Outer Frame Assembly and Alignment

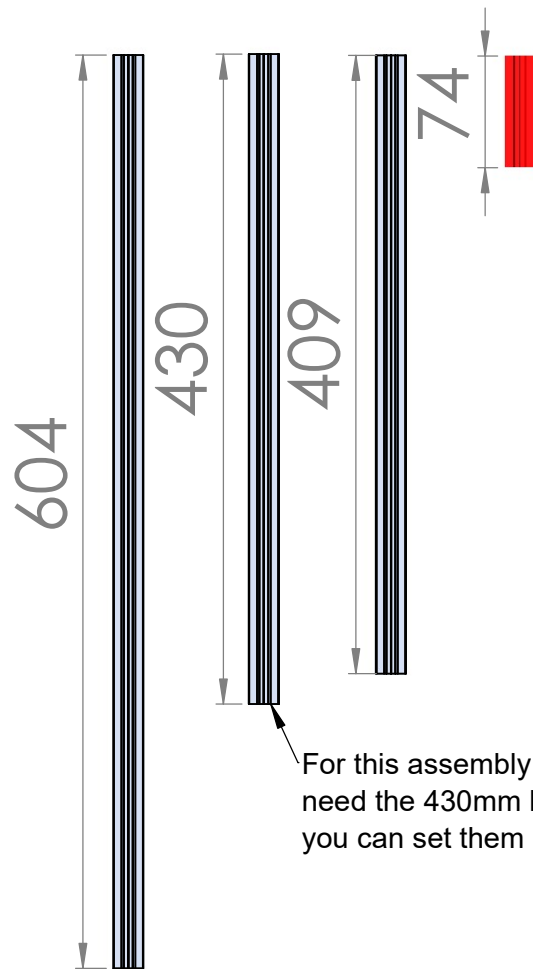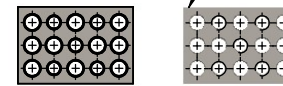|	Created by:	last edited:
	Joshua Vasquez	3/15/2021
	SCALE: 1:5	SHEET 1 OF 28

Jubilee uses 4 unique lengths of 2020 extrusions.

604

430

409

74

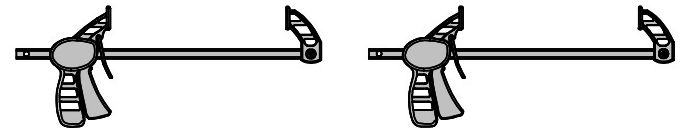For this assembly, we don't need the 430mm lengths, so you can set them aside for now.

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

Both metric (25-50-75mm) and imperial (1-2-3) Blocks will work.

2 Machinist Blocks

2 small or medium adjustable clamps

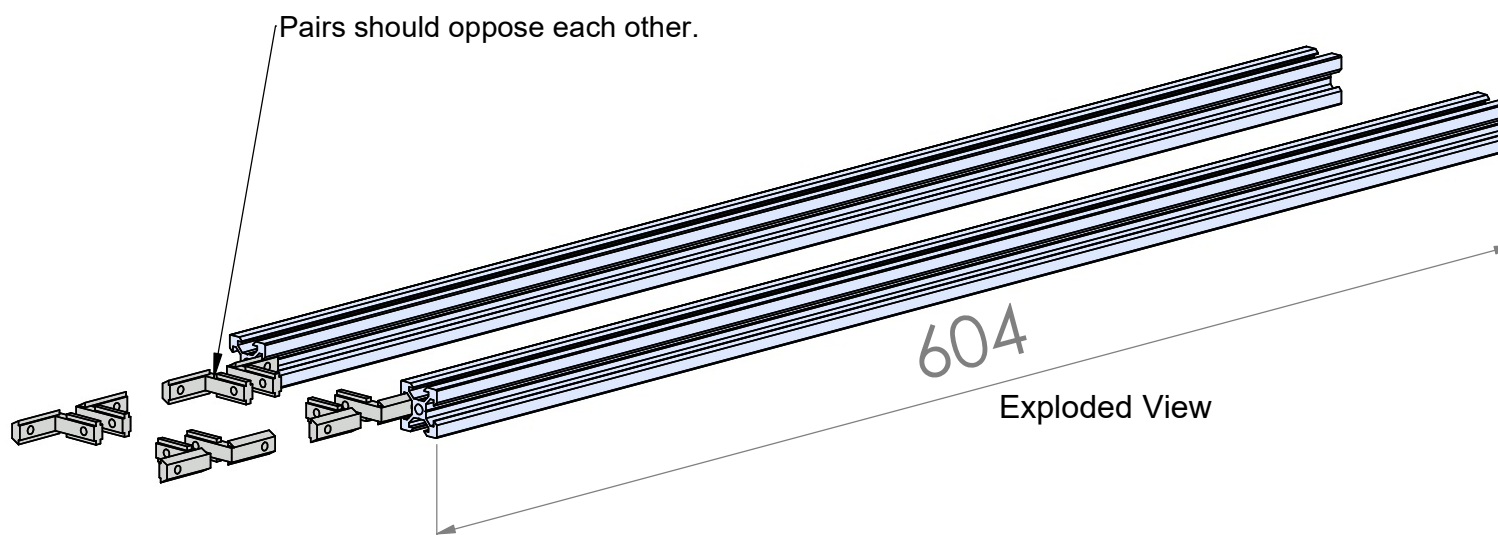|	Intro	
CC BY	Created by: Joshua Vasquez	last edited: 3/15/2021
	SCALE: 1:5	SHEET 2 OF 28

B

Pairs should oppose each other.
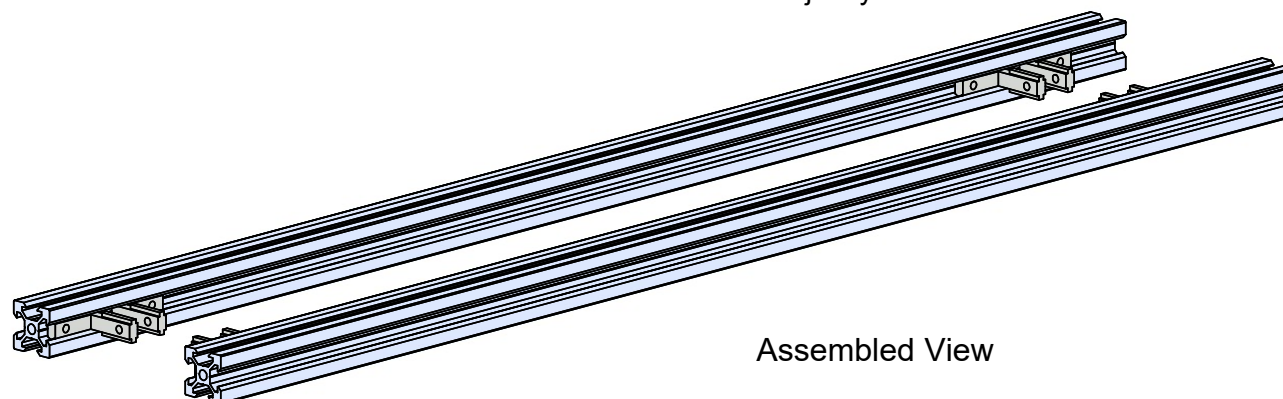
604

Exploded View

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

Assembled View

A

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

Upper Frame Squaring 1/5

Created by:
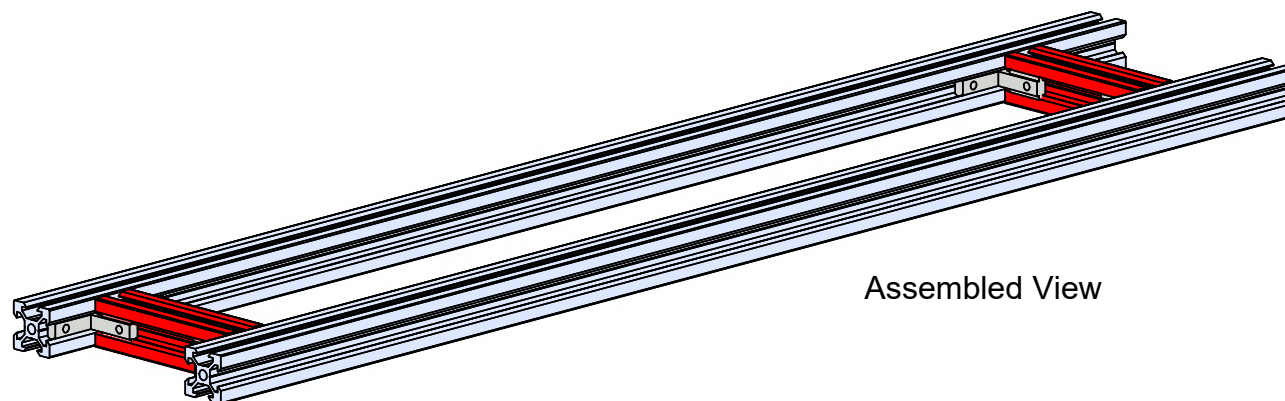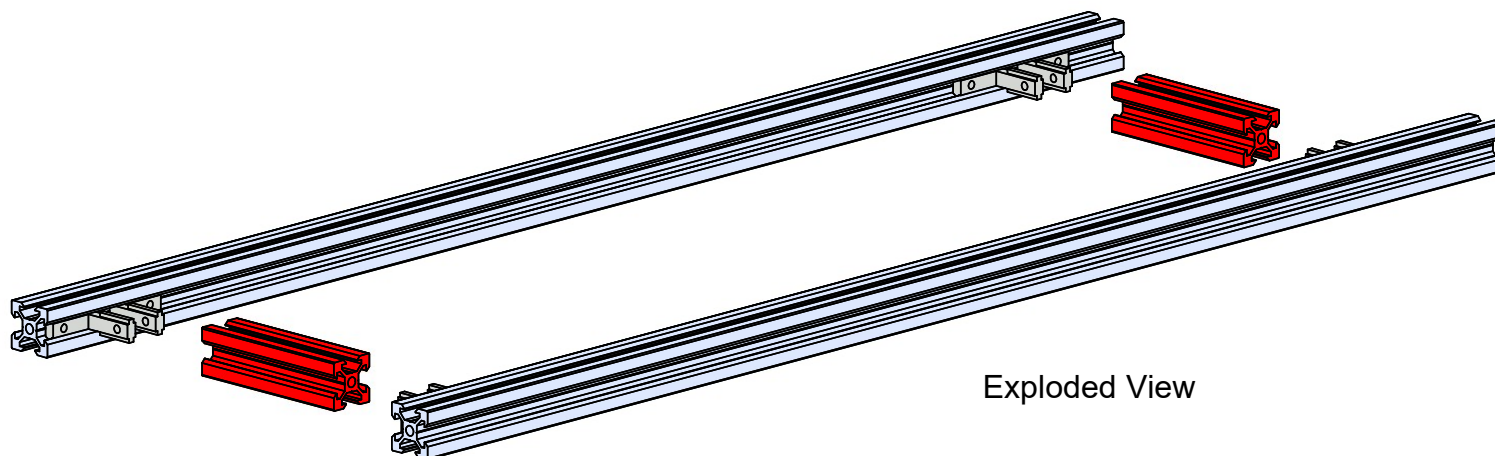Joshua Vasquez

