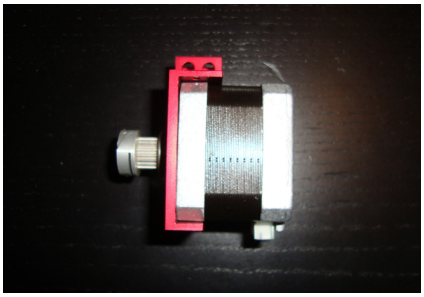
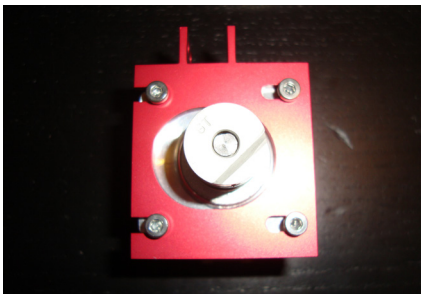
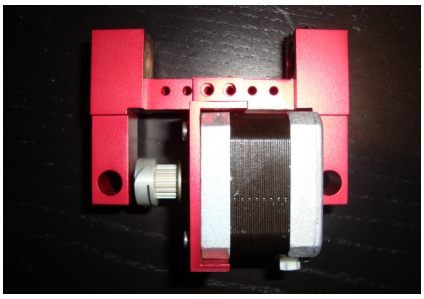
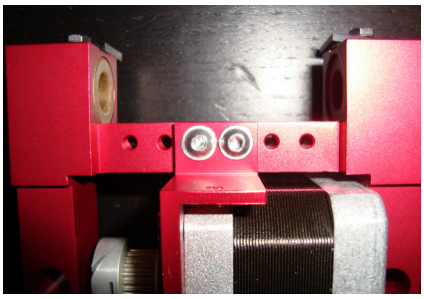
Remove the stock X-ends and prepare the rest of the components for installation.

STEP 5: FIT STEPPER MOTOR BRACKET

Fit the stepper bracket to the stepper motor using the 4 supplied screws - Note the ability to adjust the stepper motor position.

Screw the stepper mount bracket onto the right Alu-X-end.

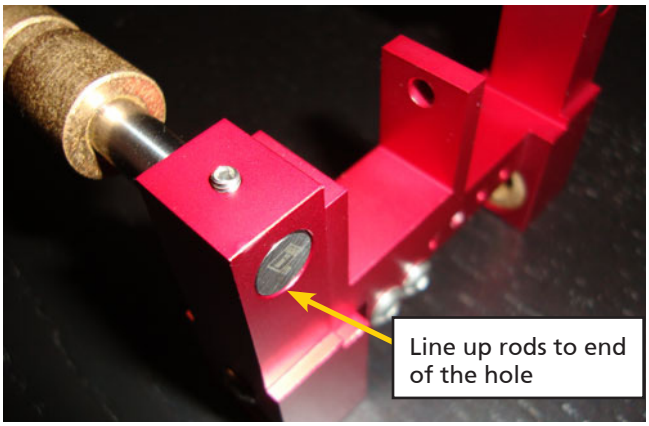






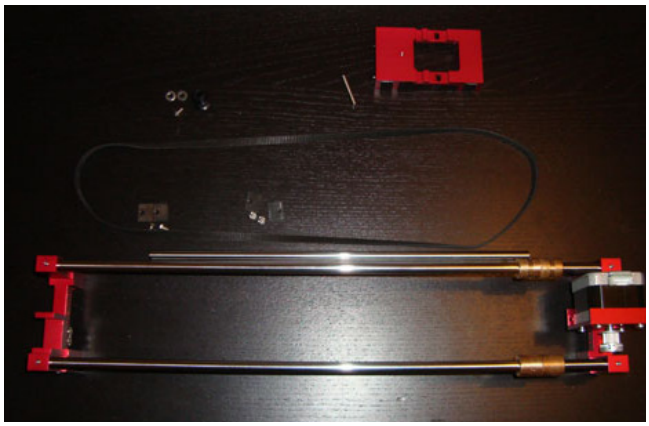
STEP 6: FIT X-AXIS RODS

Remove the timing belt clips at the top of the Alu-X-ends and place safely to the side. Stand the Alu-X-ends upside down. Loosen the 4 set screws at the bottom of the Alu-X-ends.

Add the extruder carriage bearings to the x-axis rods - it's easy to forget this step!

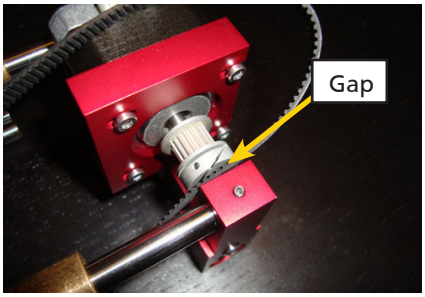
Push the x-axis rods into their slots and line them up to the end of the hole. Lightly tighten the set screws once the rods are in place. You should now have the rods with carriage bearings in place and connected to the X-ends.

