

Outer Frame Assembly/Alignment



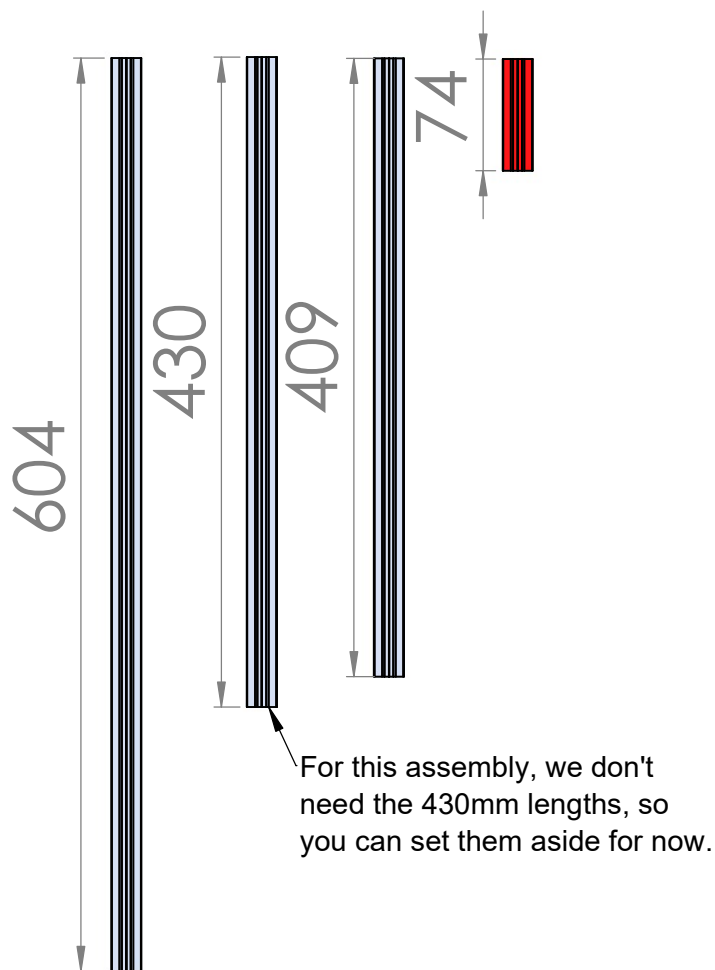
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Joshua Vasquez

last edited:
2/7/2022

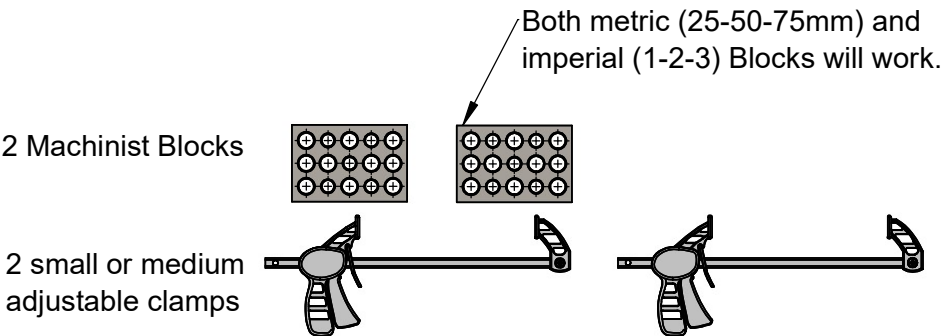
SCALE: 1:5

SHEET 1 OF 28

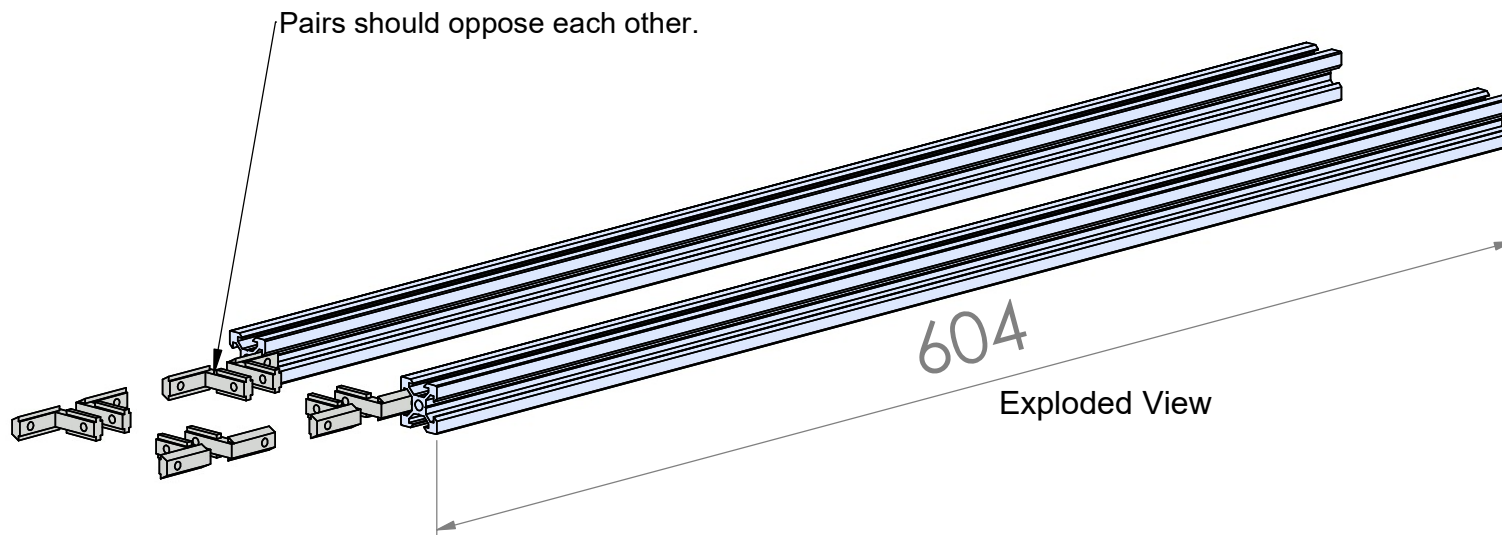
Jubilee uses 4 unique lengths of 2020 extrusions.



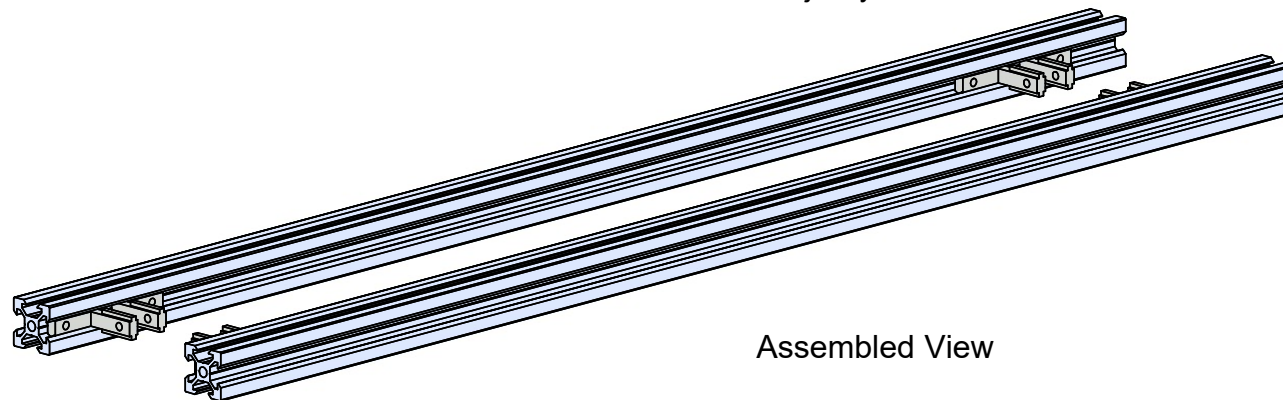
This guide will walk you through a process to create a square upper and lower frame. For the squaring process, you will also need:



Intro		
	Created by:	last edited:
	Joshua Vasquez	2/7/2022
	SCALE: 1:5	SHEET 2 OF 28



Slide in 4 Inside Corner brackets into each extrusion. Exact locations don't matter just yet.



ITEM NO.	DESCRIPTION	QTY.
1	604mm long TSlot Extrusion	2
2	Interior Inside Corner Bracket	8

Upper Frame Squaring 1/5



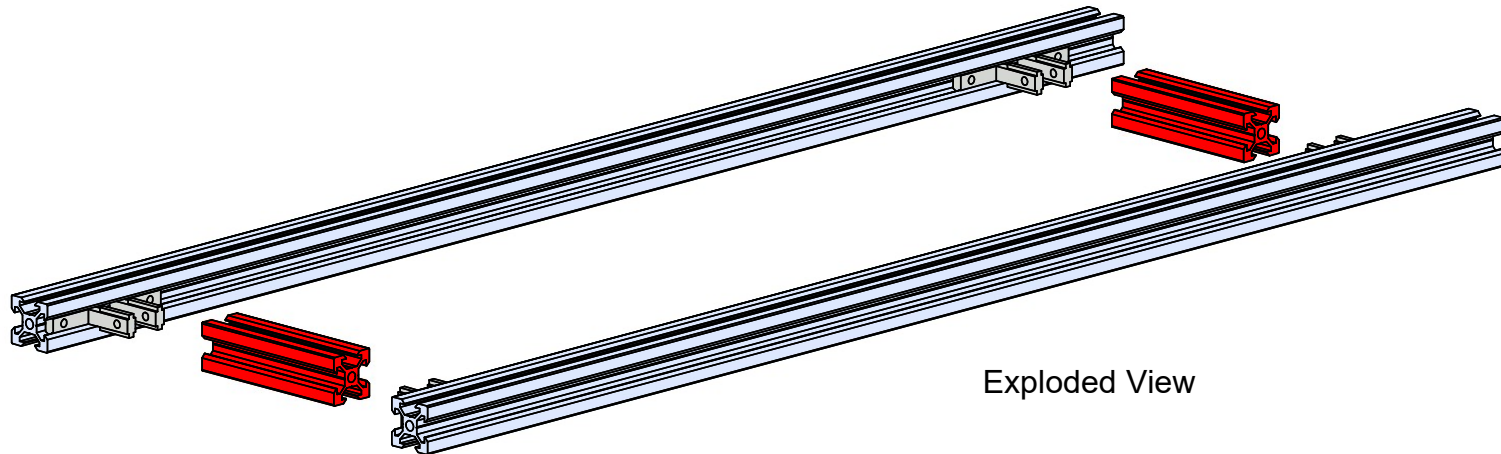
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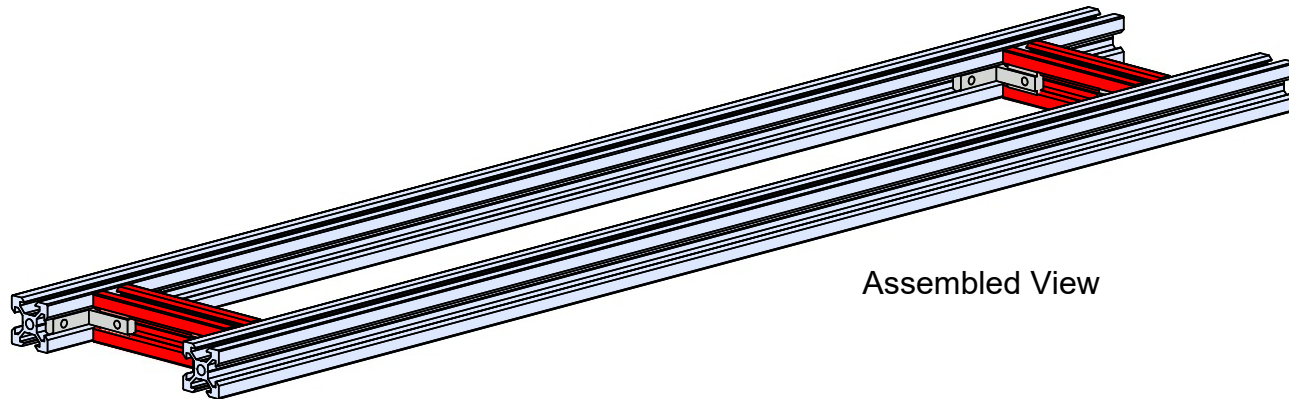
SCALE: 1:3

SHEET 3 OF 28

Slide two 74mm extrusions into the outermost brackets, but don't tighten anything.



Exploded View



Assembled View

These short red extrusions are for squaring the frame and will be removed later.