last edited:
3/15/2021

SCALE: 1:3　　SHEET 3 OF 28

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

B

Exploded View

Assembled View

A

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
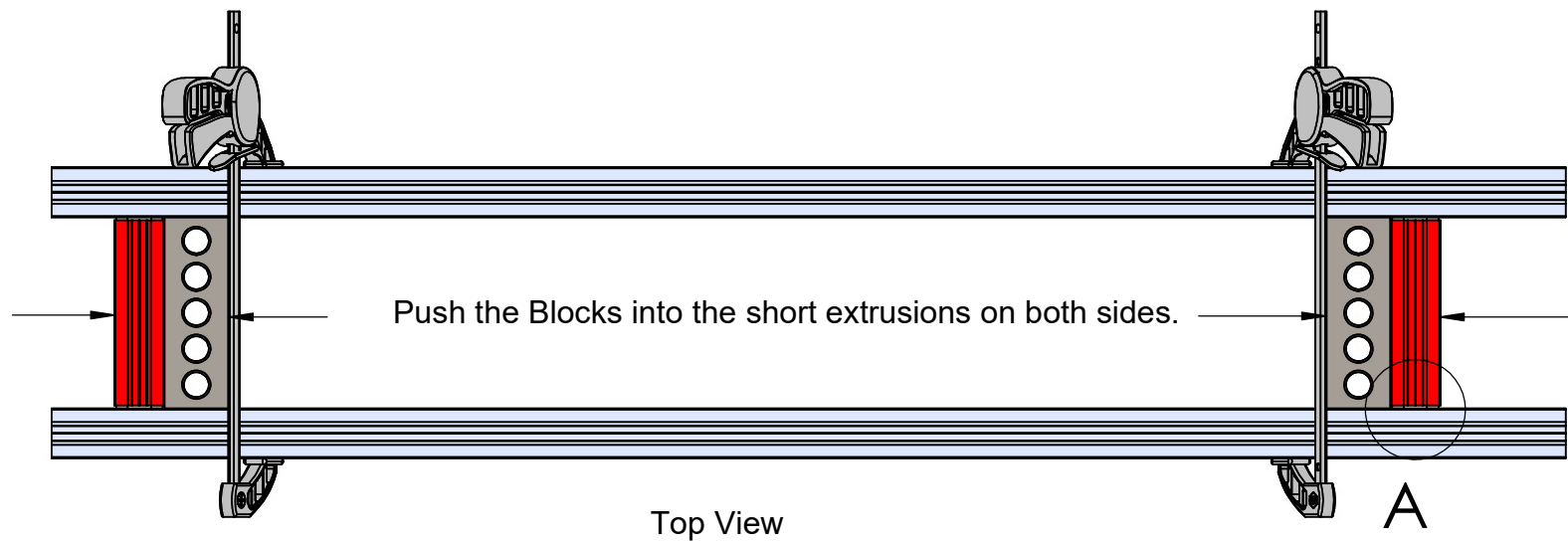
Created by:
Joshua Vasquez

last edited:
3/15/2021

SCALE: 1:3   SHEET 4 OF 28
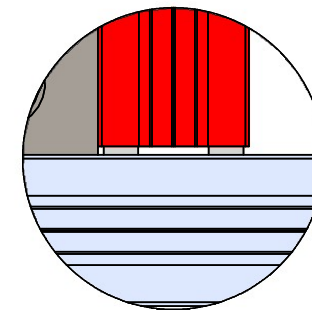
B

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

Push the Blocks into the short extrusions on both sides.

Top View

A

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.

DETAIL A

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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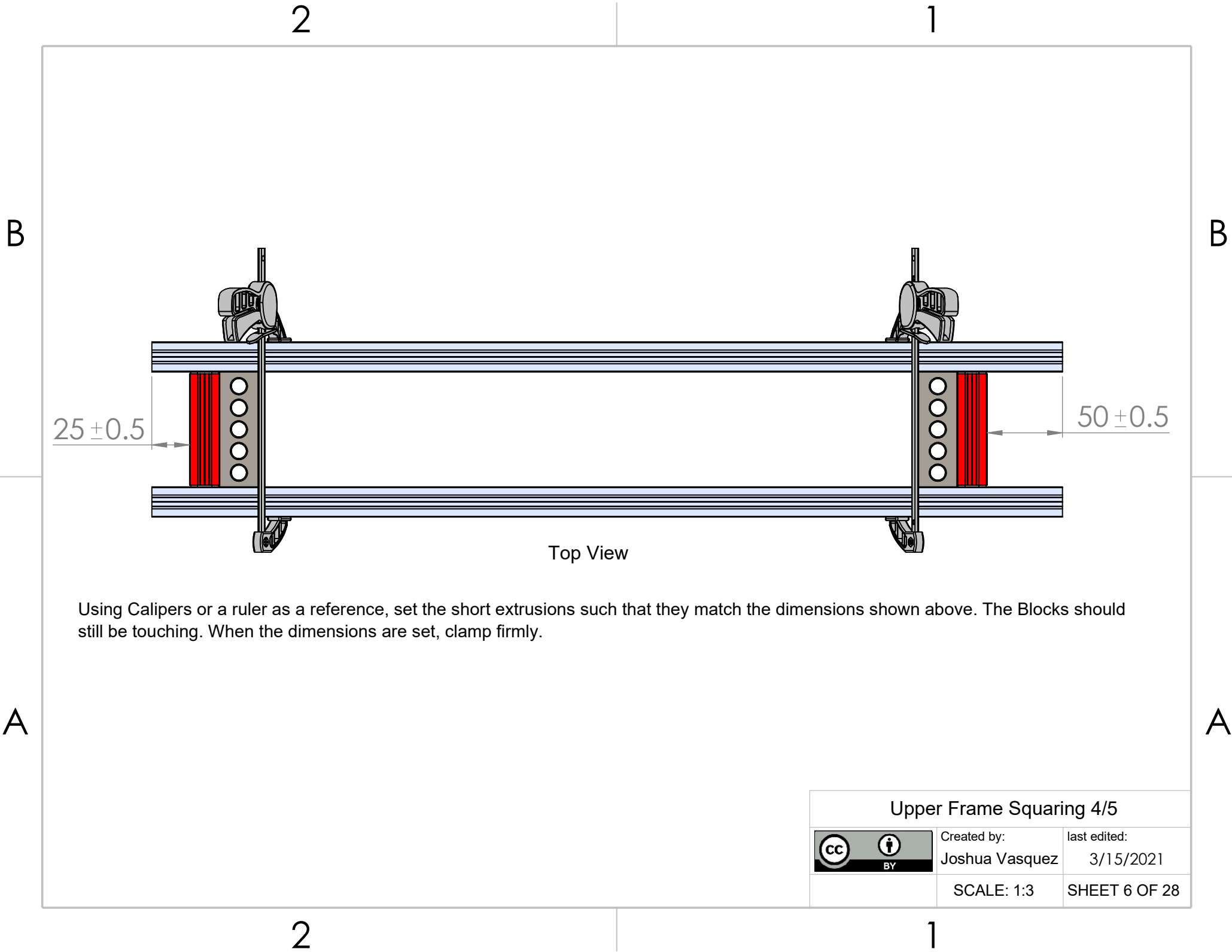last edited:
3/15/2021

SCALE: 1:3   SHEET 5 OF 28

B

B

25 ±0.5

50 ±0.5

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.