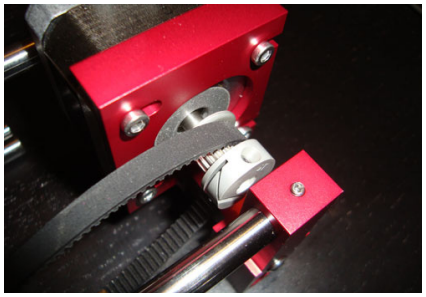


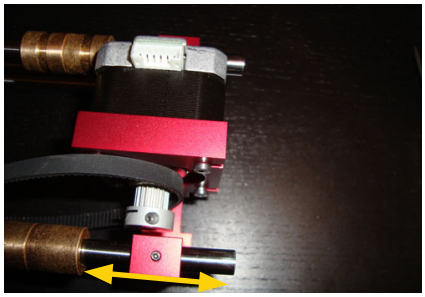


STEP 7: FIT X-AXIS TIMING BELT TO STEPPER MOTOR

Slip the belt through the gap between the stepper motor pulley and the right Alu-X-end. Loosen the set screws on the bottom of the right Alu-X-end. Slide the right Alu-X-end towards the left Alu-X-end to make it easier to slip the timing belt in place on the left Alu-X-end pulley idler side.

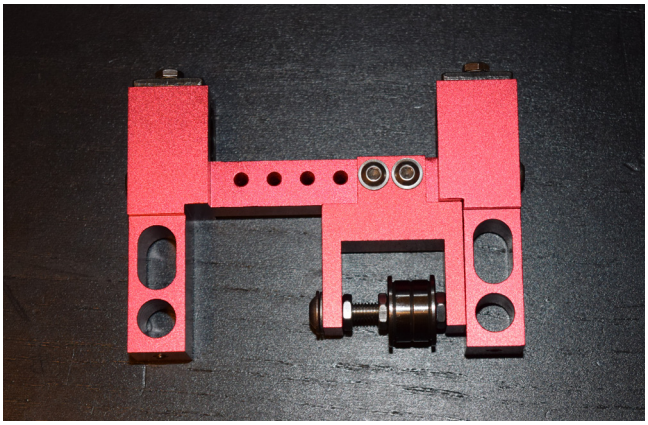




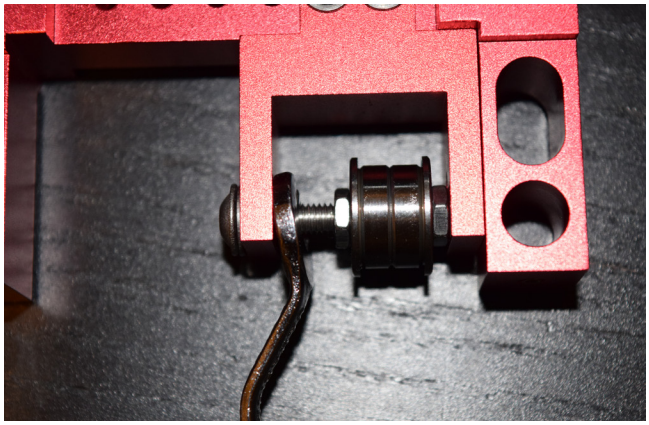


STEP 8 - OPTION A: USE EXPERIMENTAL IDLER PULLEY (ON ALU-X-ENDS SOLD FROM MAY 2015)

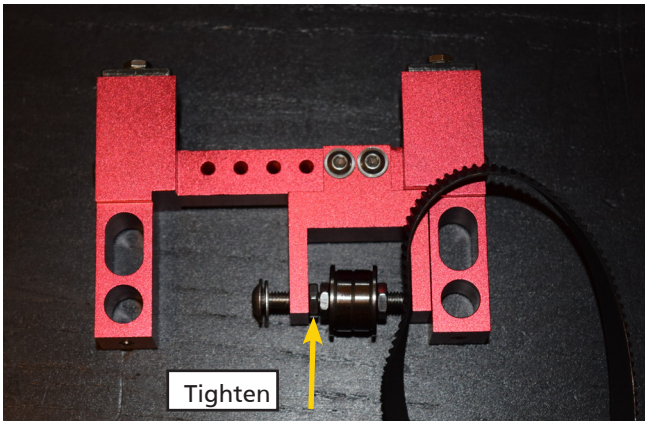
The experimental idler uses nuts to clamp the pulley wheel in position.