ITEM NO.	DESCRIPTION	QTY.
3	74mm Temporary TSlot Extrusion for Squaring	2

Upper Frame Squaring 2/5



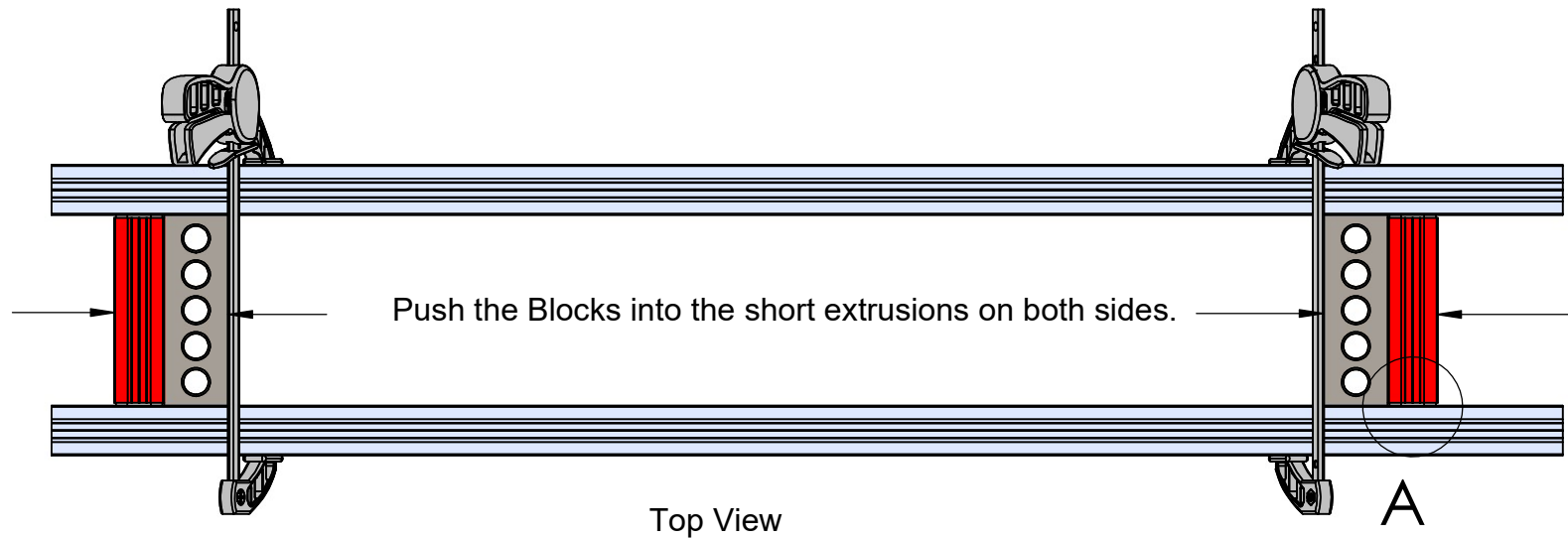
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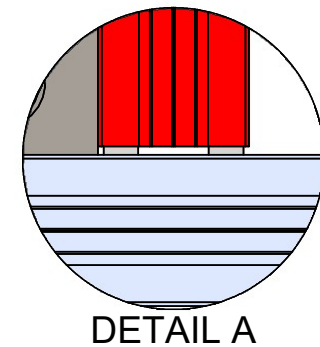
SCALE: 1:3

SHEET 4 OF 28

Slide two Machinist Blocks into the frame on both ends and gently clamp the entire setup together as shown below.



Note that the red extrusions will be loose. This is intentional. In this configuration, the frame is "square" using the 1-2-3 Blocks as a reference.



ITEM NO.	DESCRIPTION	QTY.
3	25-50-75mm (or 1-2-3) Machinist Block	2
4	Adjustable Clamp	2

Upper Frame Squaring 3/5

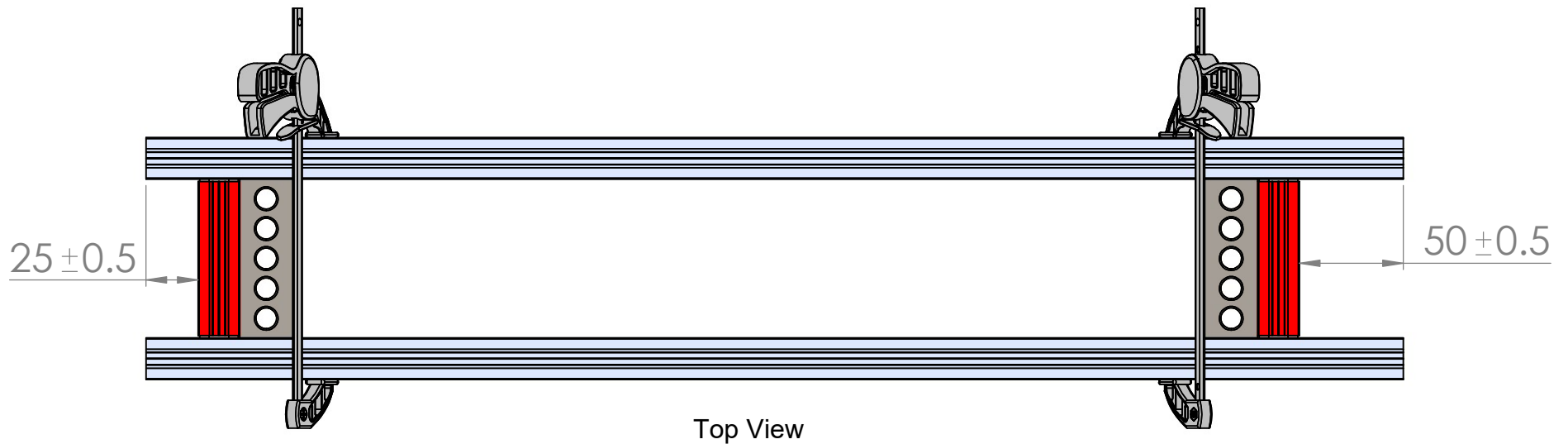


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SCALE: 1:3

SHEET 5 OF 28



Top View

Using Calipers or a ruler as a reference, set the short extrusions such that they match the dimensions shown above. The Blocks should still be touching. When the dimensions are set, clamp firmly.

Upper Frame Squaring 4/5



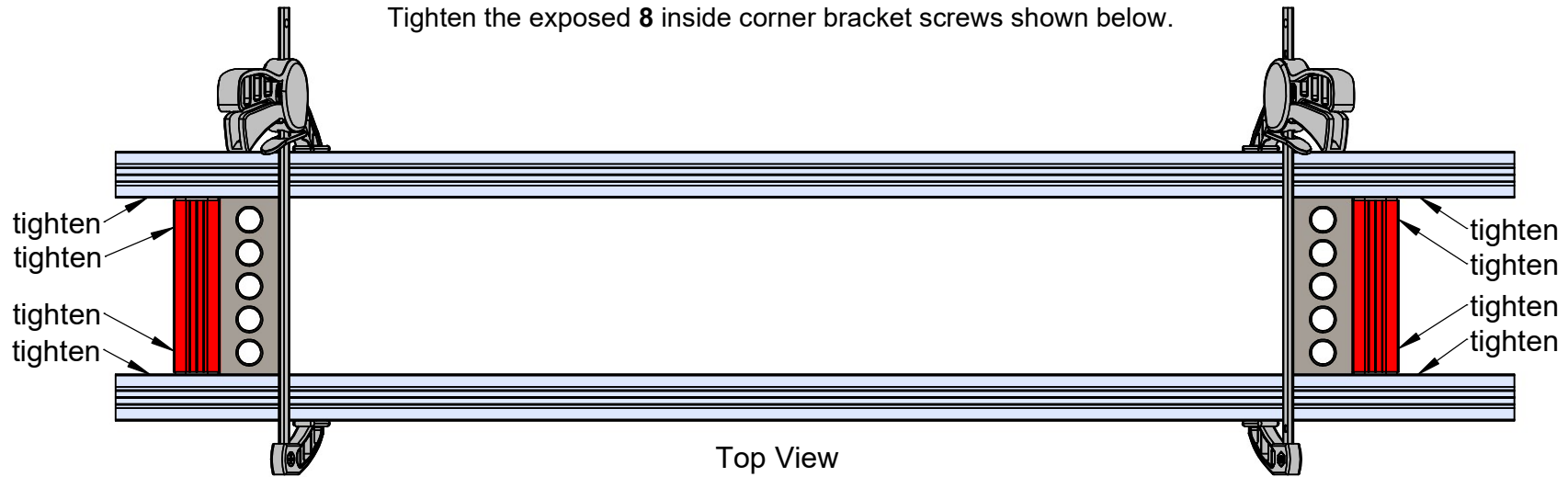
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SCALE: 1:3

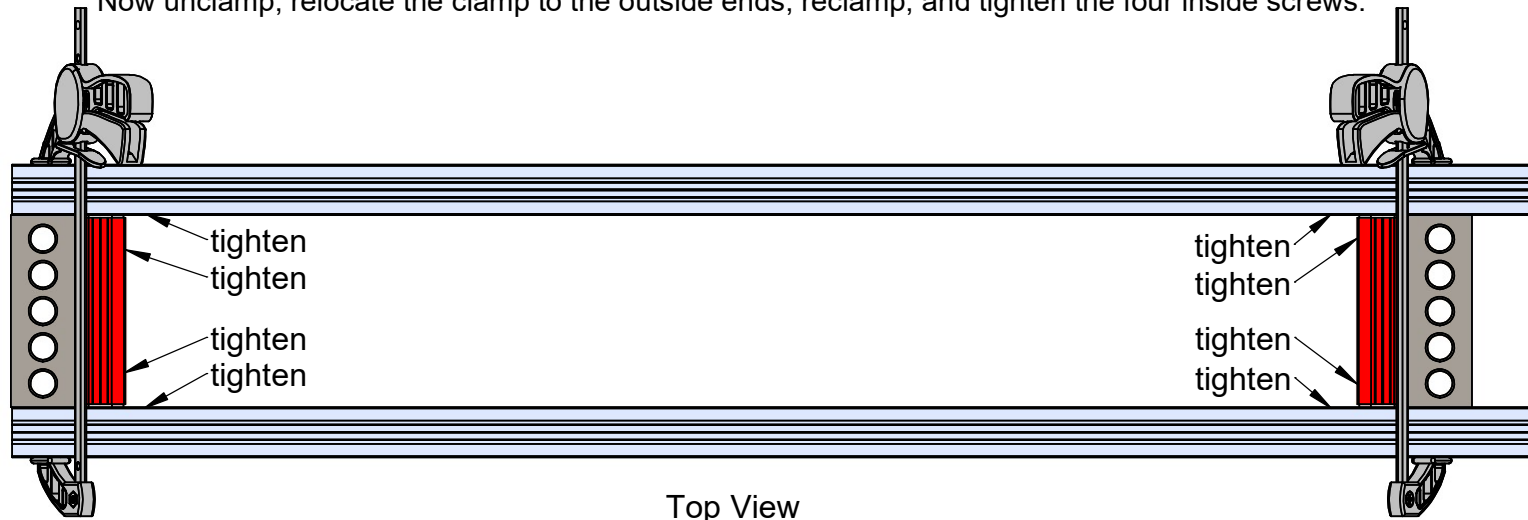
SHEET 6 OF 28

Tighten the exposed **8** inside corner bracket screws shown below.



Inside Corner Brackets tend to shift as you tighten one of their two screws. When you are close to tightening one screw, switch off to the other screw such that the clamped assembly sets the position, not the screw.

Now unclamp, relocate the clamp to the outside ends, reclamp, and tighten the four inside screws.



Your Upper Frame is now Square!
Leave this setup as-is, and set it aside for a future step.

Upper Frame Squaring 5/5

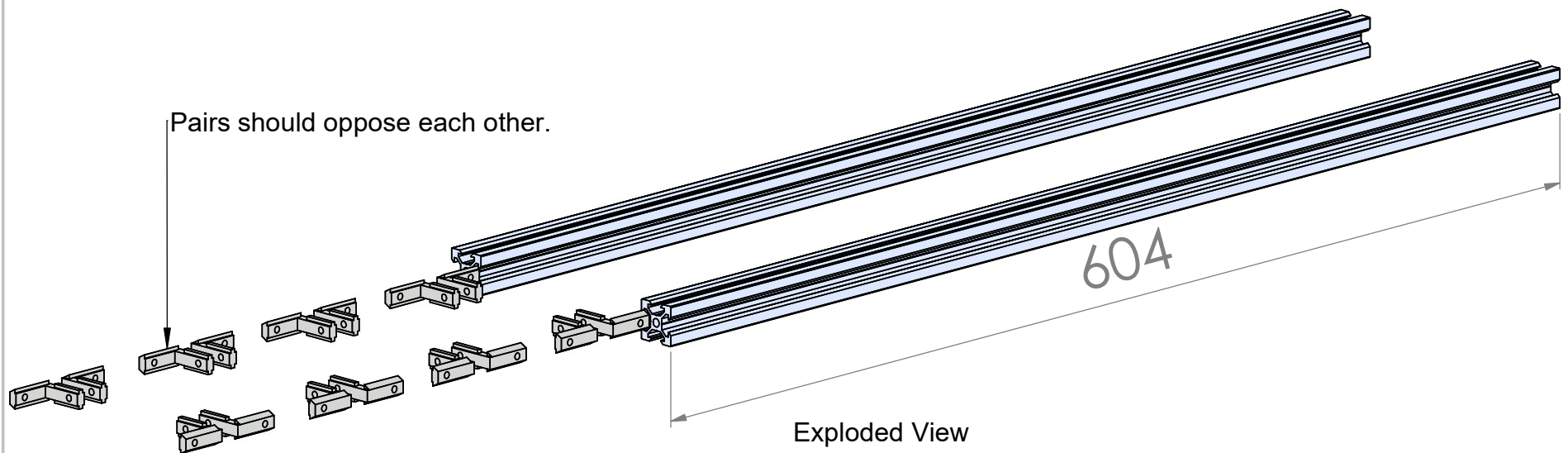


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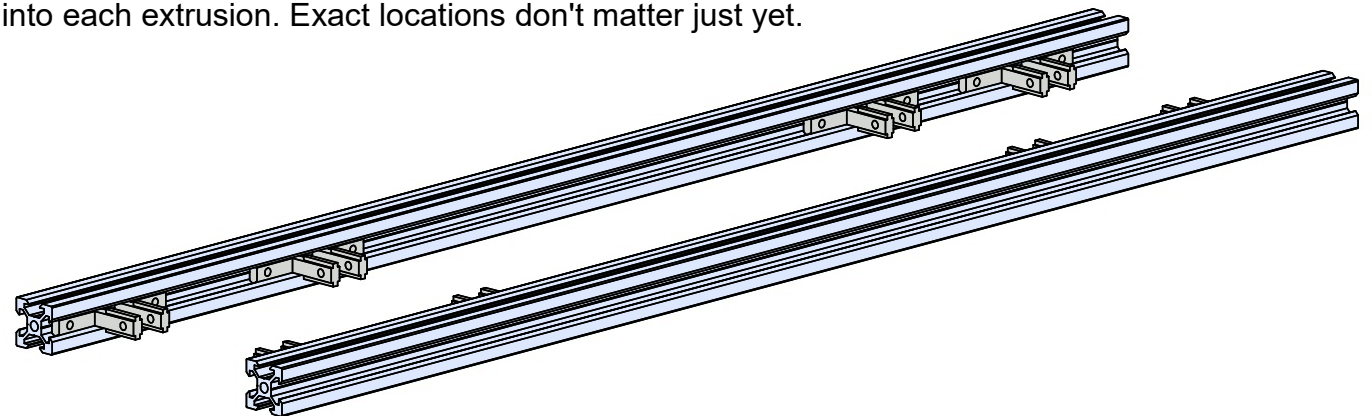
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SCALE: 1:3

SHEET 7 OF 28



Slide in 8 Inside Corner brackets into each extrusion. Exact locations don't matter just yet.