A

A

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.

tighten
tighten

tighten
tighten

tighten
tighten

tighten
tighten

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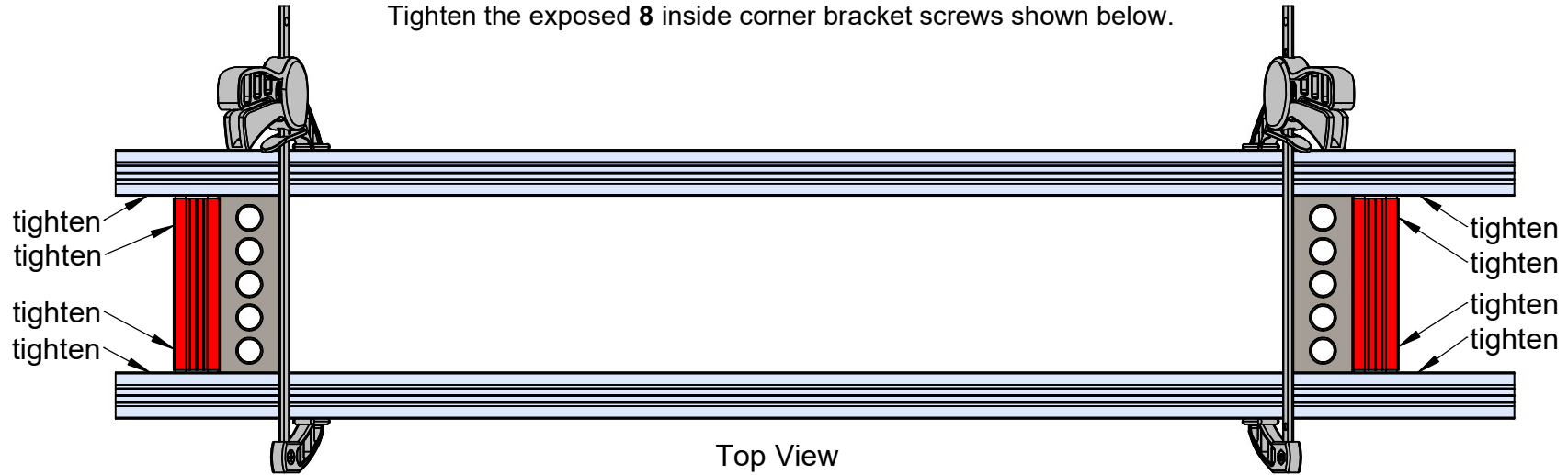
Inside Corner Brackets tend to shift as you tighten one of their two screws. When you are close to to tightening one screw, switch off to the other screw such that the clamped assembly sets the position, not the screw.

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

tighten
tighten

tighten
tighten

tighten
tighten

tighten
tighten

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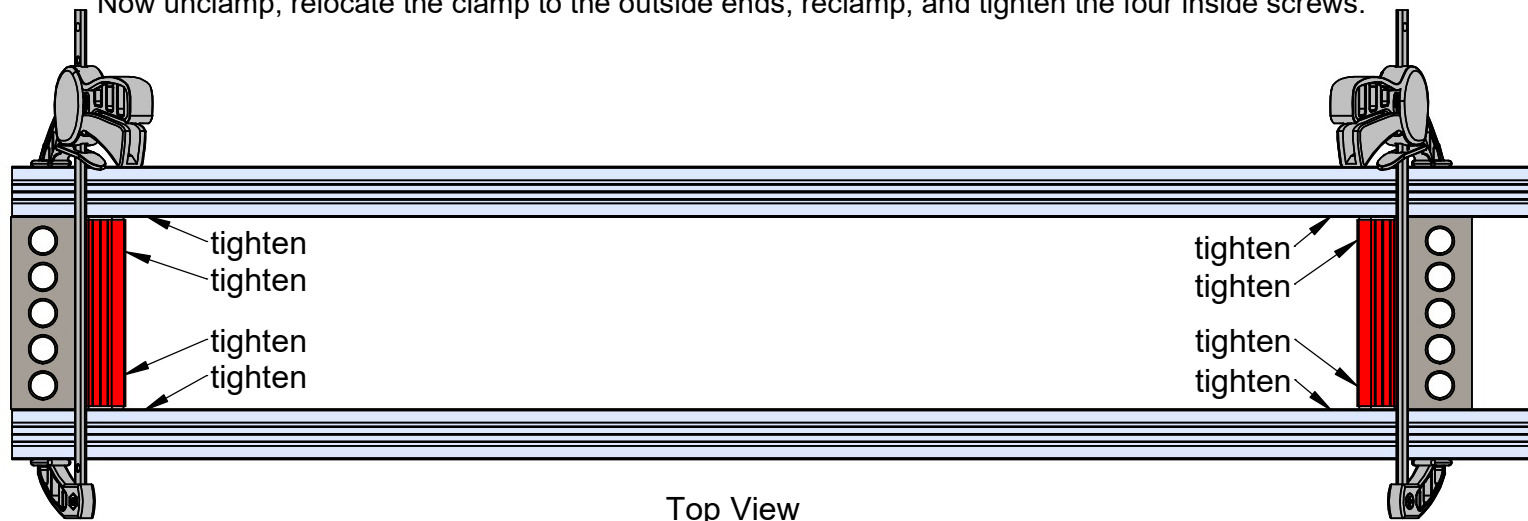
Your Upper Frame is now Square!
Leave this setup as-is, and set it aside for a future step.

Upper Frame Squaring 5/5		
CC BY	Created by: Joshua Vasquez	last edited: 3/15/2021
	SCALE: 1:3	SHEET 7 OF 28

B

Pairs should oppose each other.