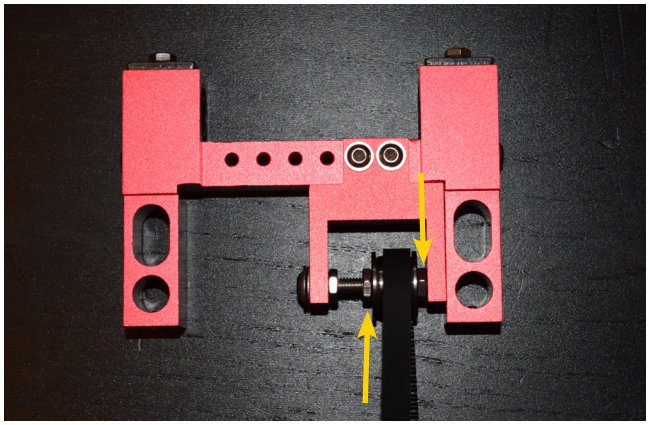
To loosen pulley hub, use a size 7 spanner to loosen the outermost nut.



Once there is a sufficient gap, slip through the belt and position it over the pulley. Ensure it runs parallel back to the other Alu-X-end. Tighten the idler pulley hub back in position by tightening the outermost nut again.

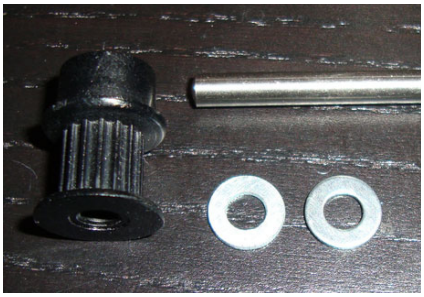
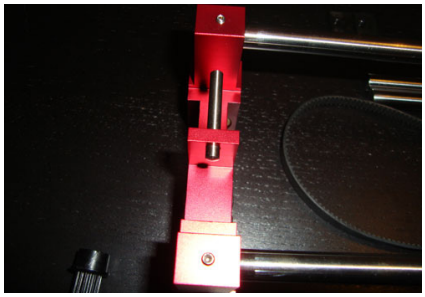
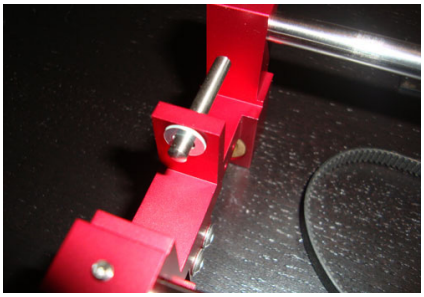
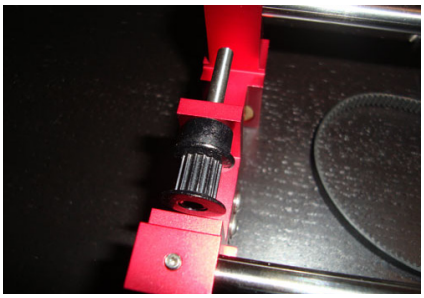
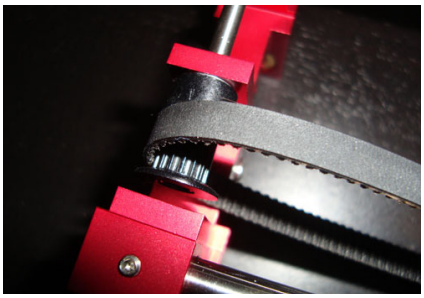
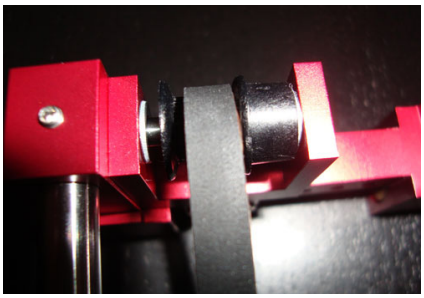


To adjust the position of the pulley on the hub, alternately loosen and retighten the nuts either side of the pulley.



STEP 8 - OPTION B: FIT STOCK IDLER PULLEY

Assemble the left Alu-X-end using the supplied hub and two washers. With the Alu-X-ends still upside down, begin to slide the hub in place. Add a washer, then the stock idler pulley (or a bearing pulley of your choice). Slip the timing belt through the gap and over the pulley. Add the other washer and push the hub into place. The hub is held in place by the pressure from the timing belt once tensioned.