ITEM NO.	DESCRIPTION	QTY.
1	604mm long TSlot Extrusion	2
2	Interior Inside Corner Bracket	16

Lower Frame Squaring 1/5



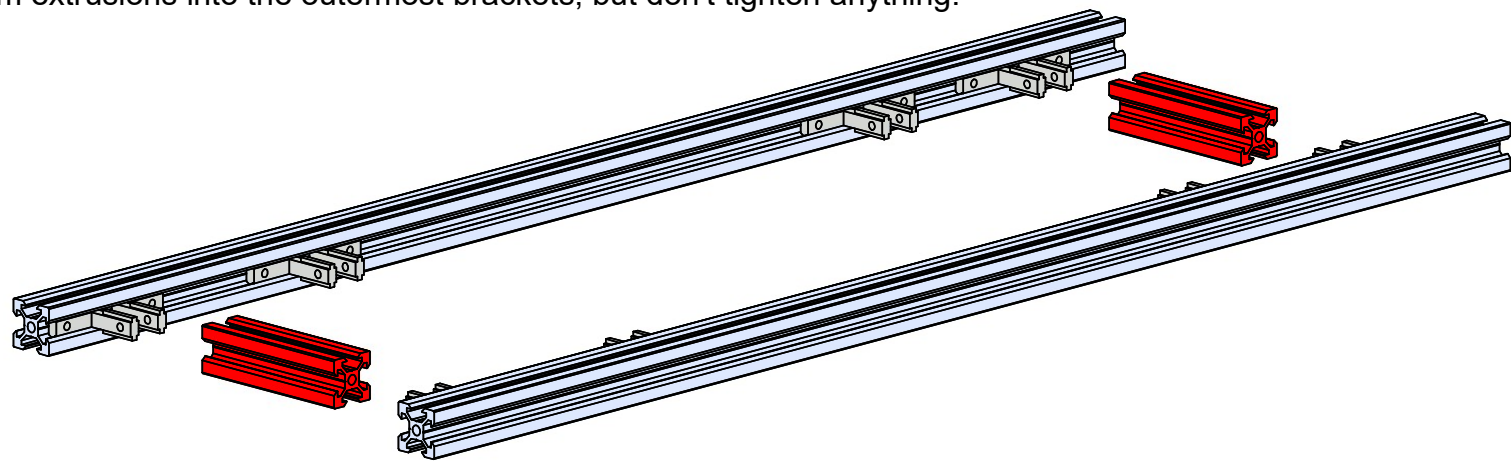
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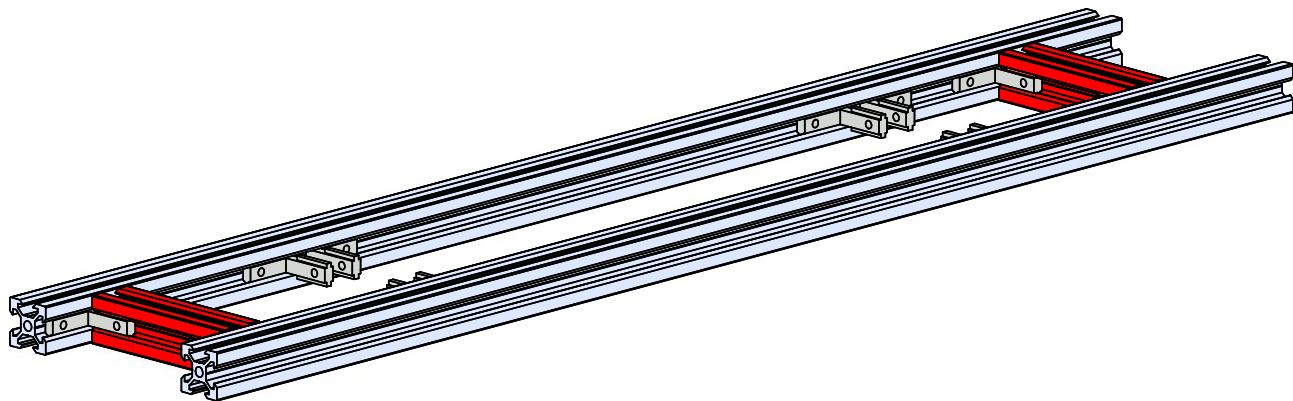
SCALE: 1:3

SHEET 8 OF 28

Slide two 74mm extrusions into the outermost brackets, but don't tighten anything.




Exploded View

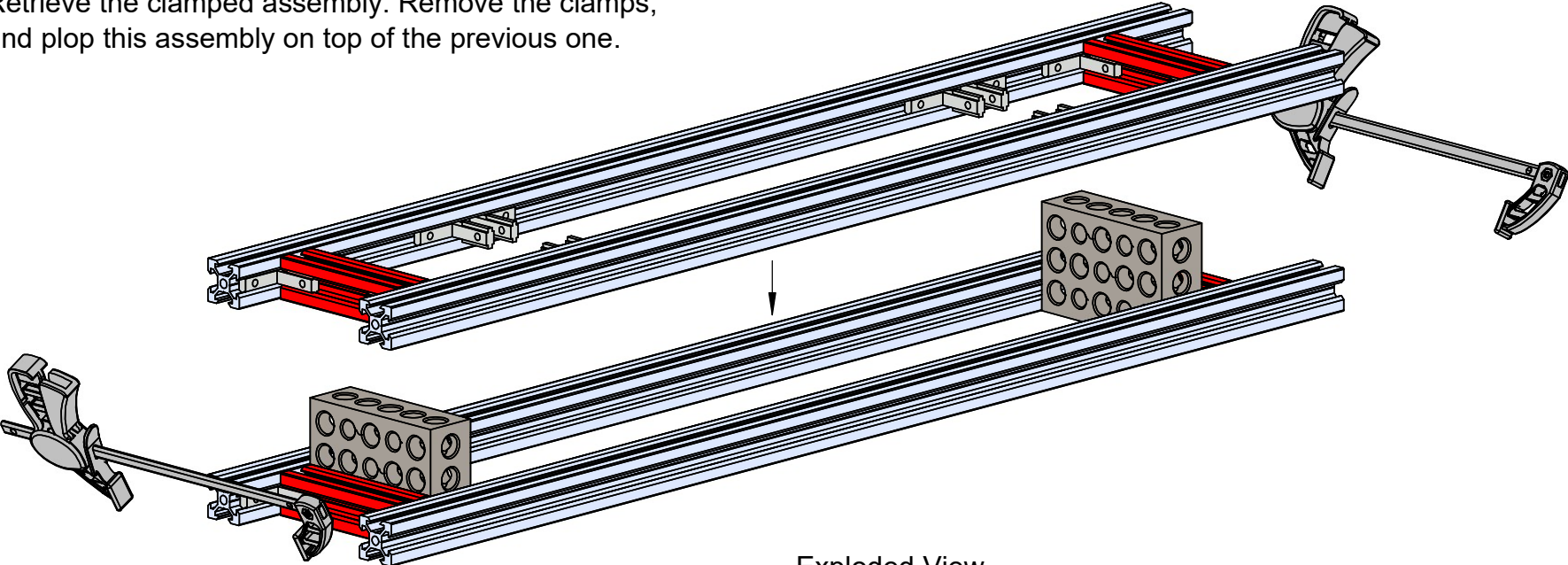


Assembled View

ITEM NO.	DESCRIPTION	QTY.
1	74mm Temporary TSlot Extrusion for Squaring	2

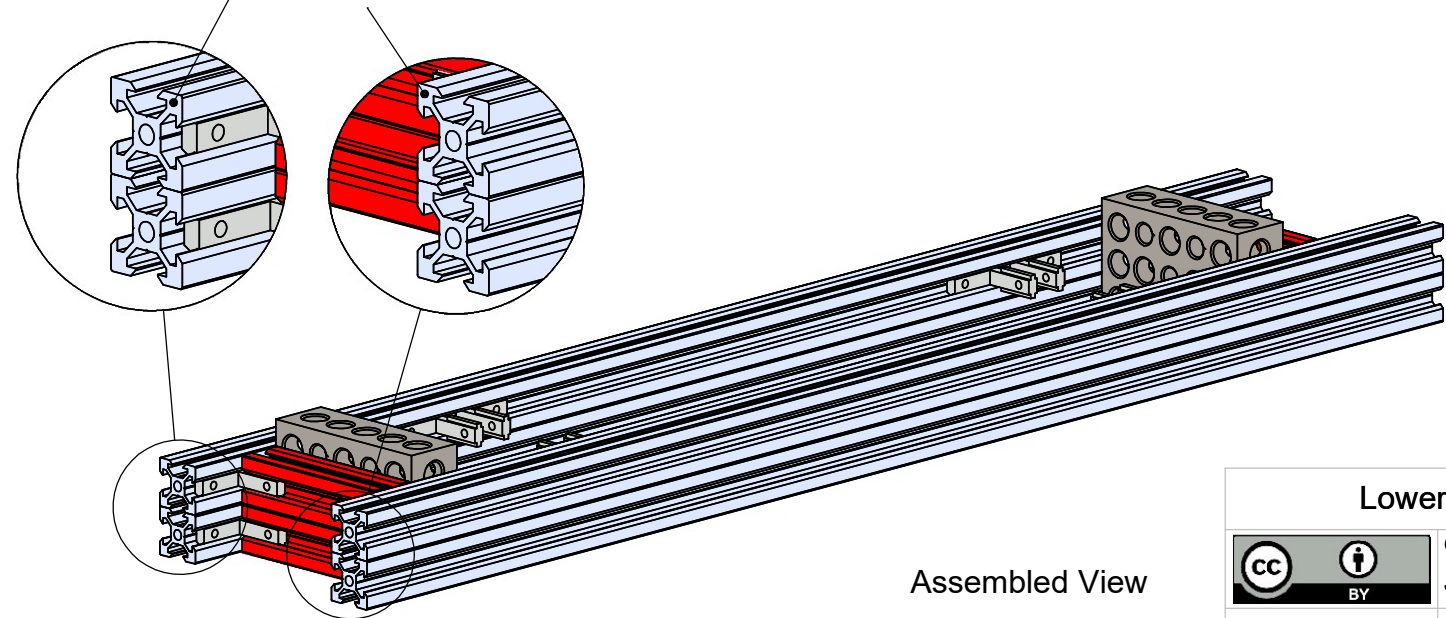
Lower Frame Squaring 2/5		
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	SCALE: 1:3	SHEET 9 OF 28

Retrieve the clamped assembly. Remove the clamps, and plop this assembly on top of the previous one.



Exploded View

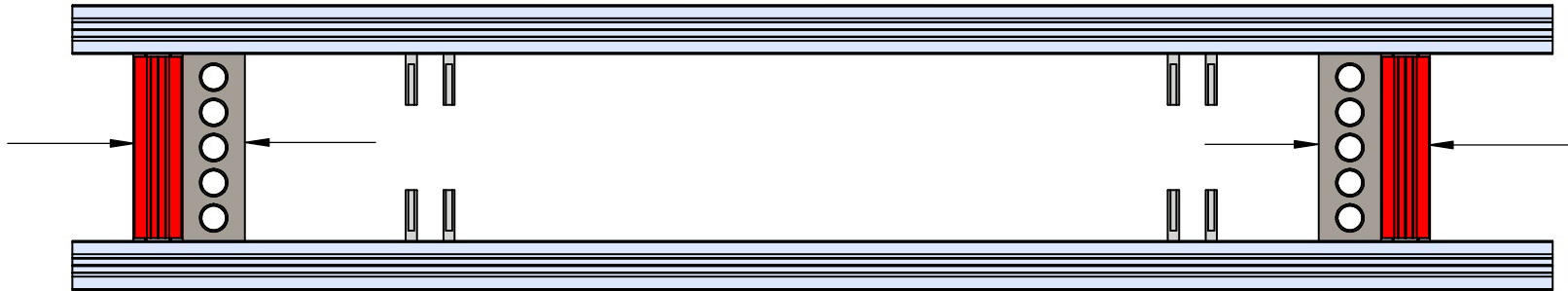
Line up all four end faces on one side.



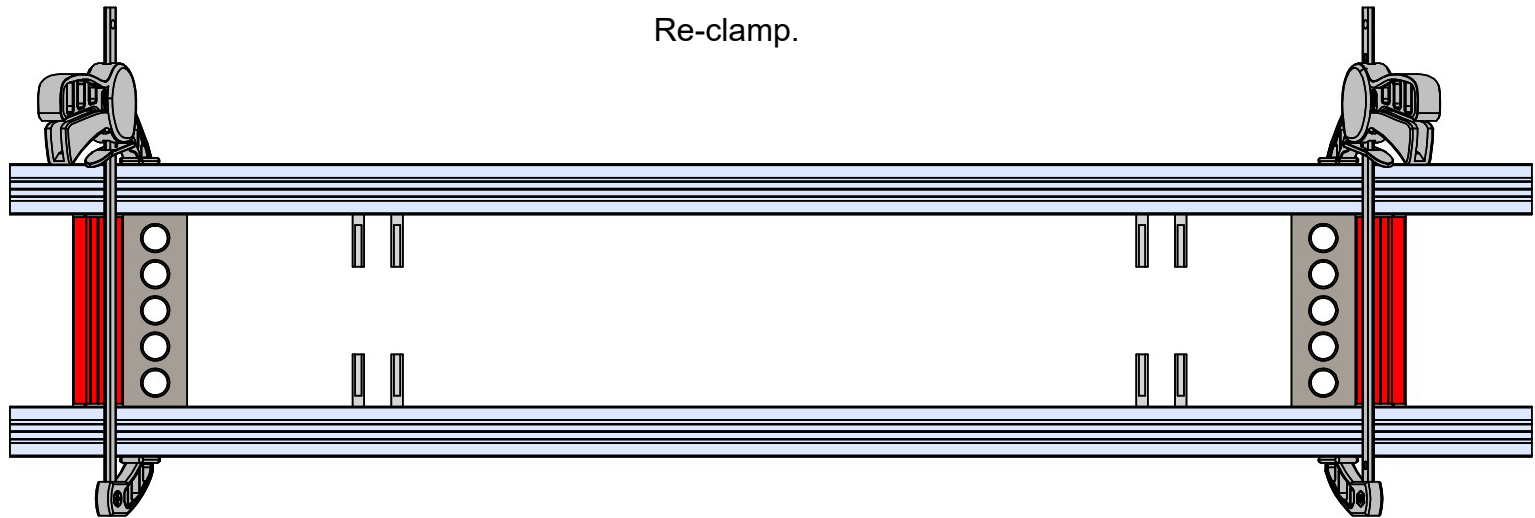
Assembled View

Lower Frame Squaring 3/5		
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SCALE: 1:3		SHEET 10 OF 28

Push the loose extrusions into the Block. Ensure that the Block is fully contacting top and bottom red extrusions.