604
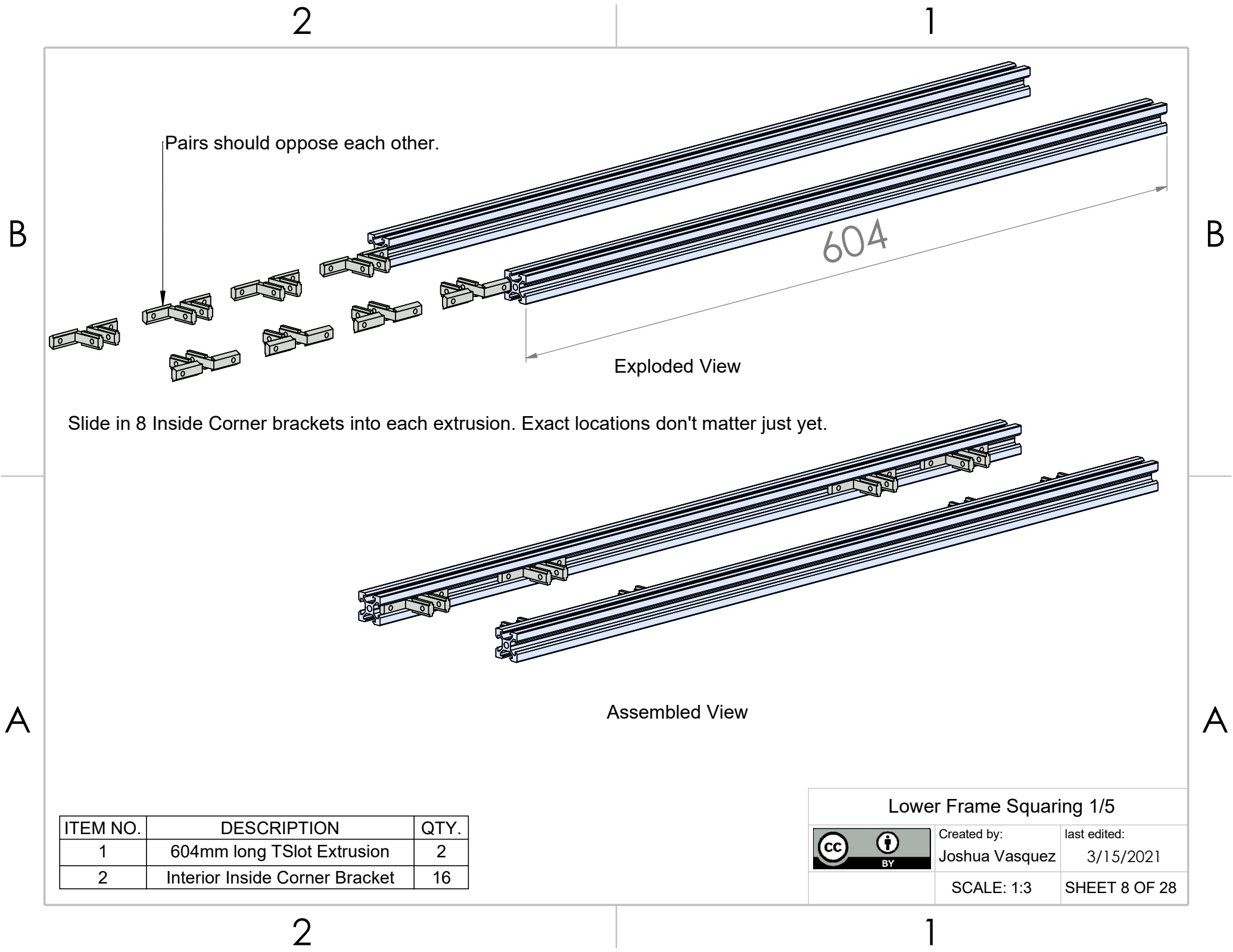
Exploded View

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

Assembled View

B

A

A

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

Lower Frame Squaring 1/5
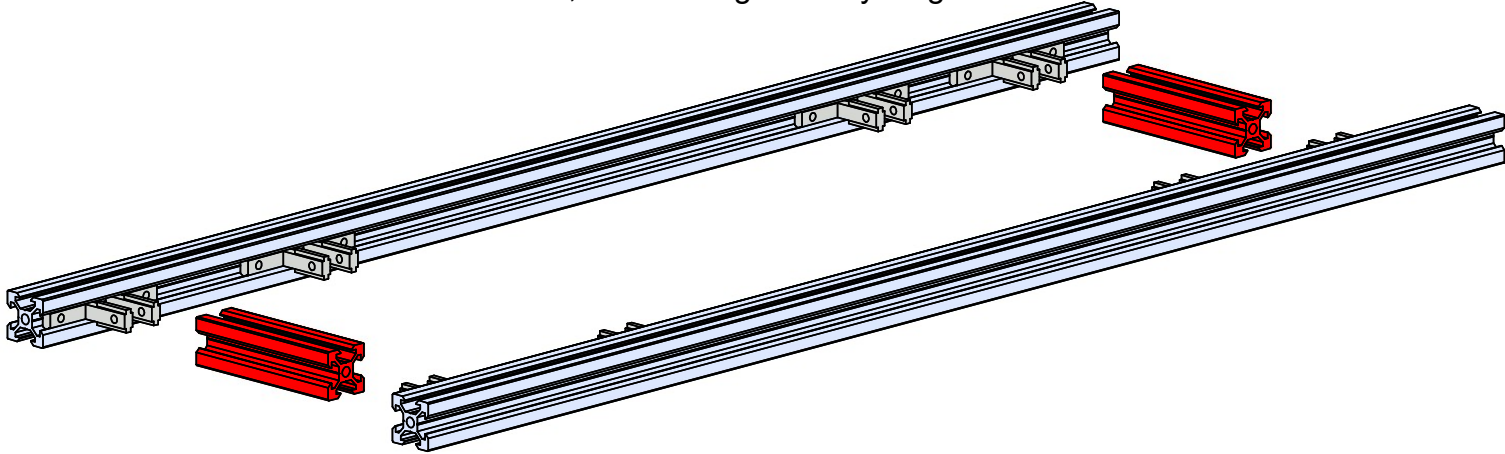
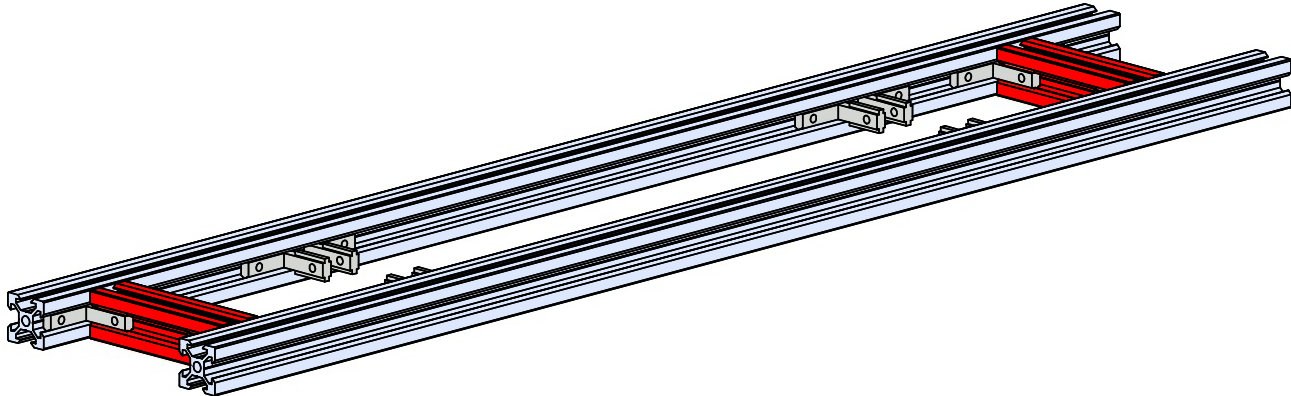| Created by:	last edited:
Joshua Vasquez	3/15/2021
SCALE: 1:3	SHEET 8 OF 28

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

B

Exploded View

A

Assembled View

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

Lower Frame Squaring 2/5

Created by:
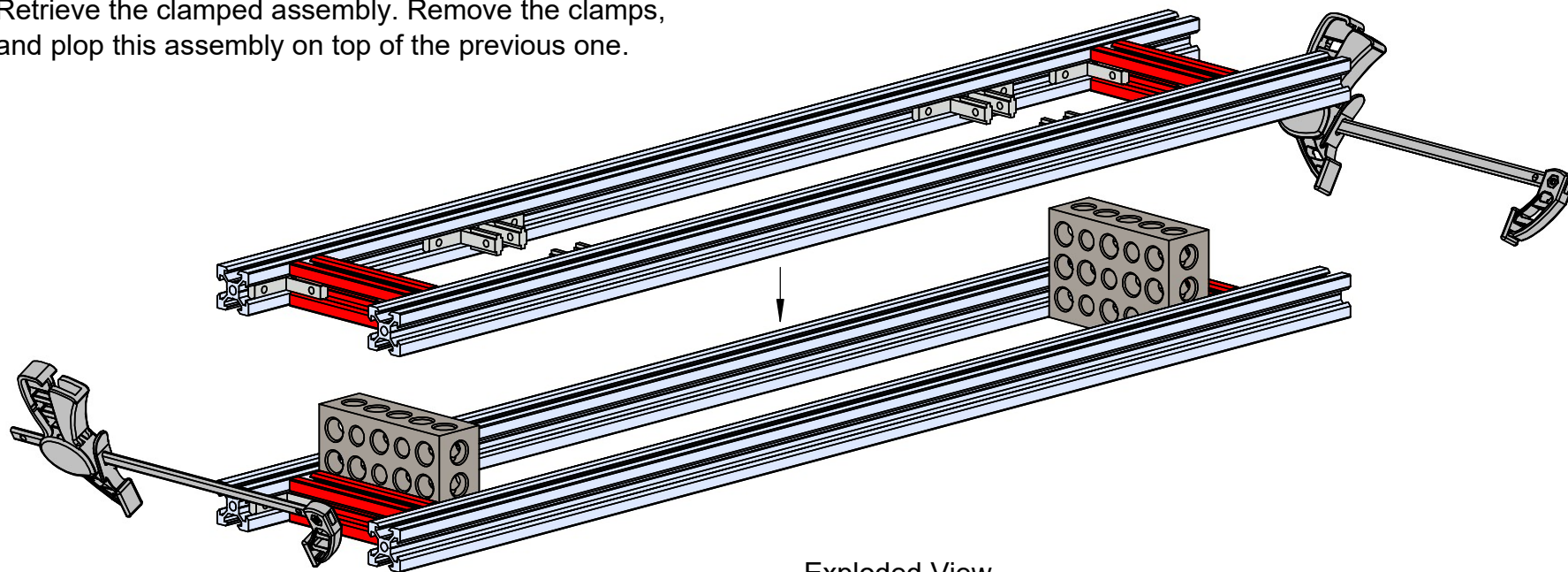Joshua Vasquez

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3/15/2021

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
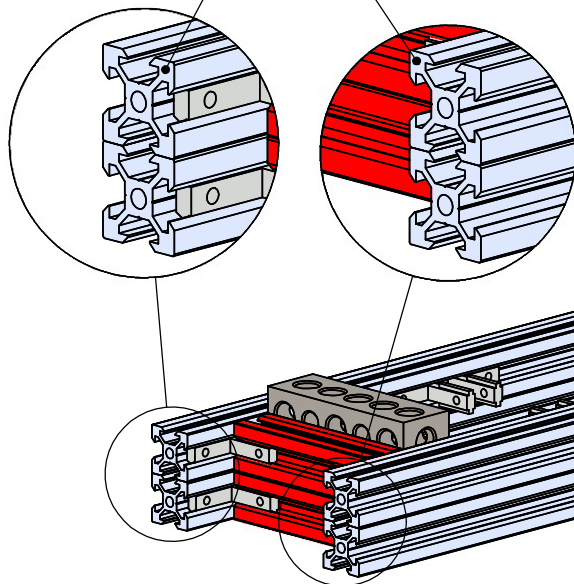
Line up all four end faces on one side.