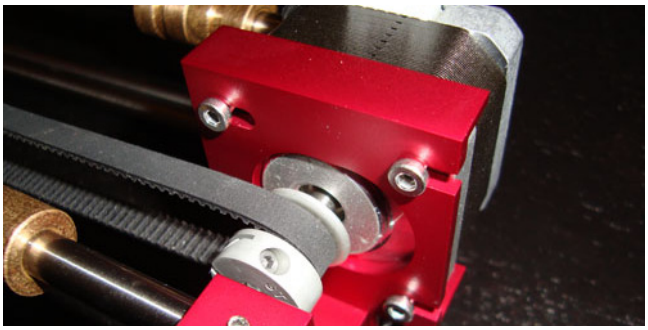
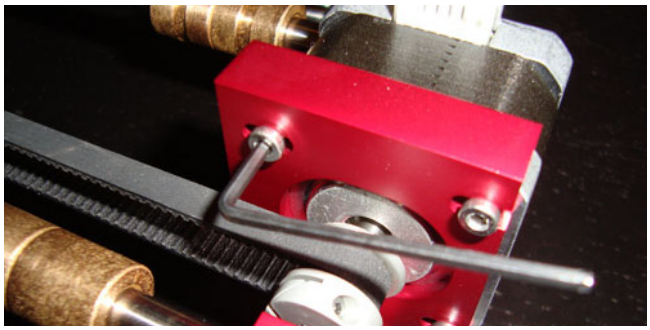
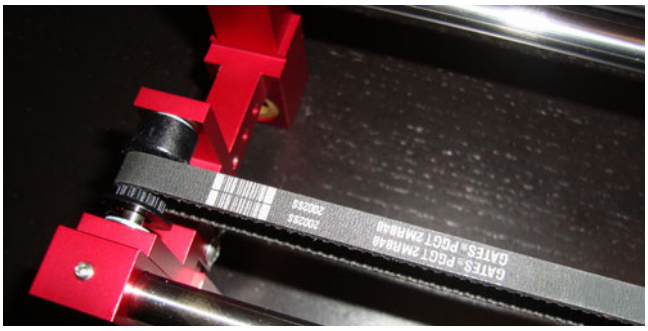
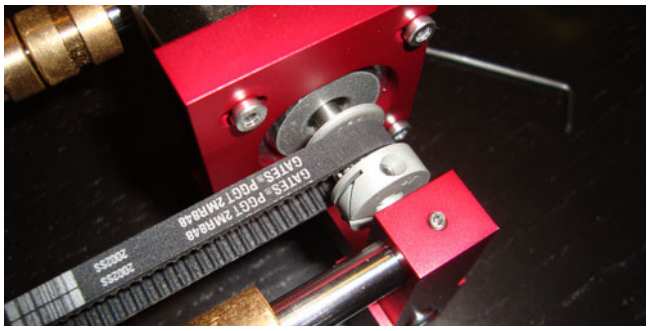
STEP 9: TENSION THE X-AXIS TIMING BELT

With the timing belt now in place, slide the right Alu-X-end back into position and tighten the set screws.

The timing belt now needs to be tensioned. This is done in the same way as on the stock setup.

Loosen the stepper motor screws slightly. Slide the stepper motor towards the outside of the bracket until the belt is tensioned. Tighten the screws to lock the stepper motor in position.

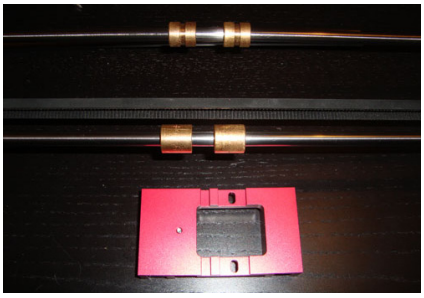
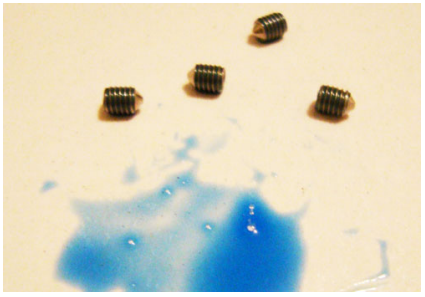
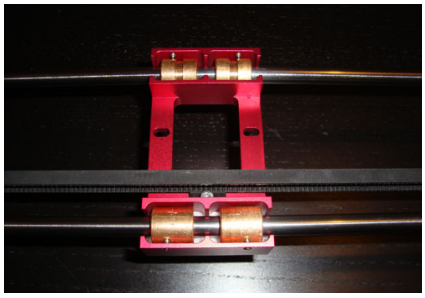
Manually run the timing belt back and forward to make sure that it is running smoothly and nicely tensioned.