Re-clamp.



Lower Frame Squaring 4/5



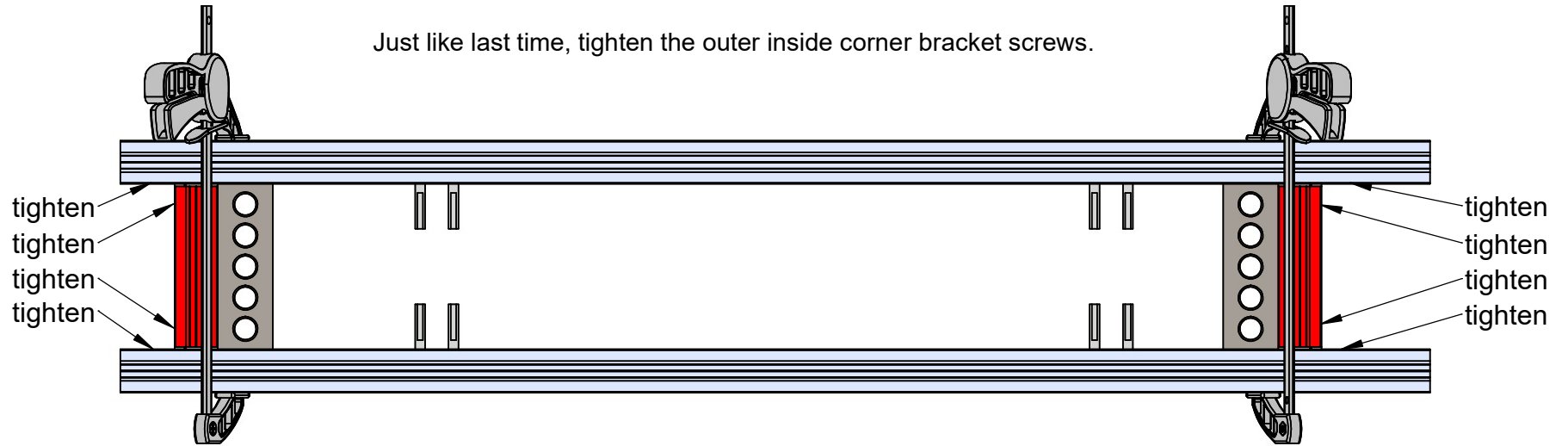
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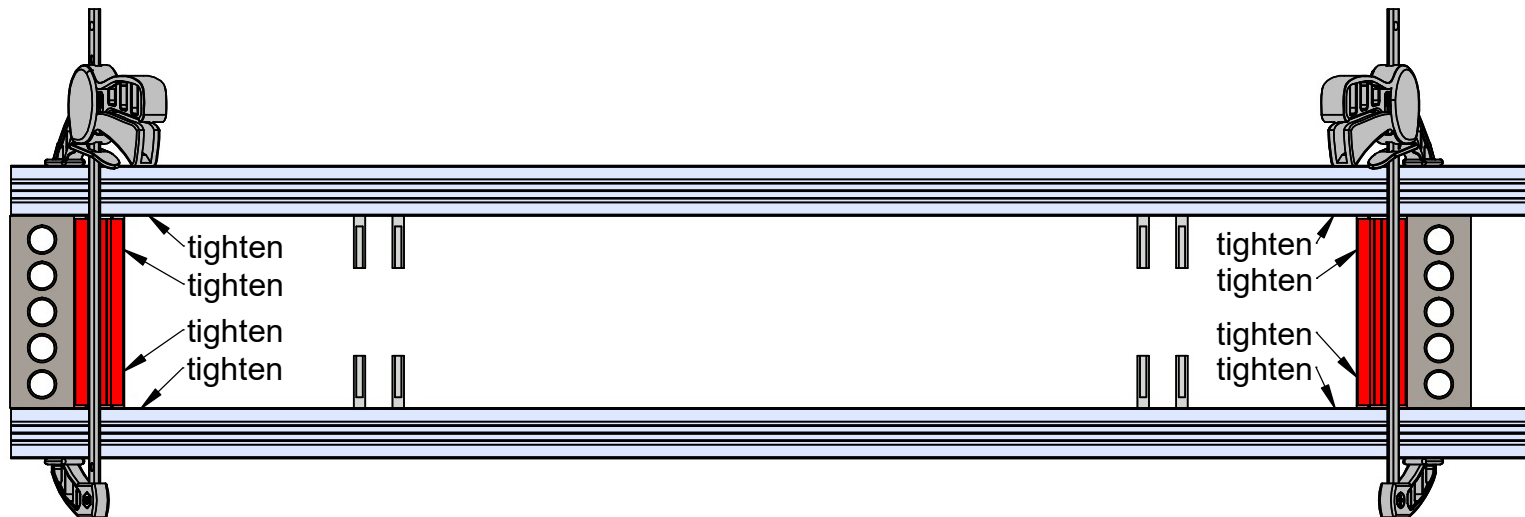
SCALE: 1:3

SHEET 11 OF 28

Just like last time, tighten the outer inside corner bracket screws.



Now unclamp, relocate the clamp to the outside ends, reclamp, and tighten the four inside screws.



Lower Frame Squaring 5/5



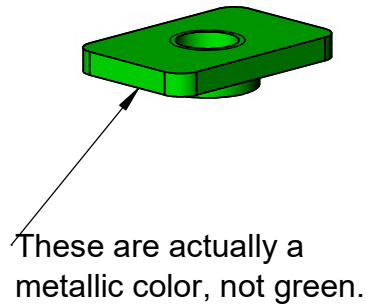
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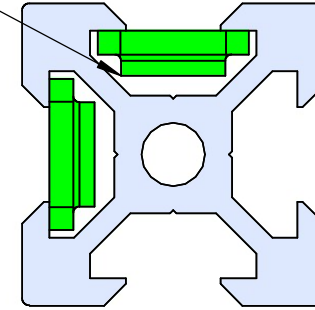
SCALE: 1:3

SHEET 12 OF 28

The next few steps involve these M5 Drop-In T Nuts. These are directional.



The flared side should point into the extrusion.



Each time you install an M5 Stamped T Nut, install it with a backing spring. These springs will prevent the nuts from sliding around unpredictably when you move the assembly. It's also important for some T Nuts that need to be installed partway up a vertical slot.



Stamped T Nut Intro

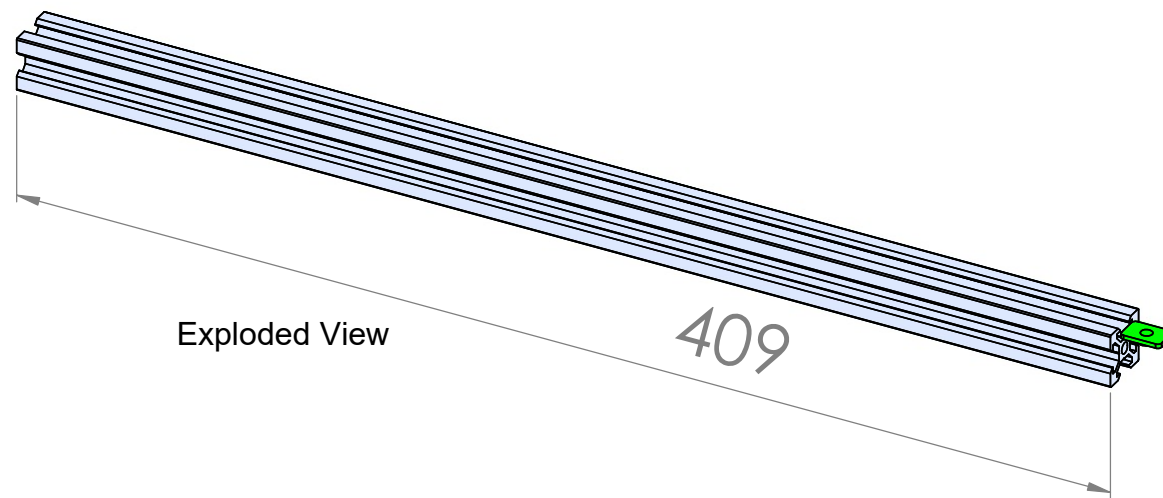


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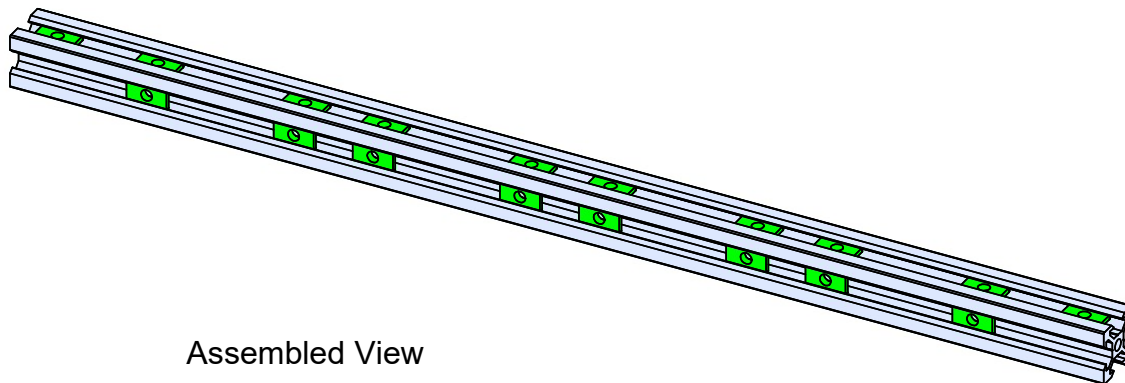
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SCALE: 1:2

SHEET 13 OF 28



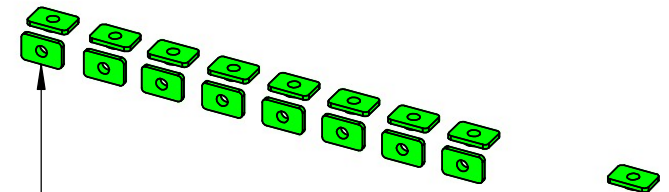
Exploded View



Assembled View

Slide in:

- **10** Stamped **M5** nuts into the **top**
 - **8** Stamped **M5** nuts into the **front**
- Exact locations don't matter for now.



Optional: you can skip adding springs to these inner 16 nuts.

Set this assembly aside for now.

ITEM NO.	DESCRIPTION	QTY.
1	409mm TSlot Extrusion	1
2	M5 Stamped Slide-In T Nut	18
3	T Nut Backing Spring	18

Upper Frame Assembly 1/6

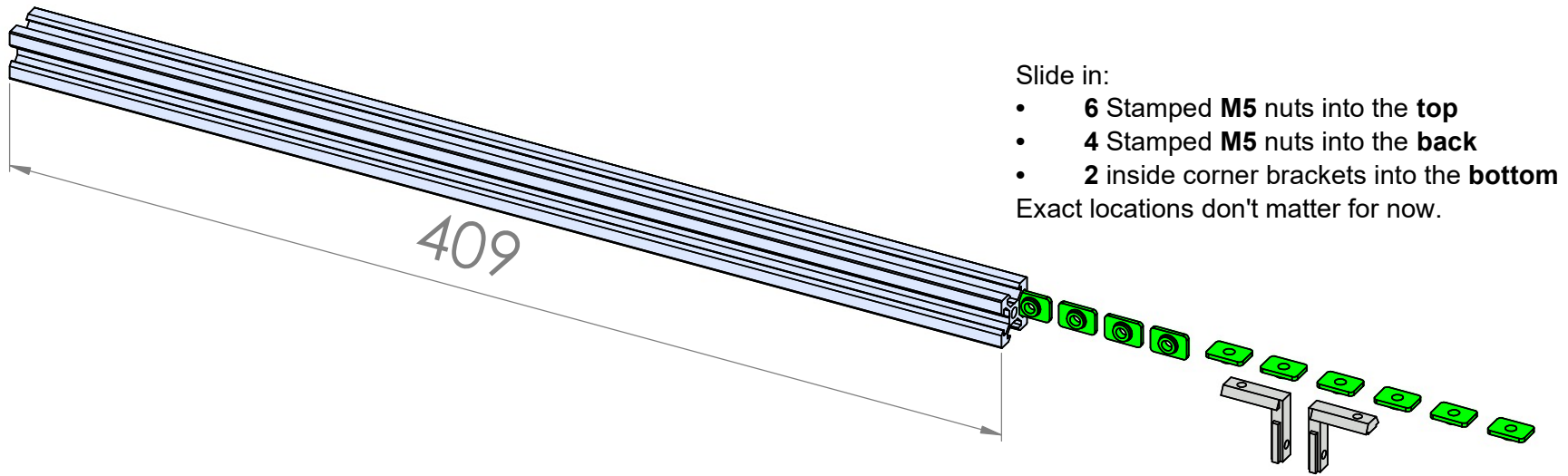


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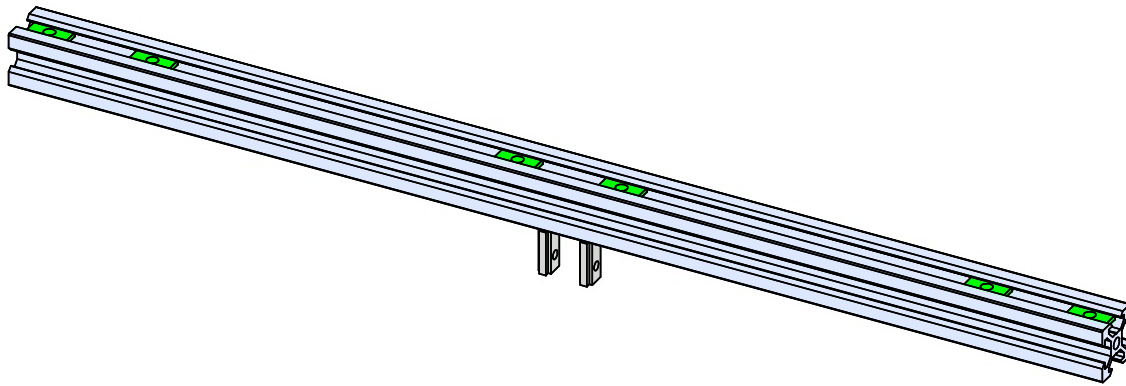
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SCALE: 2:5

SHEET 14 OF 28



Exploded View



Assembled View

Set this assembly aside for now.