Assembled View

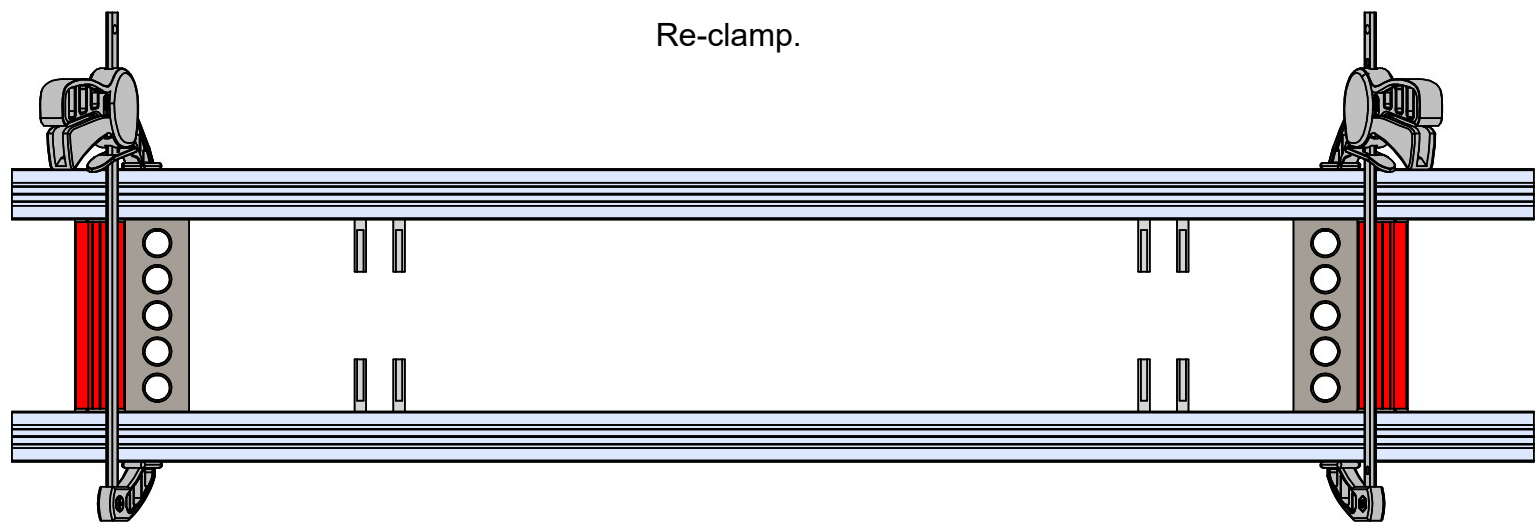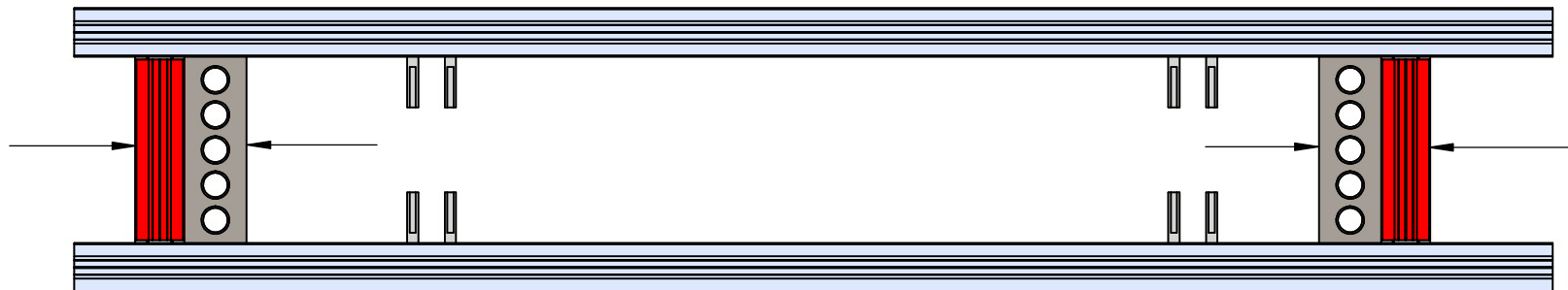| Lower Frame Squaring 3/5		
CC BY	Created by: Joshua Vasquez	last edited: 3/15/2021
	SCALE: 1:3	SHEET 10 OF 28

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

B

Re-clamp.

A

Lower Frame Squaring 4/5

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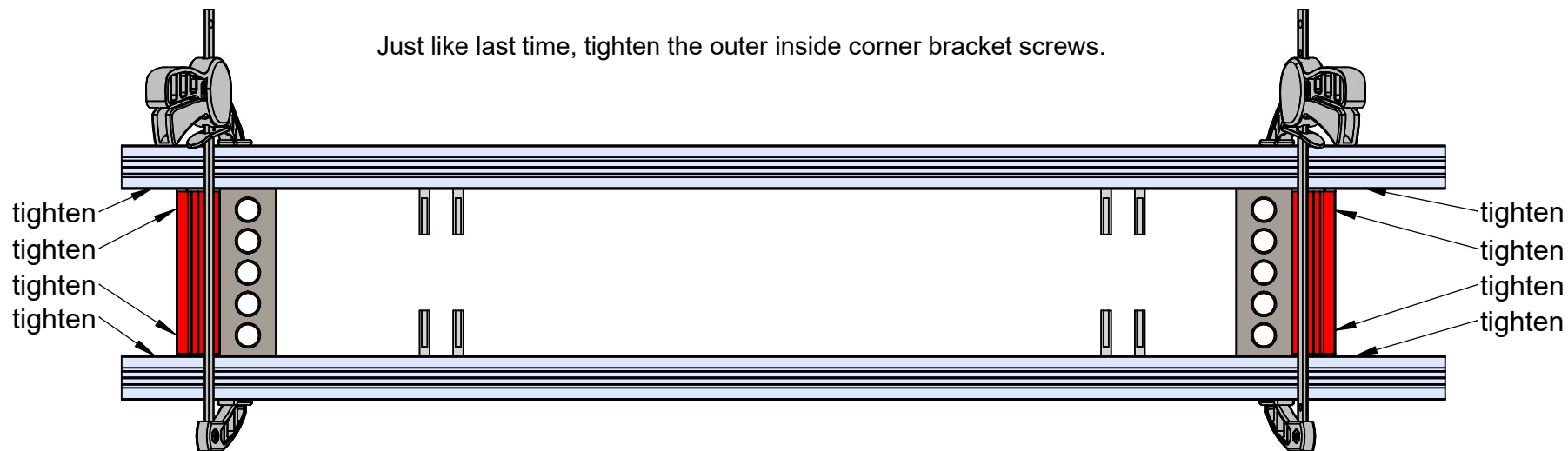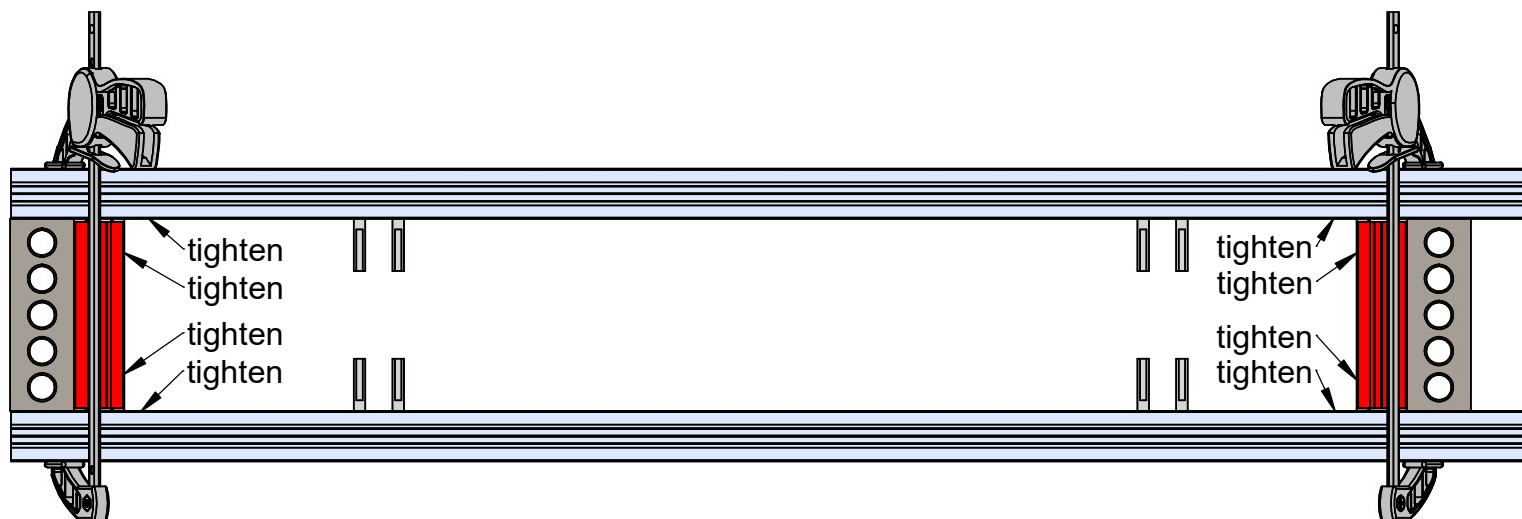
last edited:
3/15/2021

SCALE: 1:3 | SHEET 11 OF 28

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

B

tighten
tighten
tighten
tighten

tighten
tighten
tighten
tighten

B

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

A

tighten
tighten
tighten
tighten

tighten
tighten
tighten
tighten

A

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. Thes are directional.

The flared side should point into the extrusion.
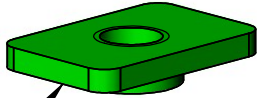
These are actually a
metallic color, not green.
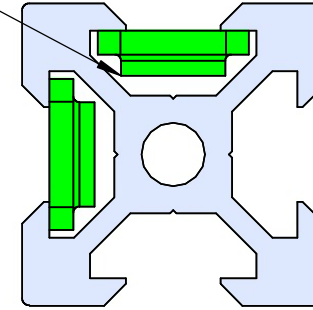
Each time you install an M5 Stamped T Nut, install it with a backing spring. These springs
will prevent the nuts from sliding around unpredictably when you move the assembly. It's
also important for some T Nuts that need to be installed partway up a vertical slot.