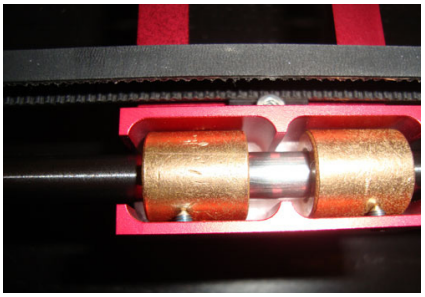





STEP 10: FIT CARRIAGE

At this stage the carriage can be refitted. The stock carriage presses onto the bearings, and the timing belt clips into the profile.

For the AluCarriage, as an optional step, prepare the set screws by dabbing a small amount of Loctite Blue 242 onto the screws to prevent them working loose due to vibration. Still working upside down, place the carriage underneath the bearings.Lightly tighten the four set screws until they make contact with the linear bearings. Do not over-tighten the set screws as this will affect the linear bearing operation. Install the timing belt and tighten the belt clip screw.

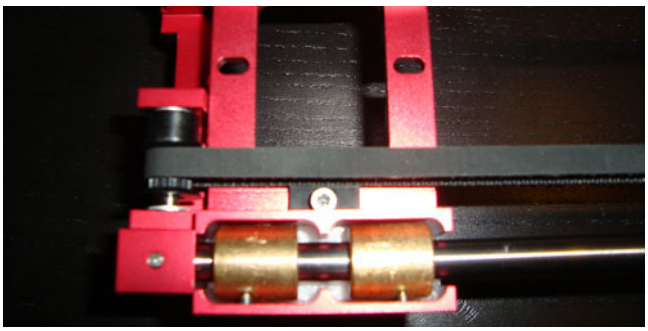
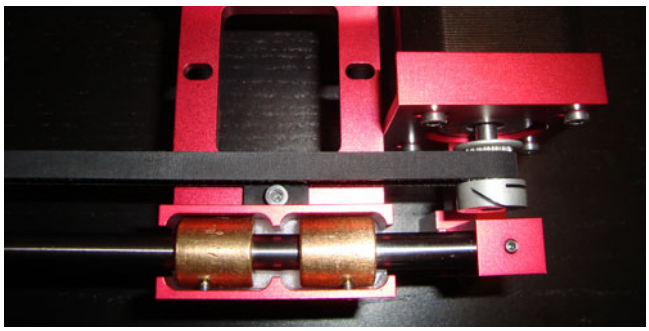
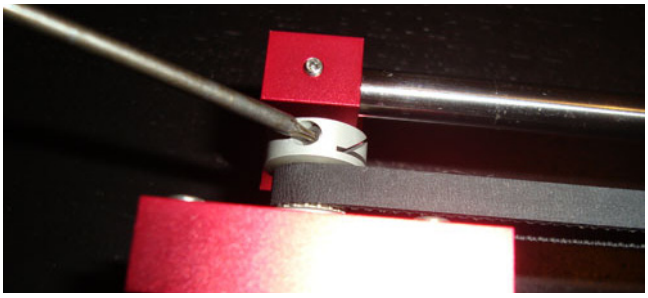
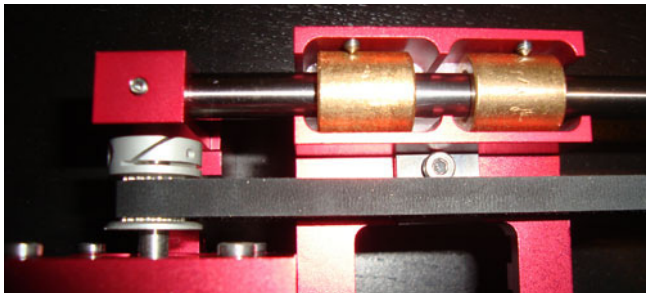







STEP 11: ALIGN X-AXIS TIMING BELT

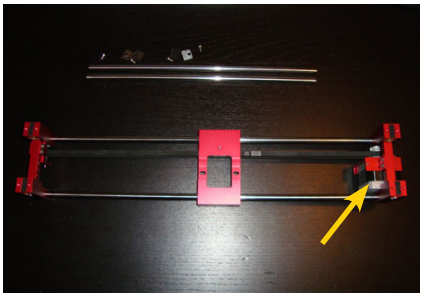
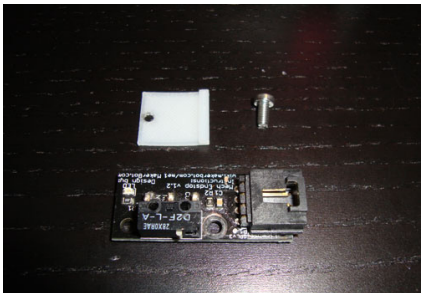
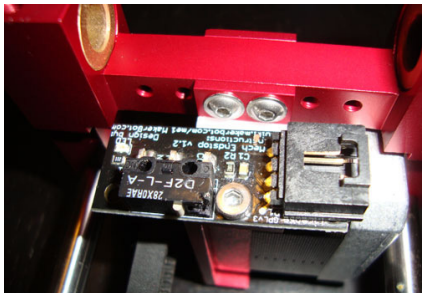
The timing belt needs to run parallel to the x-axis rods. Check the alignment of the belt by running the carriage from one end to the other. If there is binding caused by belt misalignment, check the alignment of the stepper motor pulley on the right Alu-X-end. If adjustment is necessary, use an allen key to loosen the set screw and adjust the pulley back and forward.