ITEM NO.	DESCRIPTION	QTY.
1	409mm TSlot Extrusion	1
2	Interior Inside Corner Bracket	2
3	M5 Stamped Slide-In T Nut	10
4	T Nut Backing Spring	10

Upper Frame Assembly 2/6



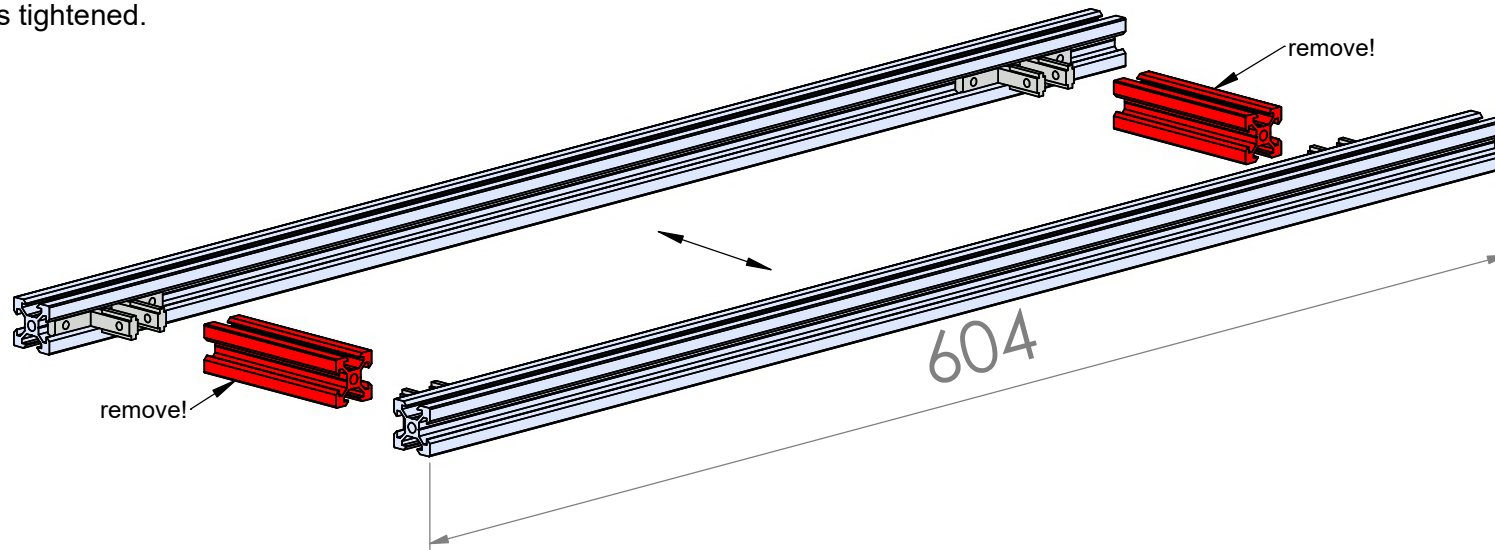
Created by:
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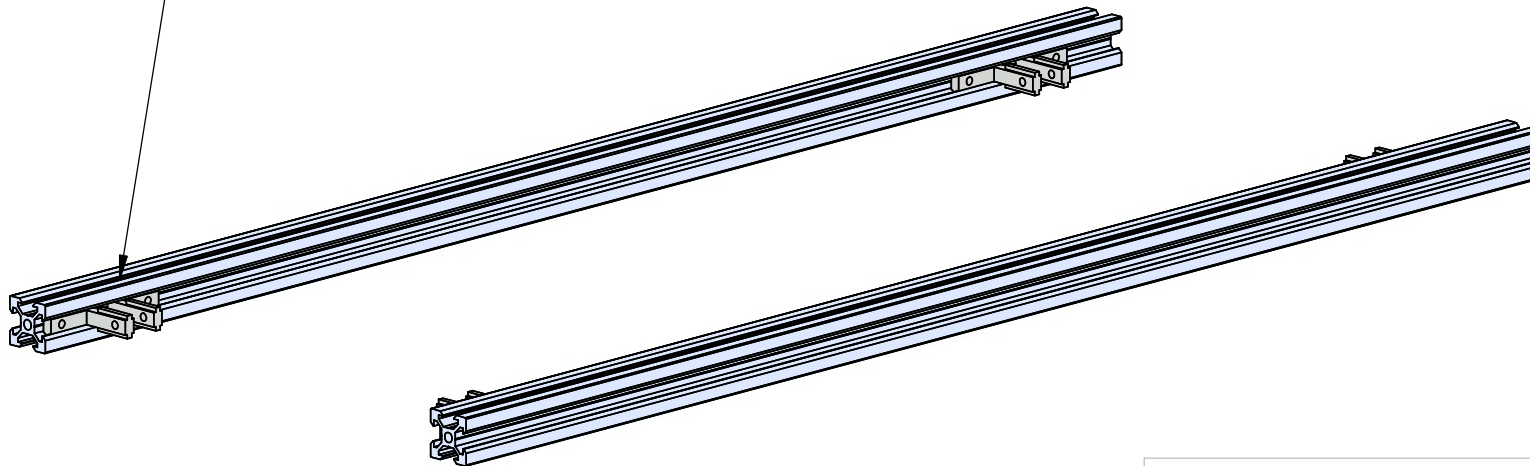
SCALE: 2:5

SHEET 15 OF 28

Remove the clamps and Machinist Blocks from the previous assembly.
Then loosen **only** the 8 screws connecting the red extrusions. Leave all other screws tightened.



Make sure you retrieved the pair with 4 inside corner brackets per side, not 8.



Upper Frame Assembly 3/6



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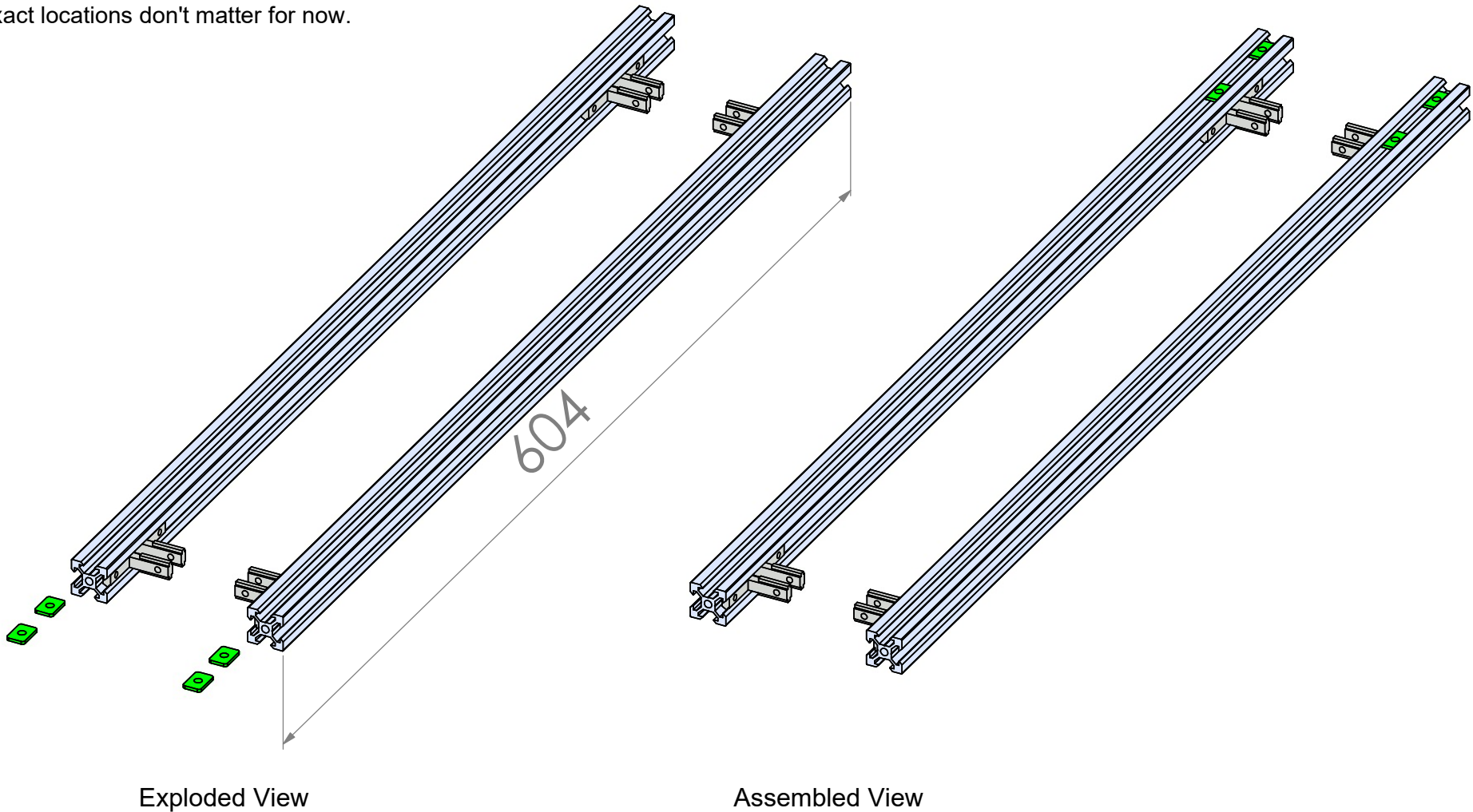
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SCALE: 1:3


SHEET 16 OF 28

Slide in:

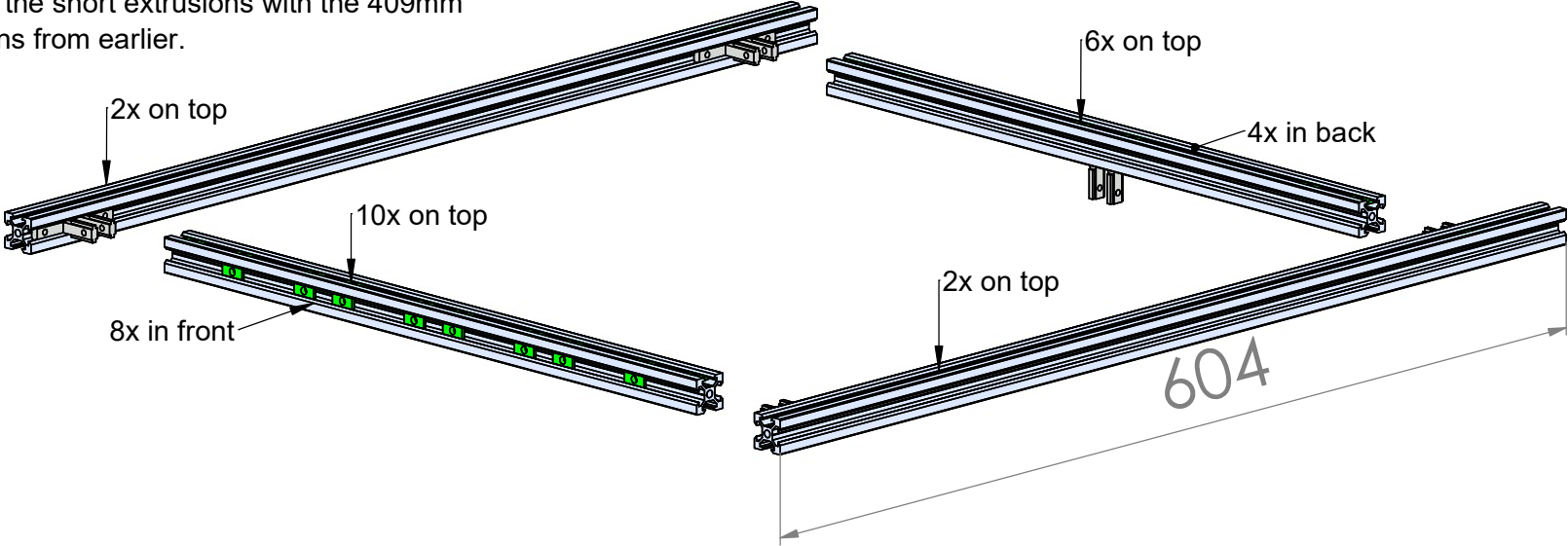
- 2 Stamped **M5** nuts into the **top** of each Extrusion
- Exact locations don't matter for now.