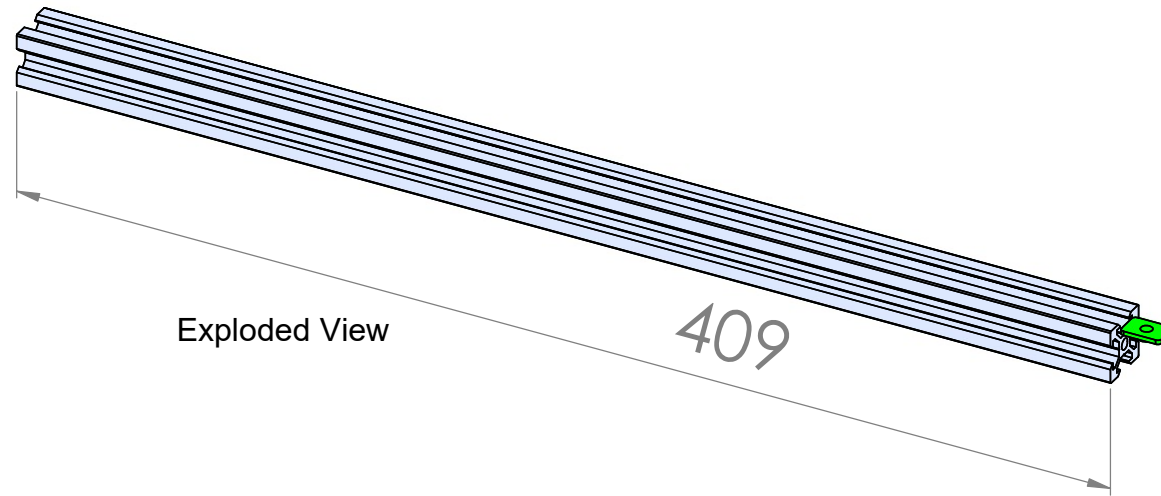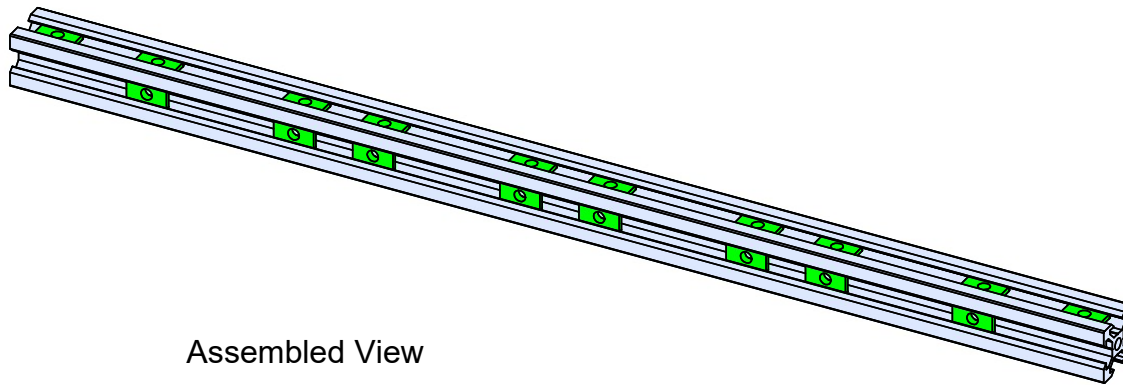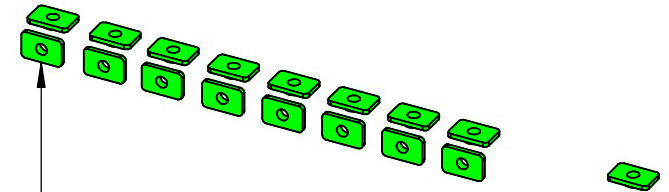| Stamped T Nut Intro		
CC BY	Created by: Joshua Vasquez	last edited: 3/15/2021
	SCALE: 1:2	SHEET 13 OF 28

Exploded View

409

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.

Assembled View

Set this assembly aside for now.

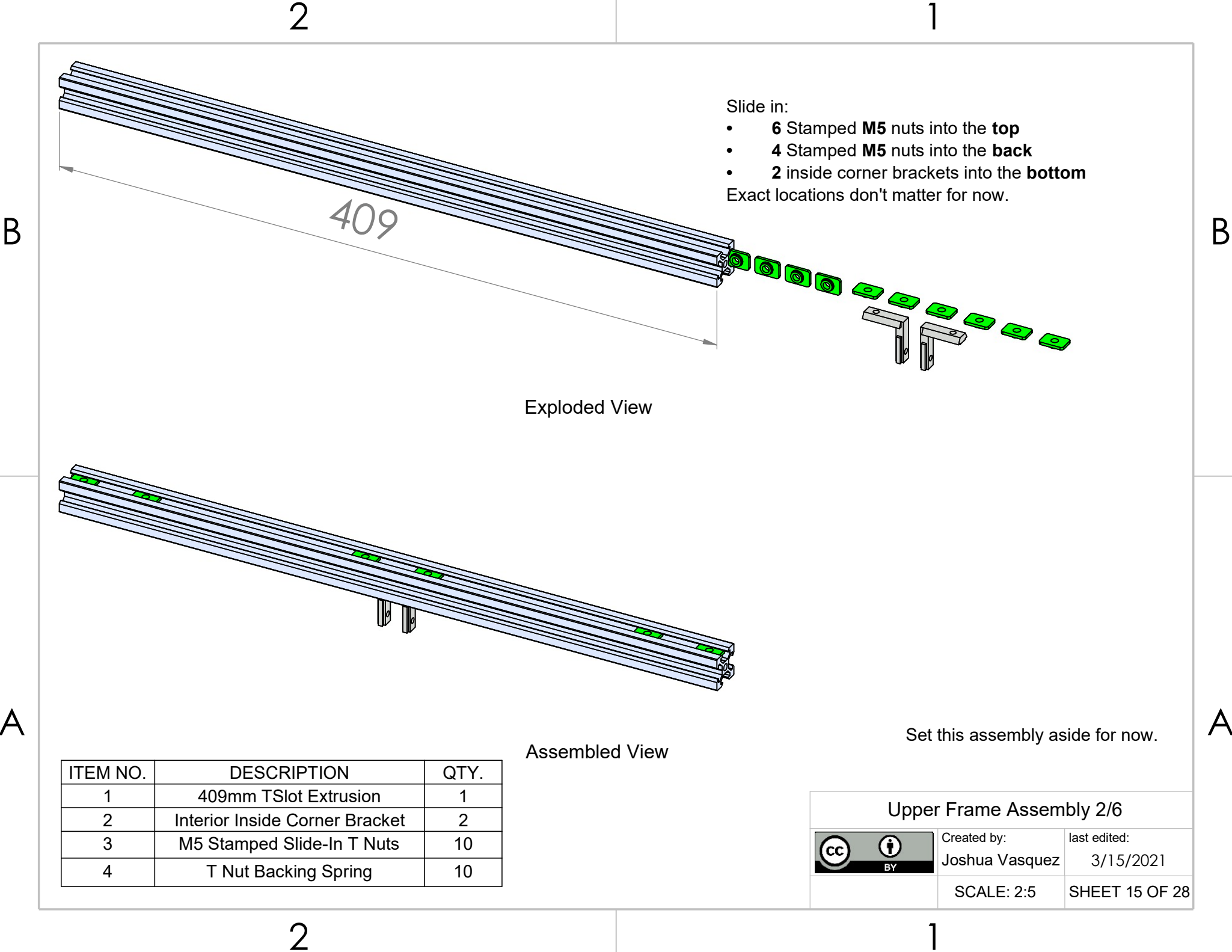| ITEM NO.	DESCRIPTION	QTY.
1	409mm TSlot Extrusion	1
2	M5 Stamped Slide-In T Nuts	18
3	T Nut Backing Spring	18

Upper Frame Assembly 1/6

Created by:
Joshua Vasquez

last edited:
3/15/2021

SCALE: 2:5   SHEET 14 OF 28

B

B

409

Slide in:
- **6** Stamped **M5** nuts into the **top**
- **4** Stamped **M5** nuts into the **back**
- **2** inside corner brackets into the **bottom**

Exact locations don't matter for now.

Exploded View

Assembled View

Set this assembly aside for now.

A

A

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

Upper Frame Assembly 2/6

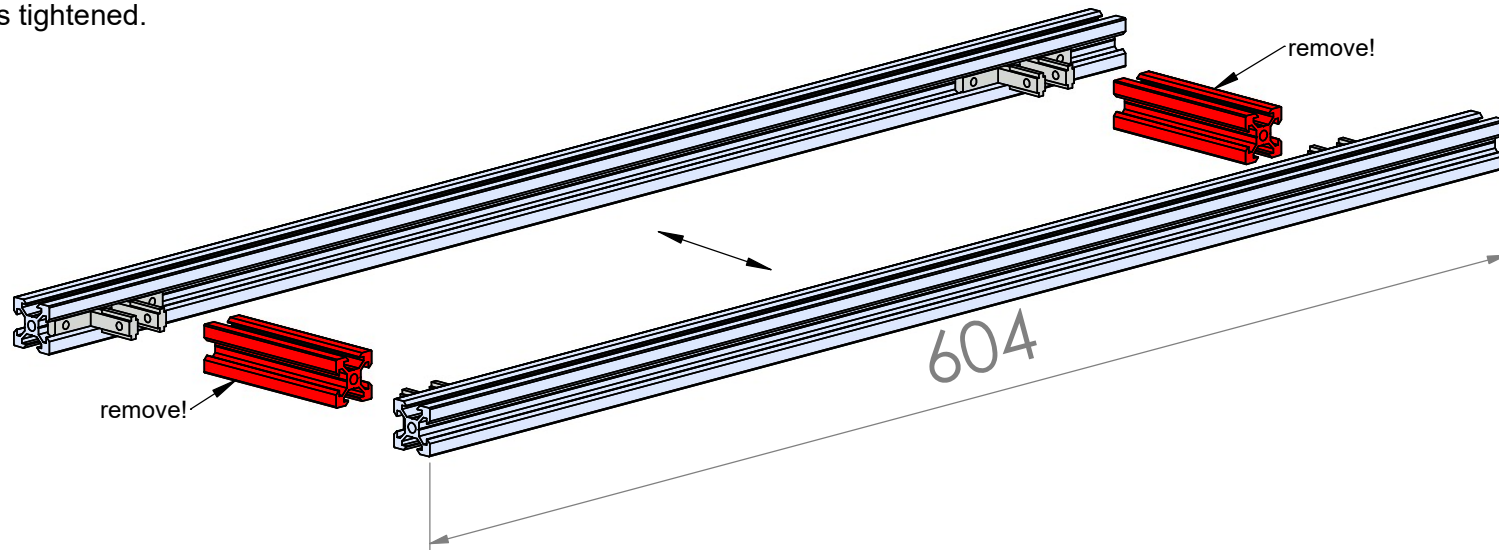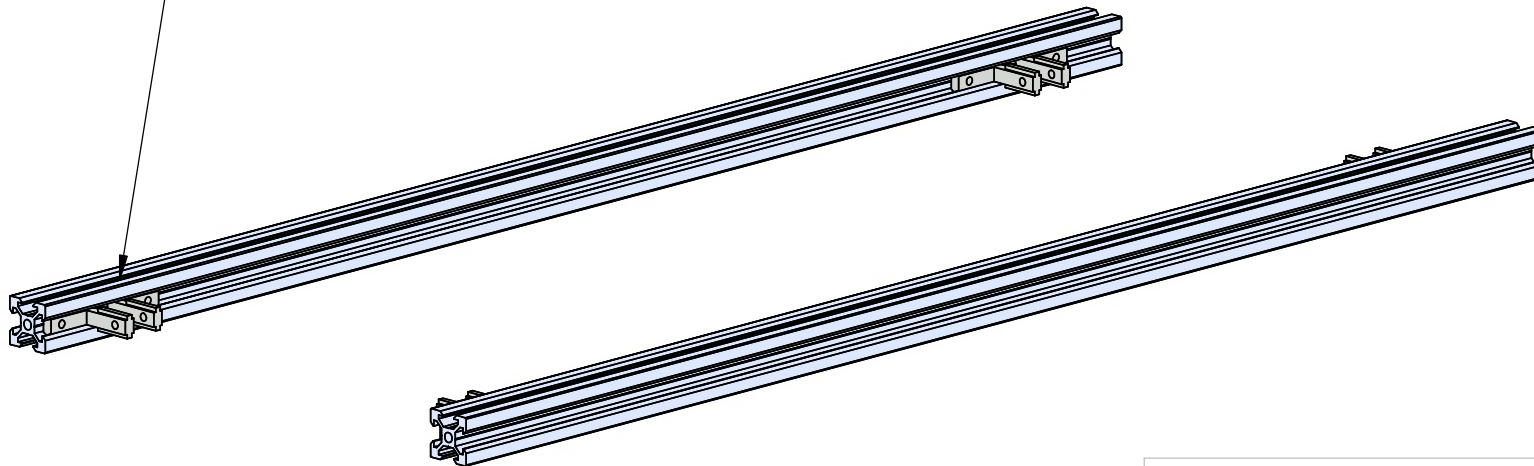| Created by:	last edited:
Joshua Vasquez	3/15/2021
SCALE: 2:5	SHEET 15 OF 28