The idler pulley should self- align to keep the belt parallel on the left Alu-X-end side. If this is not the case, check the tension of the timing belt as it can negatively affect the idler pulley if over-tensioned.

STEP 12: FIT ENDSTOP CHIP

Turn the gantry over. Gently place the endstop chip on the Nylon mounting pad and place these on the ledge above the stepper motor. Firmly screw the endstop chip in place using the M3x6mm screw. Make sure the chip is perpendicular to the x-axis rods.

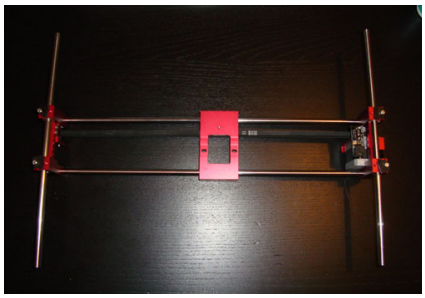




STEP 13: FIT Y-AXIS TIMING BELT CLIPS

The next step is to lightly screw in the 4 timing belt clips that will be tightened once the y-axis timings belts are in place.

STEP 14: FIT Y-AXIS RODS

Slide the y-axis rods in place through the bearings.



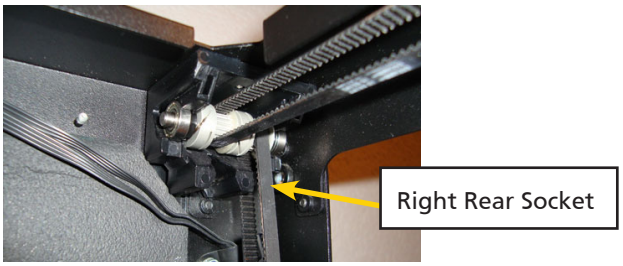
STEP 15: FIT GANTRY

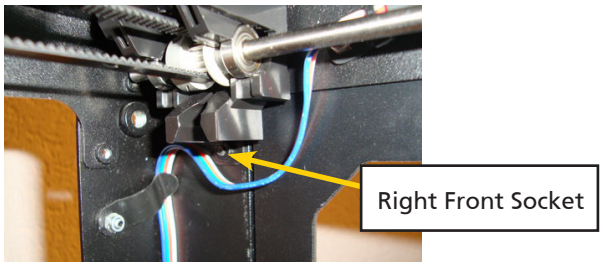
⚠ **Make sure there are no obstacles that could obstruct installation of the gantry into the machine.**

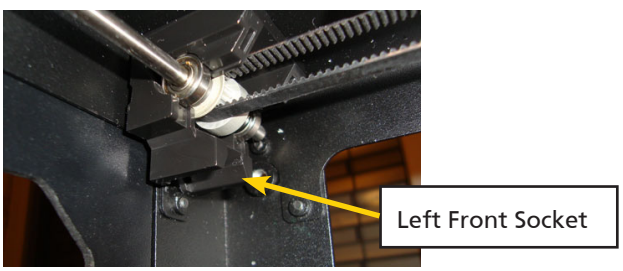
Lift the entire gantry with y-axis rods attached. Tilt at an angle and slide into the case through the side.

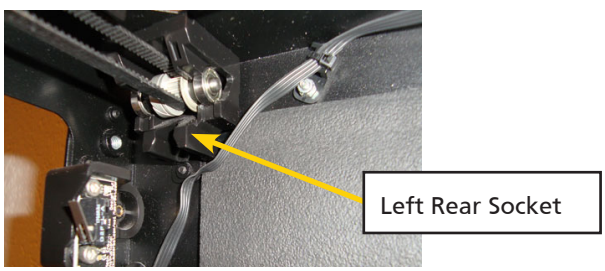
Press fit the y-axis rods into their sockets on each of the top corners of the case. Start with the right rear socket, then the right front, then left rear, and finally left front.