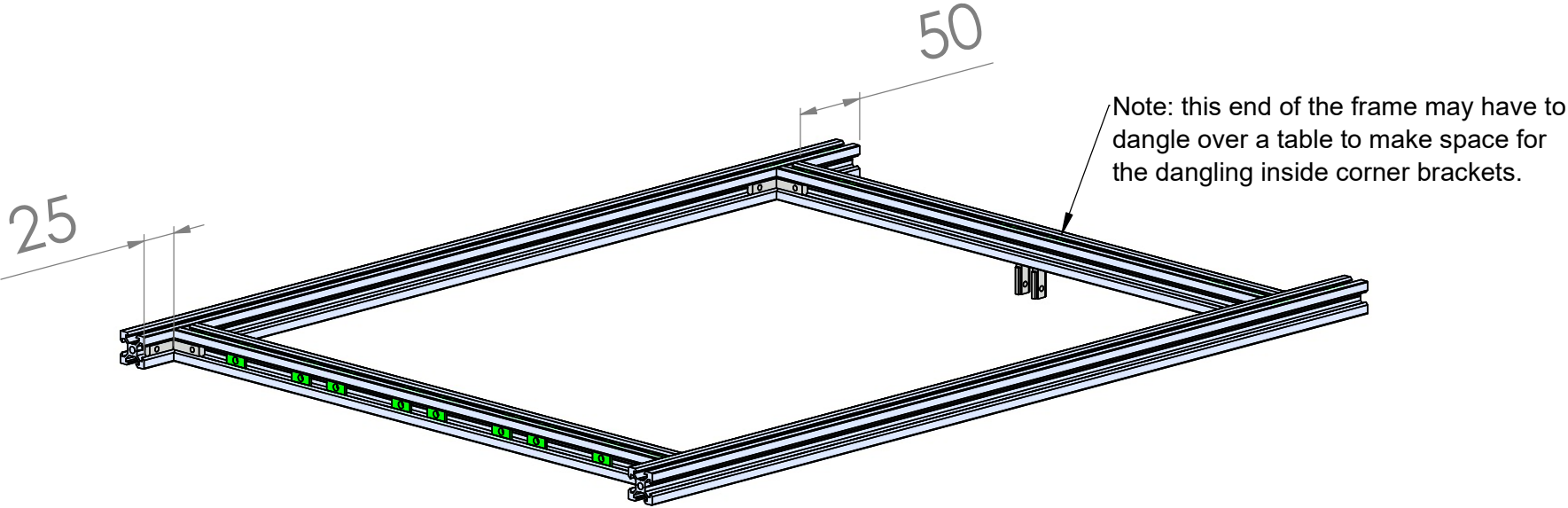
ITEM NO.	DESCRIPTION	QTY.
3	M5 Stamped Slide-In T Nut	4
4	T Nut Backing Spring	4

Upper Frame Assembly 4/6		
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SCALE: 1:3		SHEET 17 OF 28


Replace the short extrusions with the 409mm Extrusions from earlier.

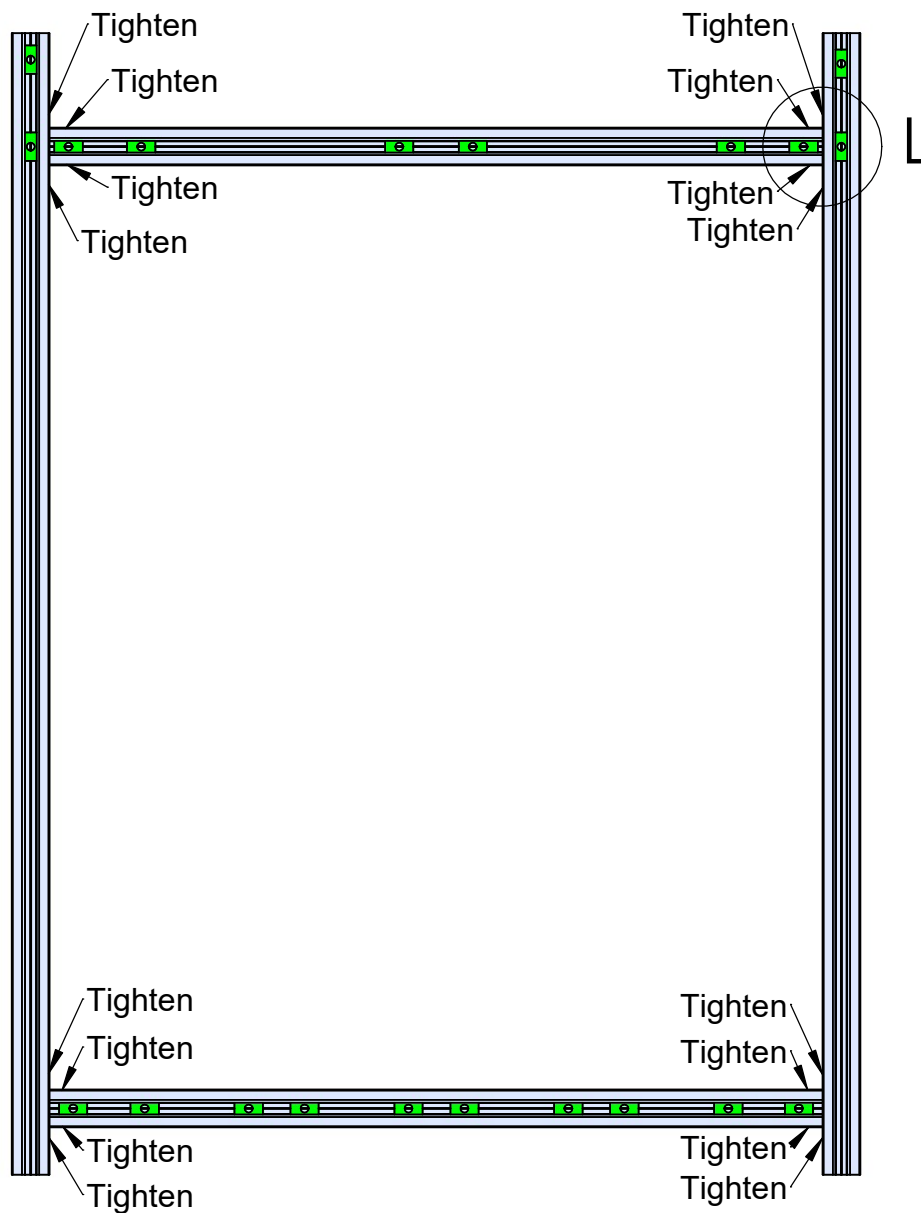


Exploded View

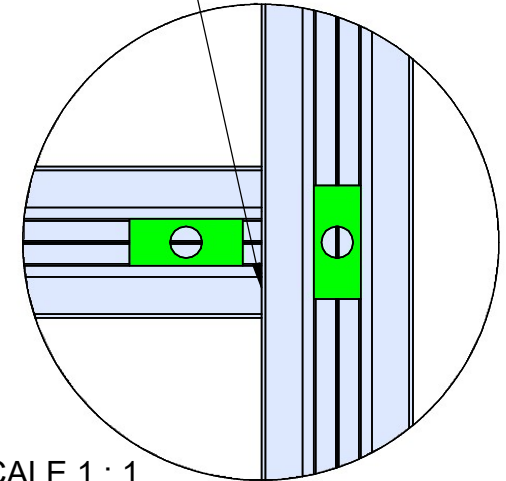


Assembled View

Upper Frame Assembly 5/6		
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	SCALE: 1:4	SHEET 18 OF 28



All four connecting surfaces should *completely* touch each other without any noticeable air gap.



SCALE 1 : 1

Assuming your 409mm TSlot Extrusions were cut to identical lengths, your frame should now be square!

Upper Frame Assembly 6/6



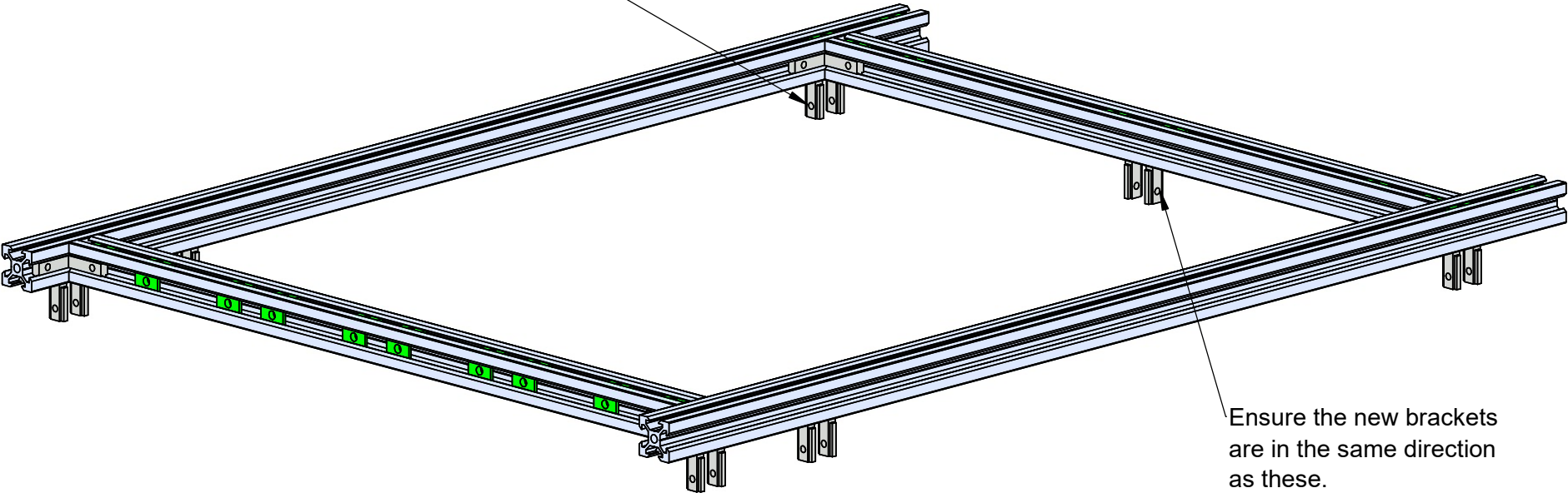
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SCALE: 1:4

SHEET 19 OF 28


Slide 3 pairs of Inside-Corner Brackets (12 total) onto the bottoms side of each long extrusion. Loosely fasten them in the approximate locations shown so they do not fall out.



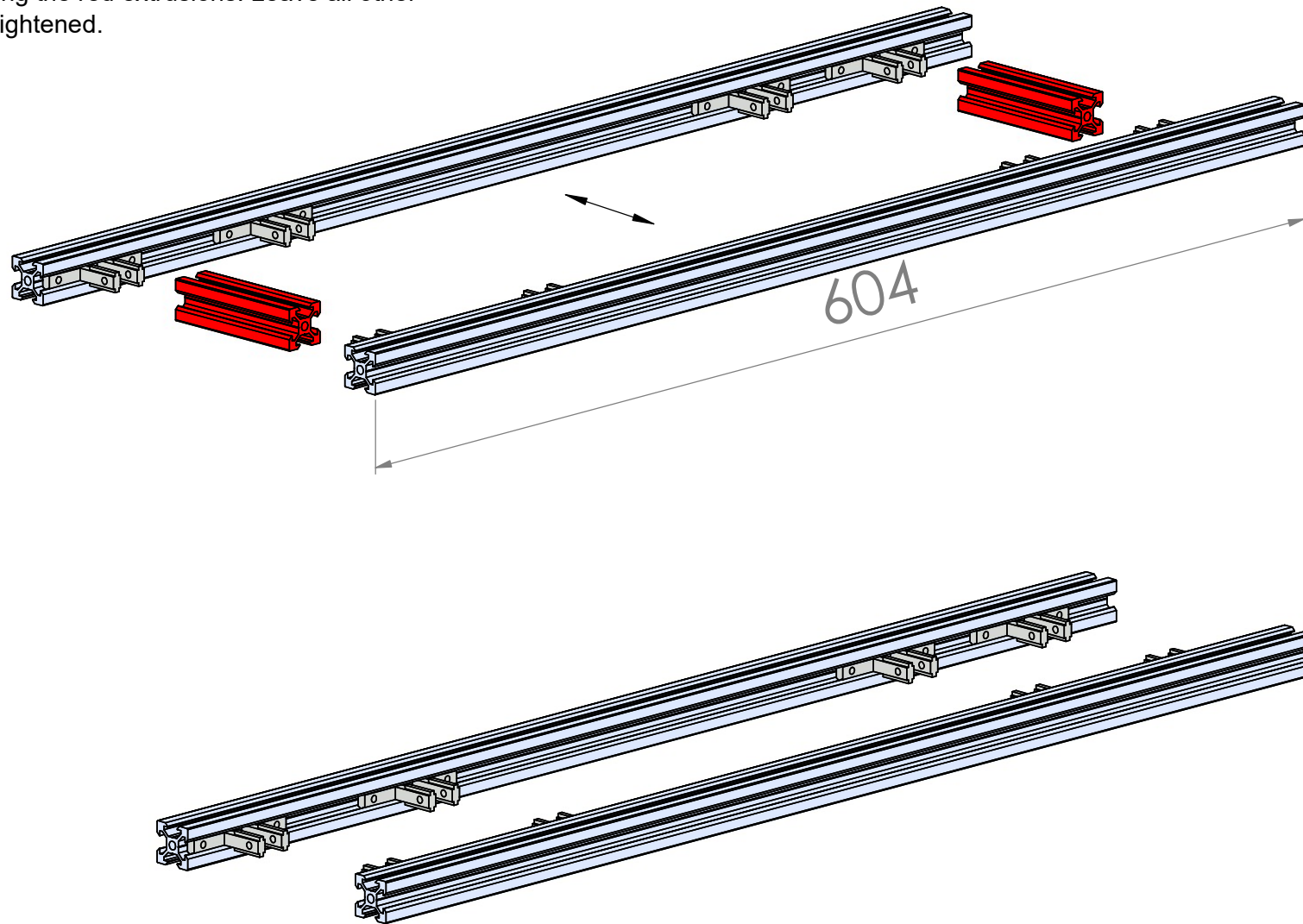
Ensure the new brackets are in the same direction as these.

The Upper Frame is now done!
Set it aside for now.

ITEM NO.	DESCRIPTION	QTY.
3	Interior Inside Corner Bracket	12

Upper Frame Bracket Loose Assembly		
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	SCALE: 1:3	SHEET 20 OF 28

Remove the clamps and Machinist Blocks from the previous assembly. Then loosen **only** the 8 screws connecting the red extrusions. Leave all other screws tightened.