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.

remove!

B

remove!

604

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

A

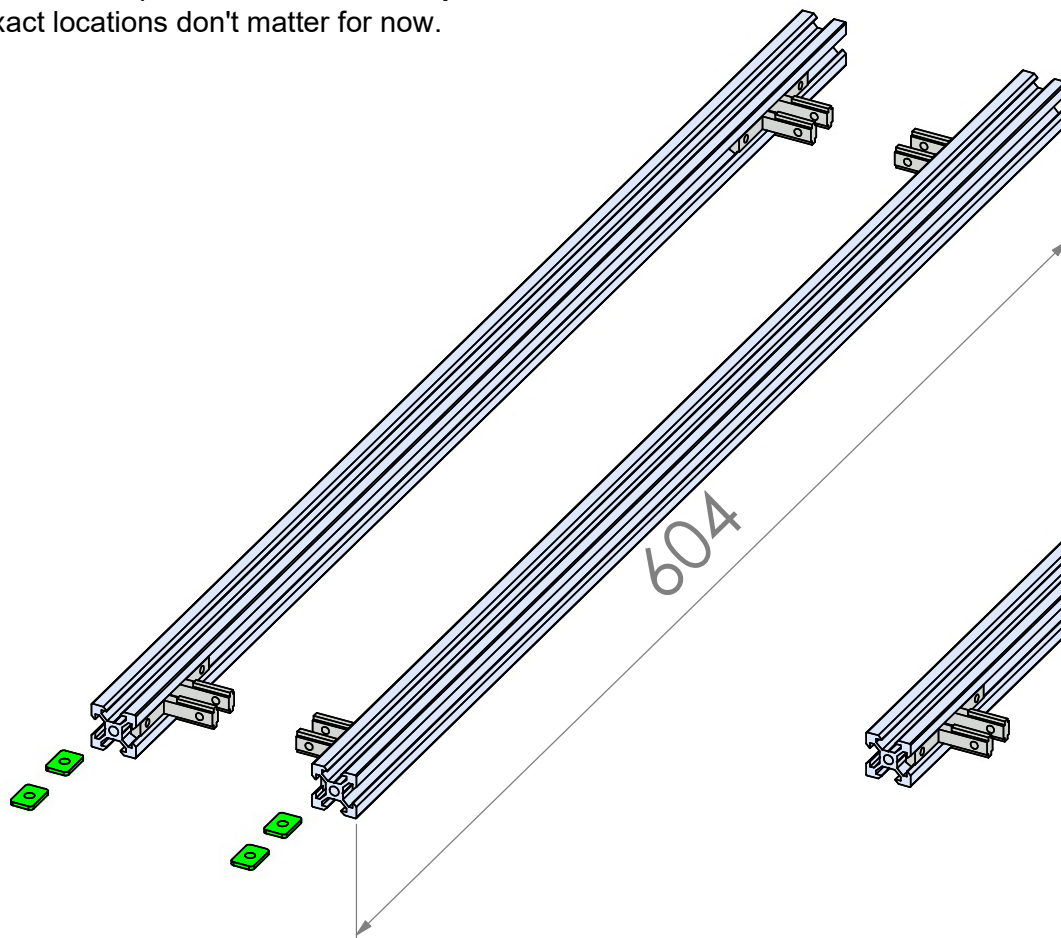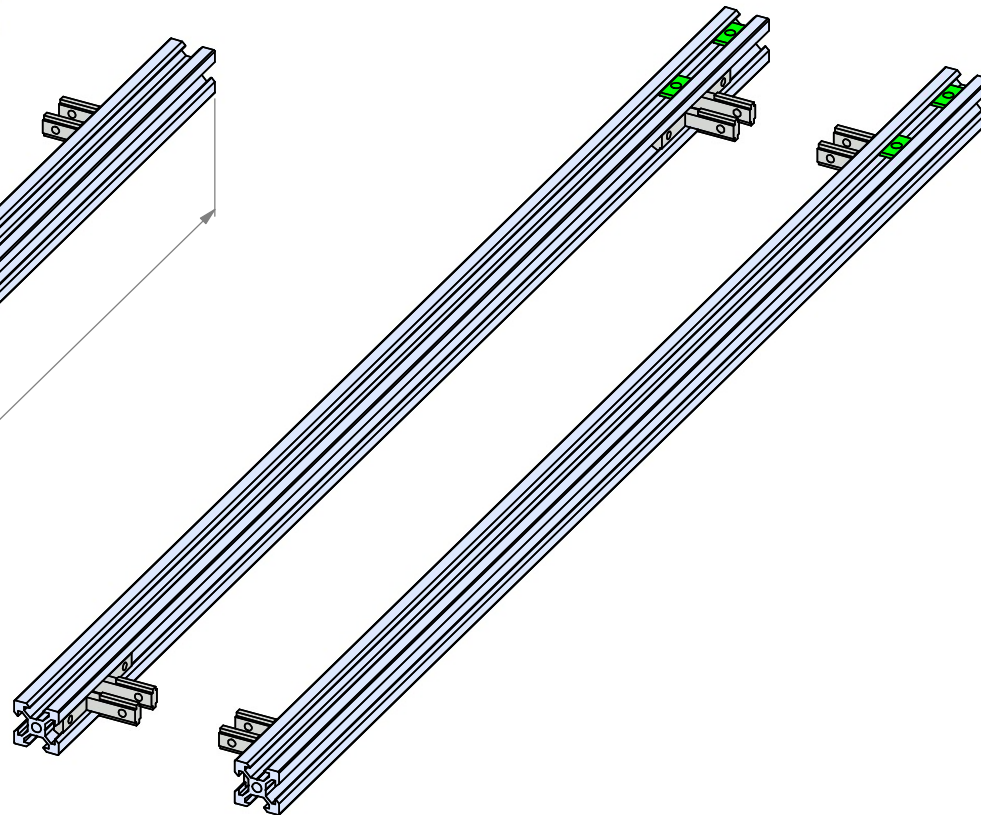| Upper Frame Assembly 3/6		
Created by:	last edited:	
Joshua Vasquez	3/15/2021	
SCALE: 1:3	SHEET 16 OF 28	

Slide in:

• **2** Stamped **M5** nuts into the **top** of each Extrusion

Exact locations don't matter for now.