⚠ **Be very careful not to damage any of the cables! Be careful not to exert too much pressure on the plastic sockets!**



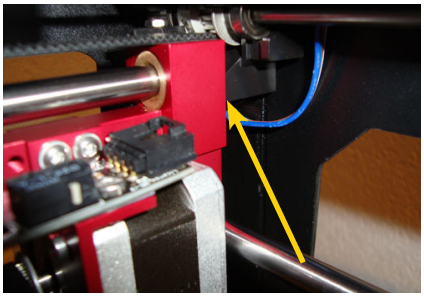
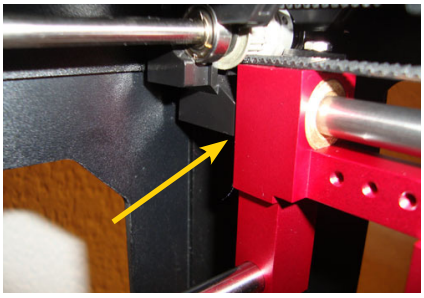
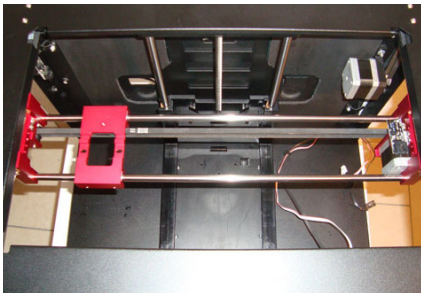
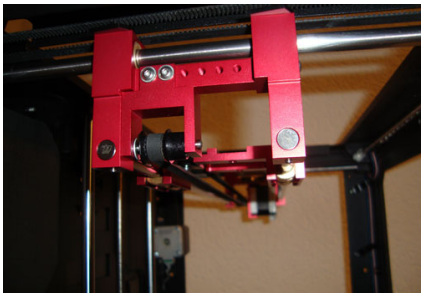
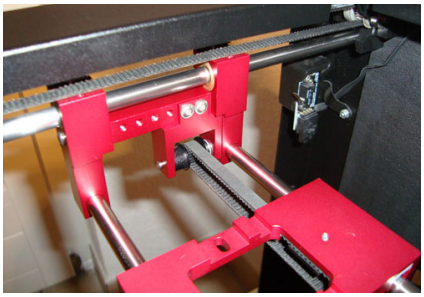






STEP 16: CHECK THE GANTRY INSTALLATION

Move the Alu-X-ends all the way to the front of the frame and make sure the Alu-X-ends line up flush with the plastic blocks on the top front of the frame. Move the carriage back and forward to make sure the motion is smooth.

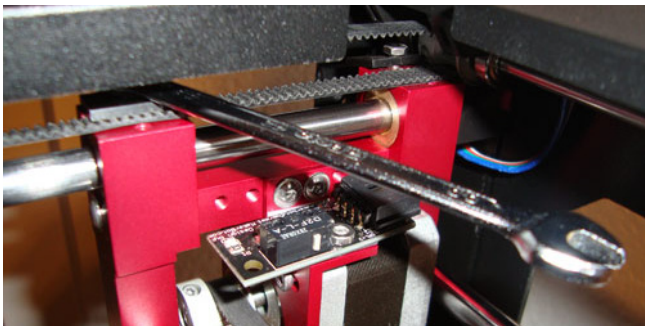






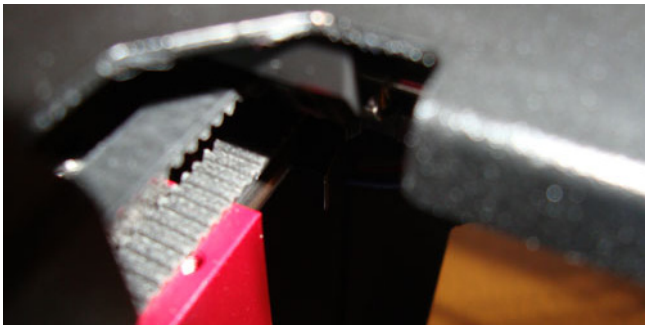
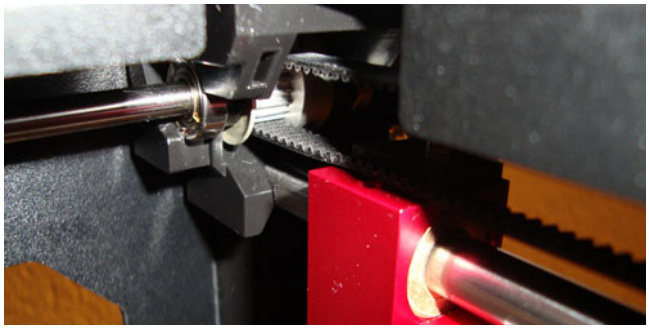

STEP 17: Y-AXIS TIMING BELT INSTALLATION

⚠ **This is probably trickiest part of the installation. Space and visibility are limited, and it is critical that the y-axis timing belts run in line with the pulleys at either end.**

Move the Alu-X-ends so they are touching the plastic blocks at the front of the case. Slip the timing belt under the belt clips and tighten the rear timing belt clip on each side of the Alu-X-ends using a 5.5mm spanner. Then slide the x-axis towards the rear of the y-axis and tighten the front timing belt clips on both sides.