Lower Frame Loose Assembly 1/8

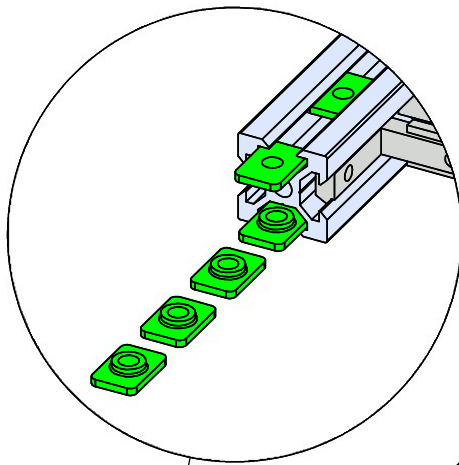


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SCALE: 1:4

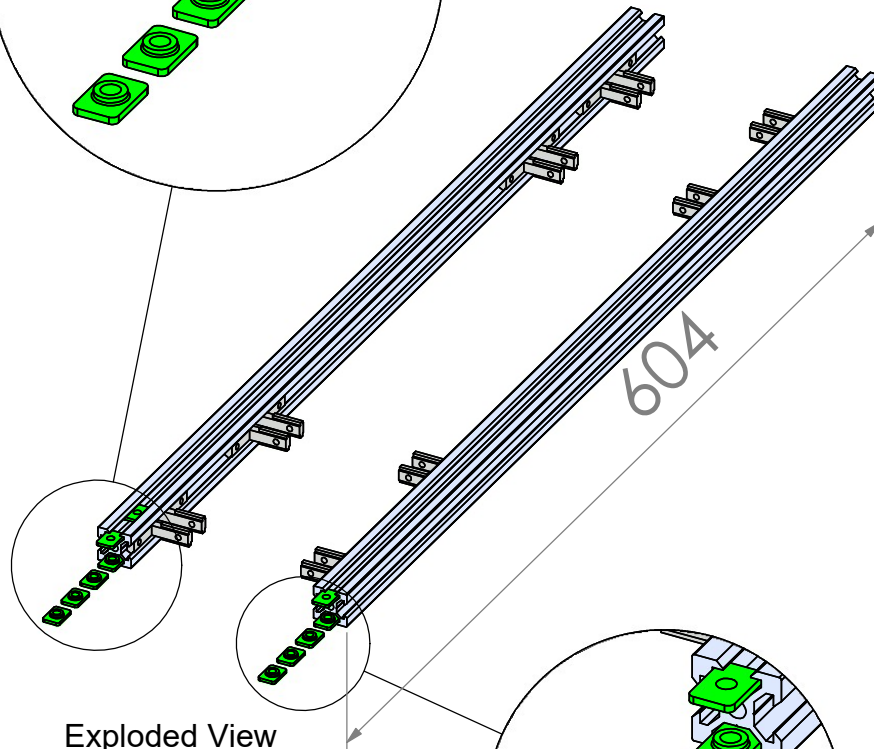
SHEET 21 OF 28



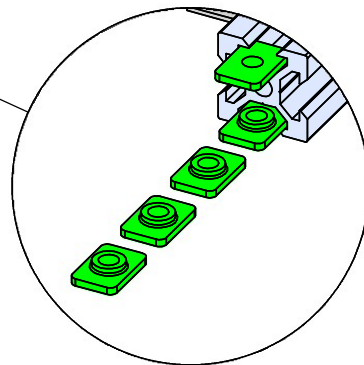
On the left side slide in:

- **2** Stamped T Nuts on **top**
- **4** Stamped T Nuts on the **bottom**

Exact locations will be set later.



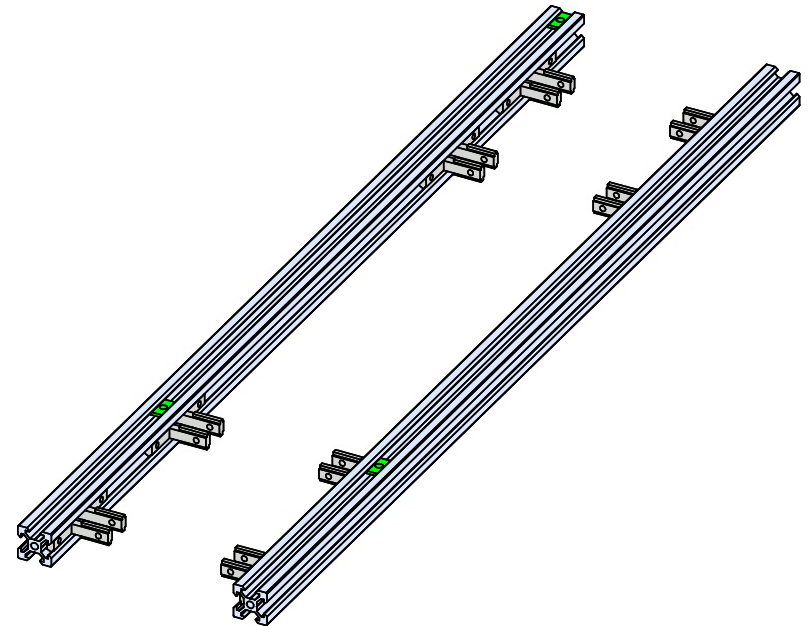
Exploded View



On the right side slide in:

- **1** Stamped T Nut on **top**
- **4** Stamped T Nuts on the **bottom**

Exact locations will be set later.



Assembled View

Set these assemblies aside for now.

ITEM NO.	DESCRIPTION	QTY.
3	M5 Stamped Slide-In T Nut	11
4	T Nut Backing Spring	11

Lower Frame Loose Assembly 2/8



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SCALE: 1:4

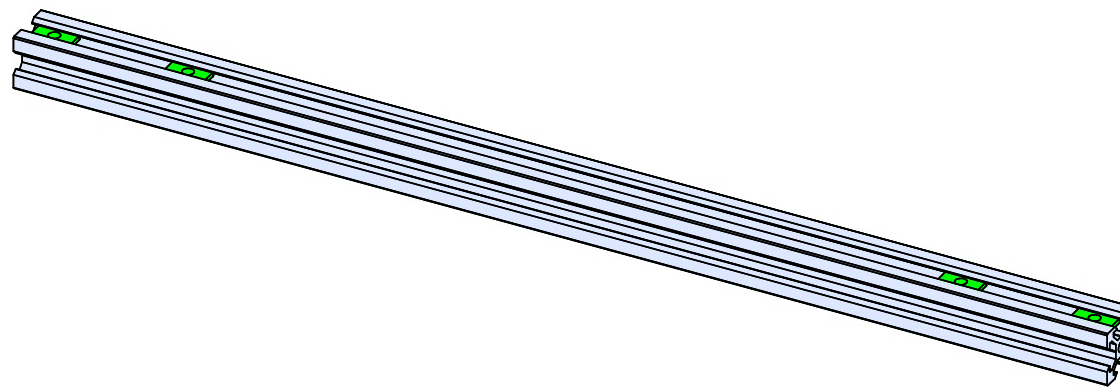
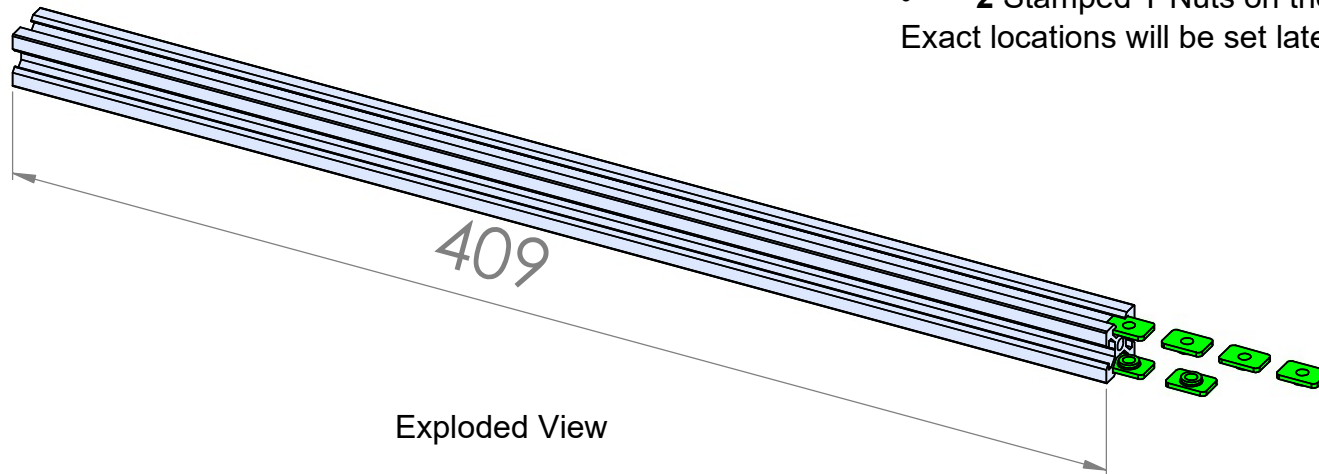
SHEET 22 OF 28

Front Extrusion

Slide in:

- **4** Stamped T Nuts on **top**
- **2** Stamped T Nuts on the **bottom**

Exact locations will be set later.



Set this assembly aside for now.

ITEM NO.	DESCRIPTION	QTY.
1	409mm TSlot Extrusion	1
2	M5 Stamped Slide-In T Nut	6
3	T Nut Backing Spring	6

Lower Frame Loose Assembly 3/8



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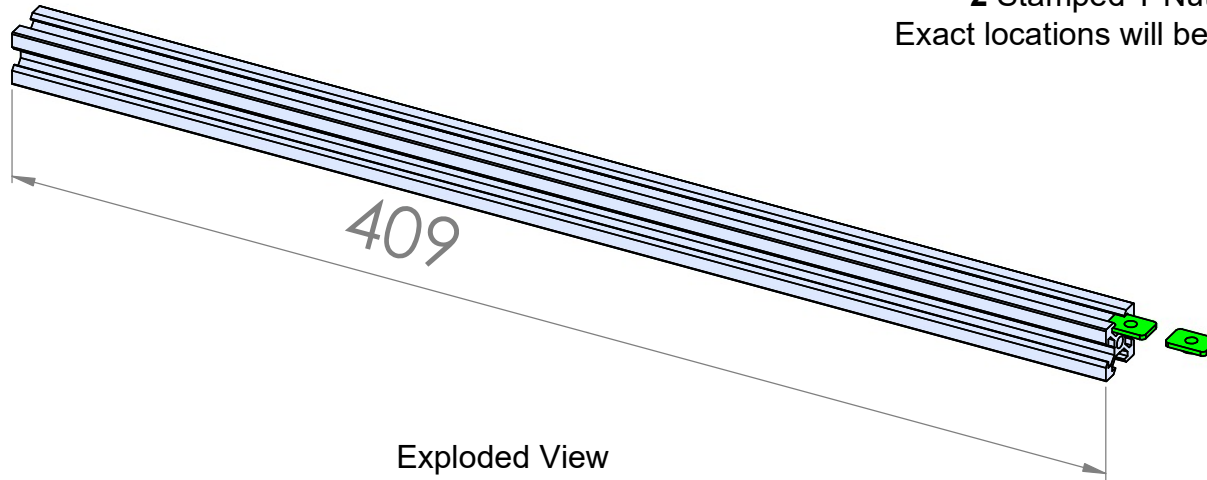
SCALE: 2:5

SHEET 23 OF 28

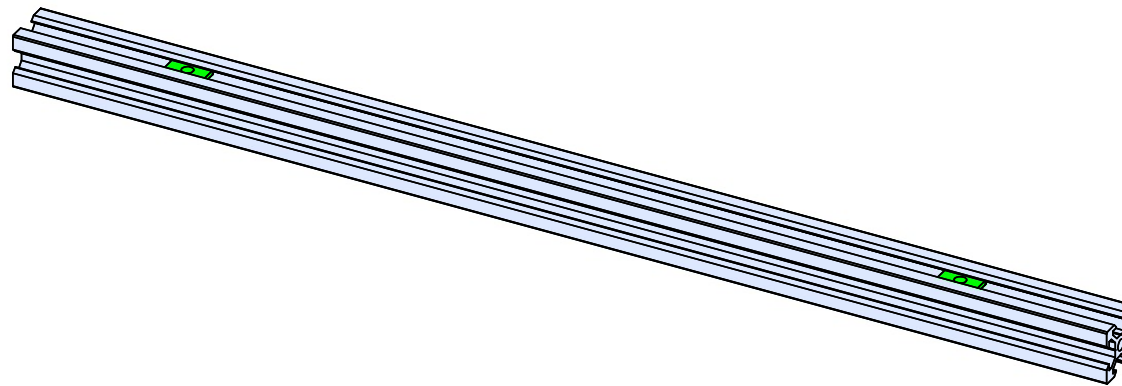
Inner Front Extrusion

Slide in:

- **2** Stamped T Nuts on **top**
Exact locations will be set later.



Exploded View



Assembled View

Set this assembly aside for now.

ITEM NO.	DESCRIPTION	QTY.
1	409mm TSlot Extrusion	1
2	M5 Stamped Slide-In T Nut	2
3	T Nut Backing Spring	2

Lower Frame Loose Assembly 4/8



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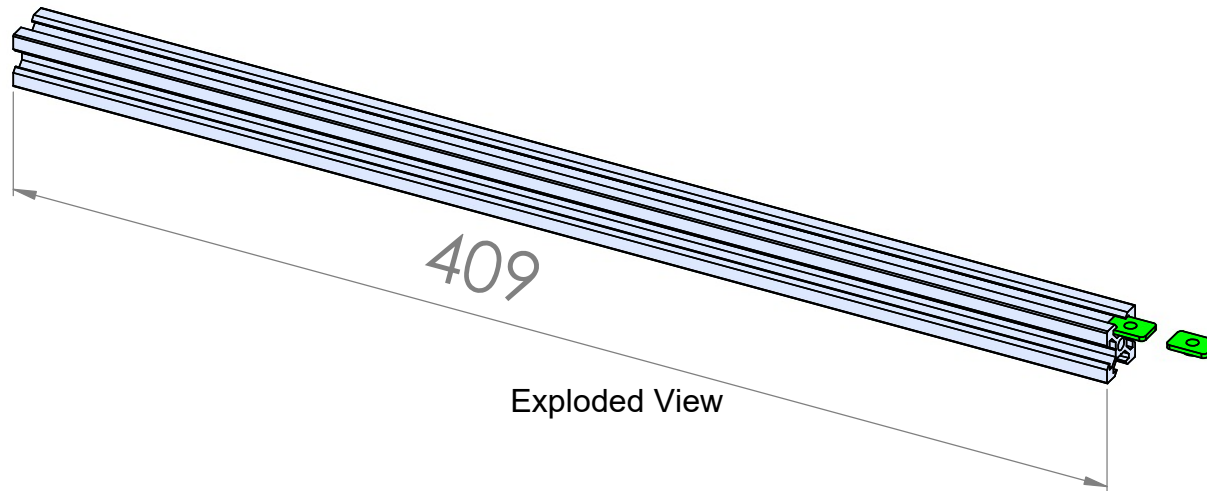
SCALE: 2:5

SHEET 24 OF 28

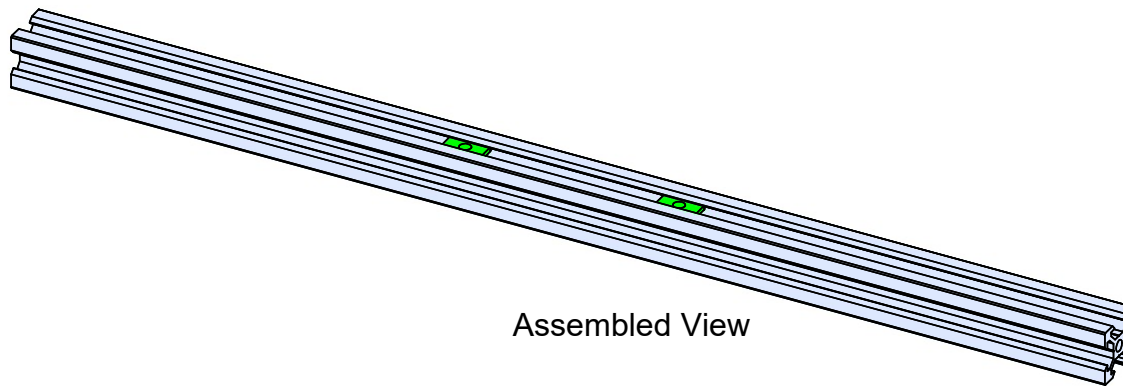
Inner Back Extrusion

Slide in:

- **2 Stamped T Nuts on top**
Exact locations will be set later.