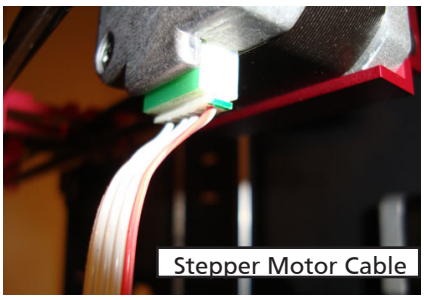
After securely fitting the timing belts, manually move the x-axis back and forward to make sure that the timing belts are running straight on both sides and that the Alu-X-ends continue to line up with the plastic blocks at the top front of the frame.

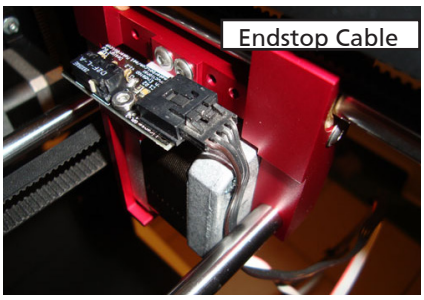


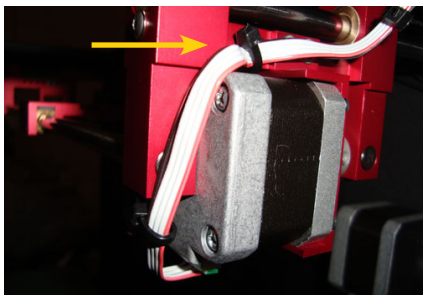



STEP 18: RECONNECT WIRING

The stepper motor and endstop cables can now be reconnected and the harness can be secured using a cable tie through one of the mounting points on the right Alu-X-end.

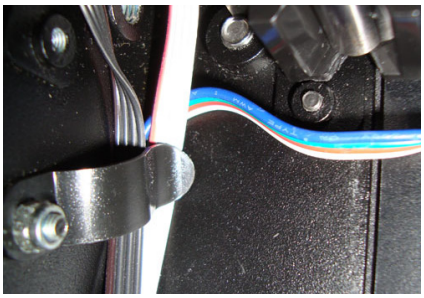


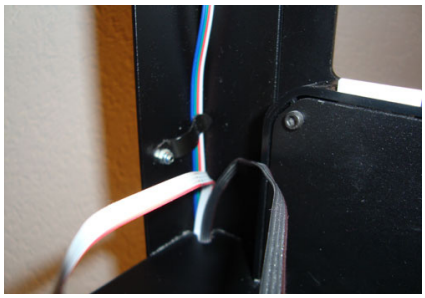




The wiring harness can then be channelled back along its original path to its bottom front entry point.

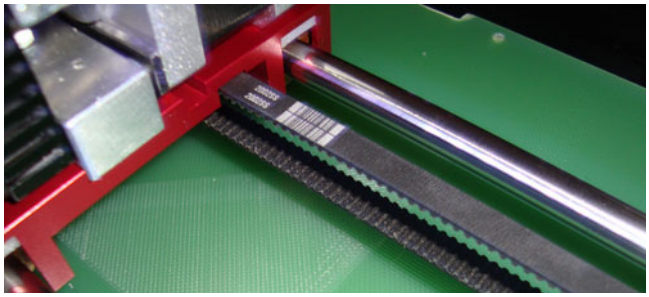
⚠ **Run the x-axis back and forward manually to make sure that the harness does not get caught on anything or have an excessive bend.**





STEP 19: TEST PRINT

After completing a manual jog mode test on each of the axes, run a few slow test prints (around 25mm/s) to make sure everything is running smoothly. Thereafter, you should be able to print as normal.



Thank you for purchasing the Alu-X-ends - I hope you have many successful prints ahead!
For more information or to contact me, please visit shop.raffle.ch.

DISCLAIMER: READ BEFORE INSTALLING

I make these parts for fun, in the hope they are useful for the 3D printing community. By proceeding with the installation, you accept this disclaimer, and you proceed with this installation at your own risk.

- Installing these parts on your printer makes substantial and potentially irreversible changes. Some skill is required to complete the installation.
- I cannot guarantee that these parts will work as intended and that they will not fail at some point in the future.
- I take no responsibility for any damages of any kind during installation or afterwards.
- I make no warranties or guarantees on the suitability, fitness or usability of these parts for any purpose whatsoever, or on the correctness or accuracy of this installation guide.