Exploded View



Assembled View

Set this assembly aside for now.

ITEM NO.	DESCRIPTION	
1	409mm TSlot Extrusion	1
2	M5 Stamped Slide-In T Nut	2
3	T Nut Backing Spring	2

Lower Frame Loose Assembly 5/8



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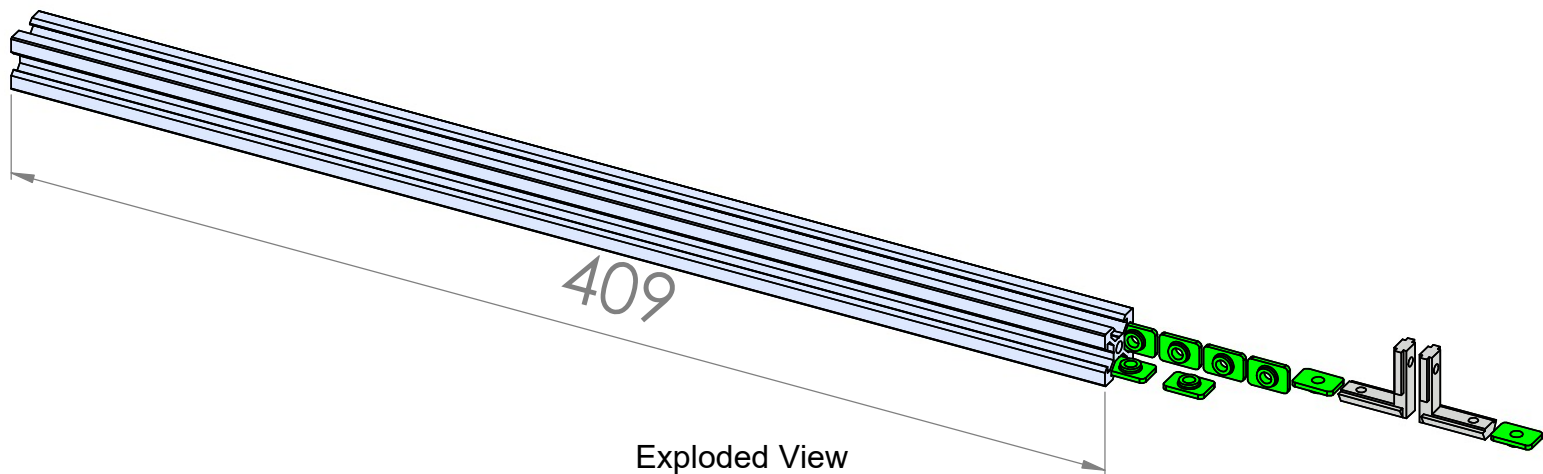
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SCALE: 2:5

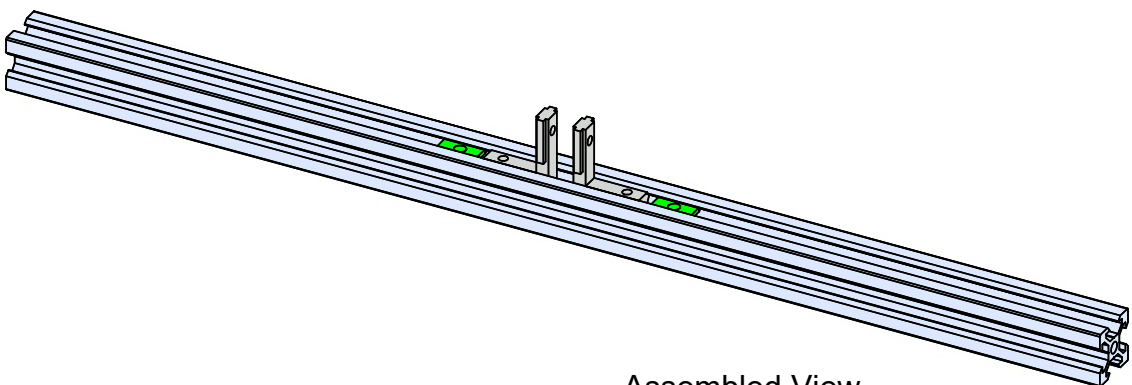
SHEET 25 OF 28

Back Extrusion

- Slide in:
- 2 Stamped T Nuts on **top** with 2 inside corner brackets in between back-to-back
 - 2 Stamped T Nuts on the **bottom**
 - 4 Stamped T Nuts in the **back**
- Exact locations will be set later.



Exploded View



Assembled View

Set this assembly aside for now.

ITEM NO.	DESCRIPTION	QTY.
1	409mm TSlot Extrusion	1
2	Interior Inside Corner Bracket	2
3	M5 Stamped Slide-In T Nut	8
4	T Nut Backing Spring	8

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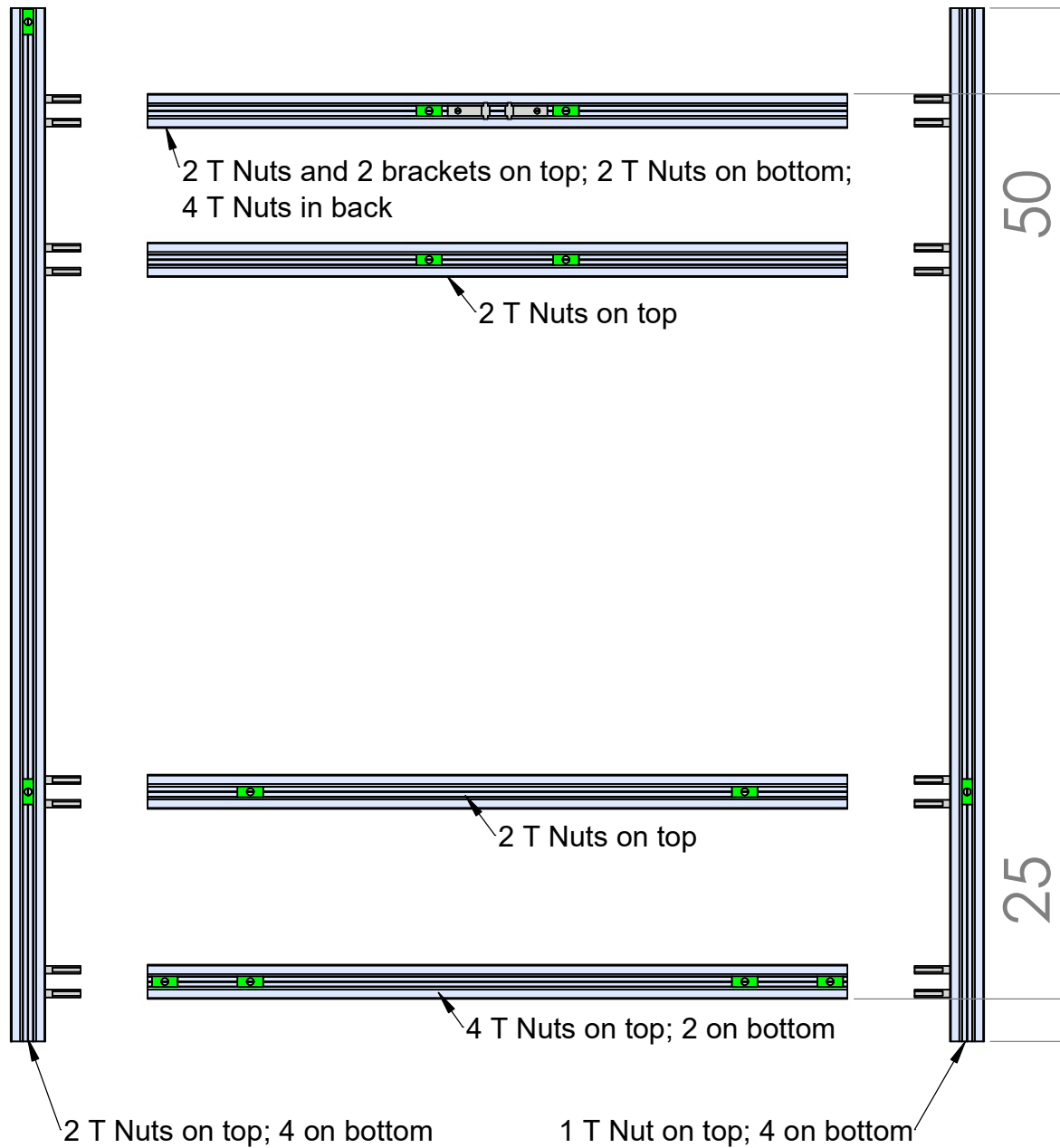
2/7/2022

SCALE: 2:5

SHEET 26 OF 28

Lower Frame Loose Assembly 6/8

Lay out this arrangement on a flat surface. Check the following orientations.



Double Check that the correct number of nuts are installed in the right spots!

This assembly is a hassle to open up later.

Lower Frame Loose Assembly 7/8



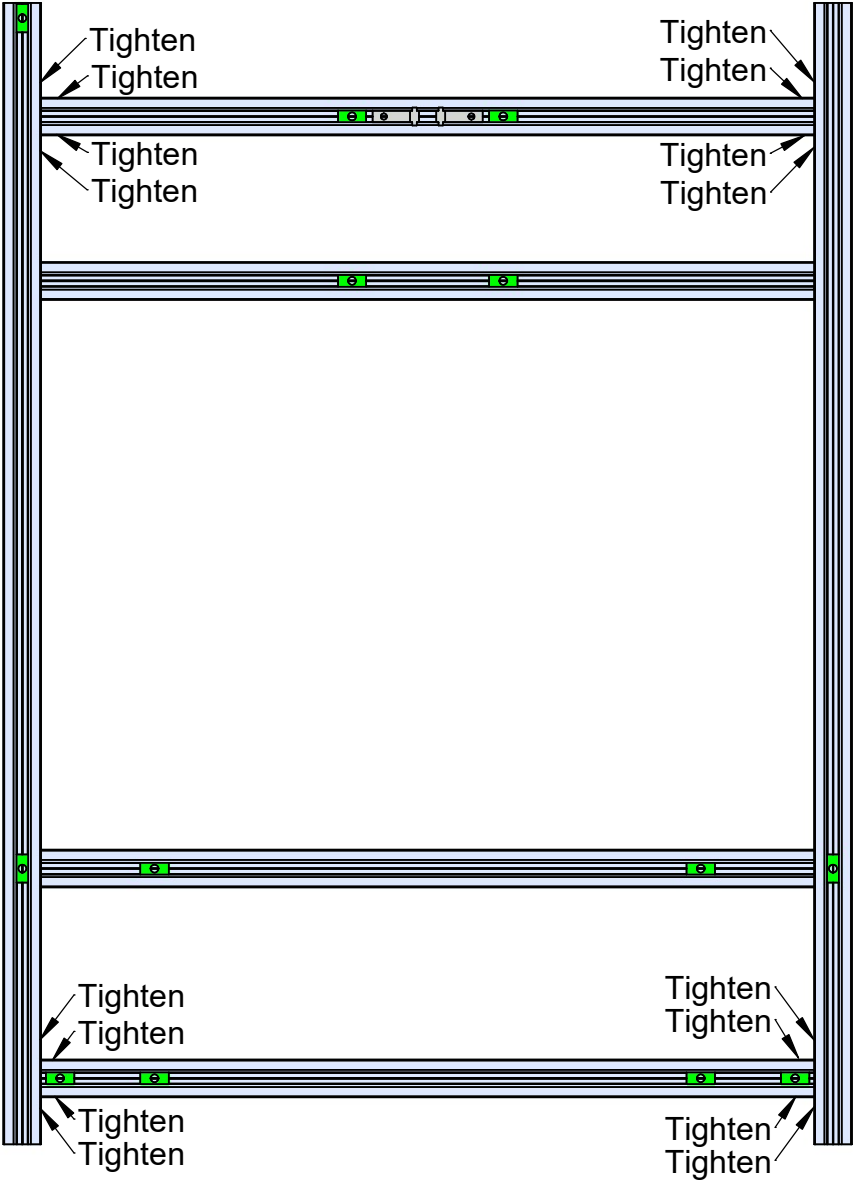
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SCALE: 1:4

SHEET 27 OF 28

Fully tighten the outer two extrusions, but let the inner ones stay loose. They will be aligned and tightened later.



The Lower Frame is Complete!

Lower Frame Loose Assembly 8/8		
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	SCALE: 1:4	SHEET 28 OF 28