B

604

Exploded View

Assembled View

A

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

Upper Frame Assembly 4/6

	Created by:	last edited:
(cc) BY	Joshua Vasquez	3/15/2021
	SCALE: 1:3	SHEET 17 OF 28

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

2x on top

6x on top

4x in back

10x on top

2x on top

8x in front

604

Exploded View

50

25

Note: this end of the frame may have to
dangle over a table to make space for
the dangling inside corner brackets.
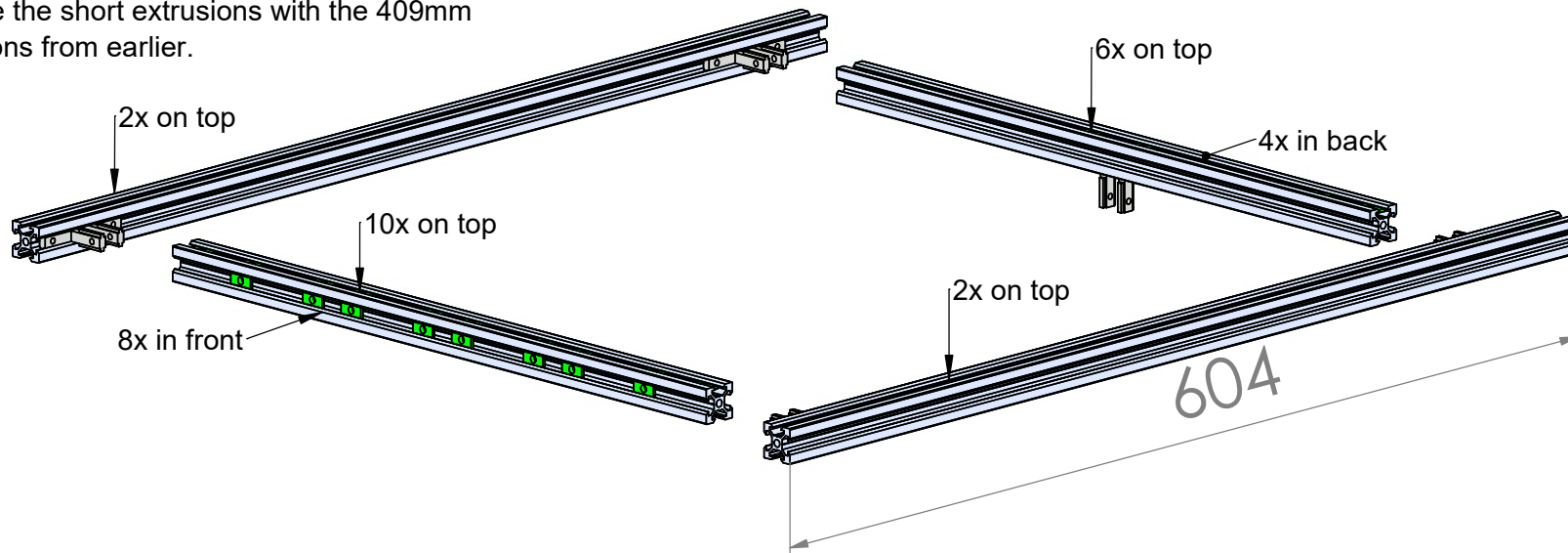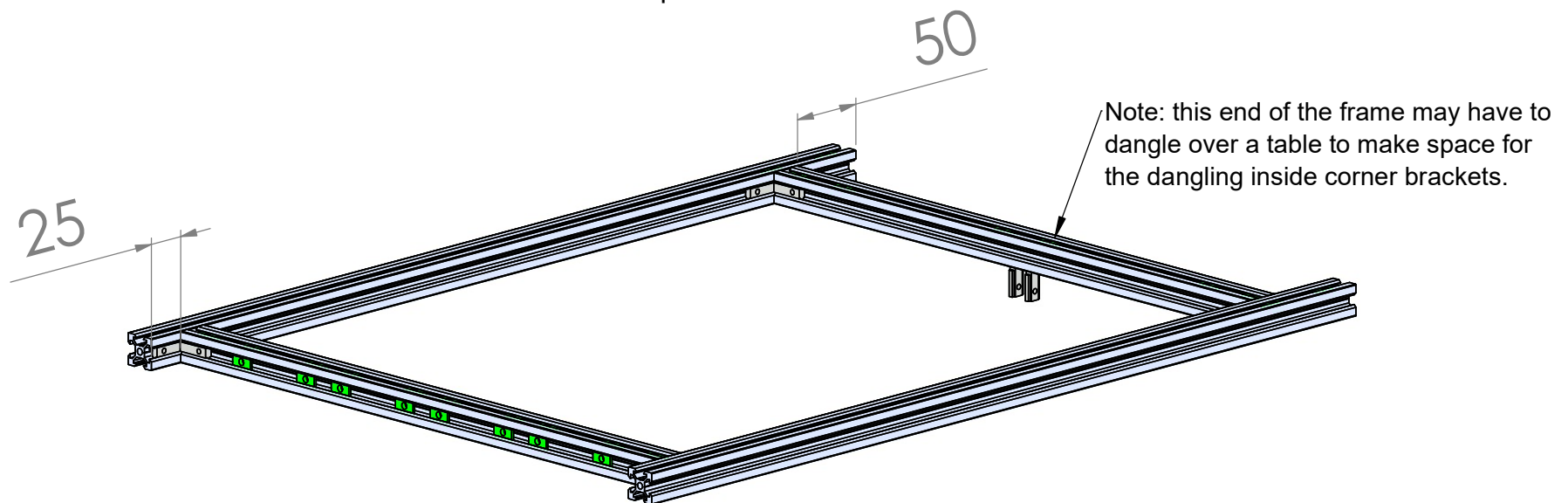
Assembled View

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

B

Tighten
Tighten
Tighten
Tighten

Tighten
Tighten
Tighten
Tighten

L

Tighten
Tighten
Tighten
Tighten

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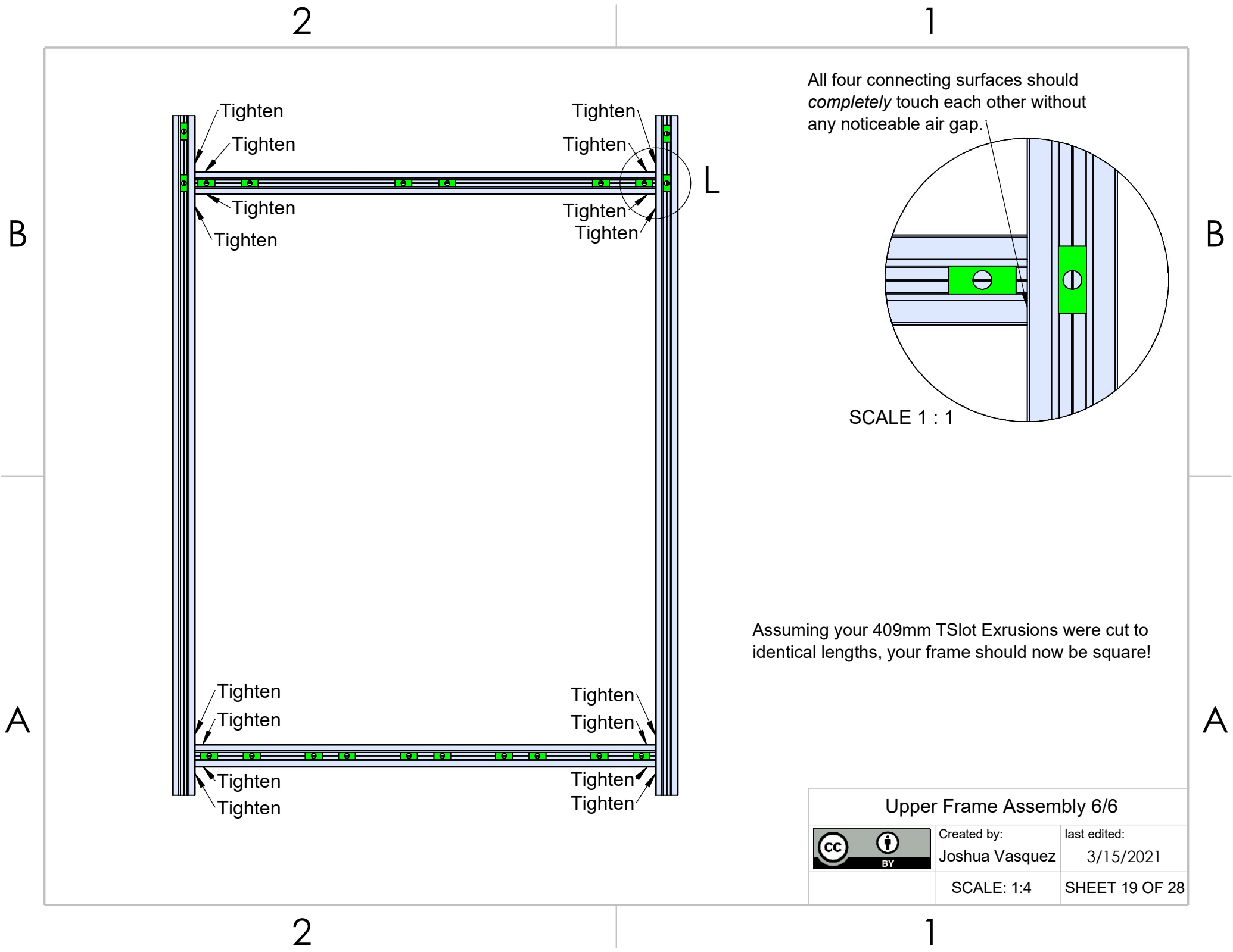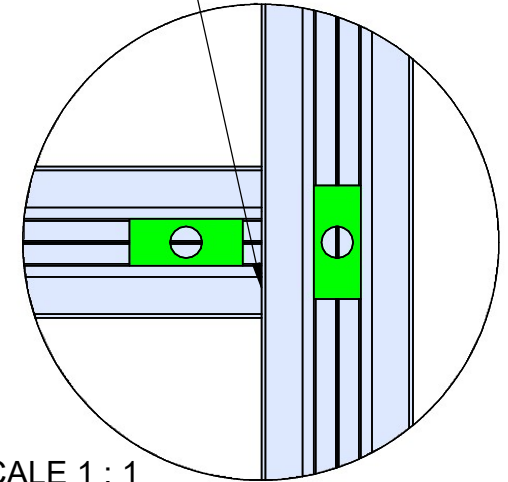
All four connecting surfaces should *completely* touch each other without any noticeable air gap.

SCALE 1 : 1

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

A

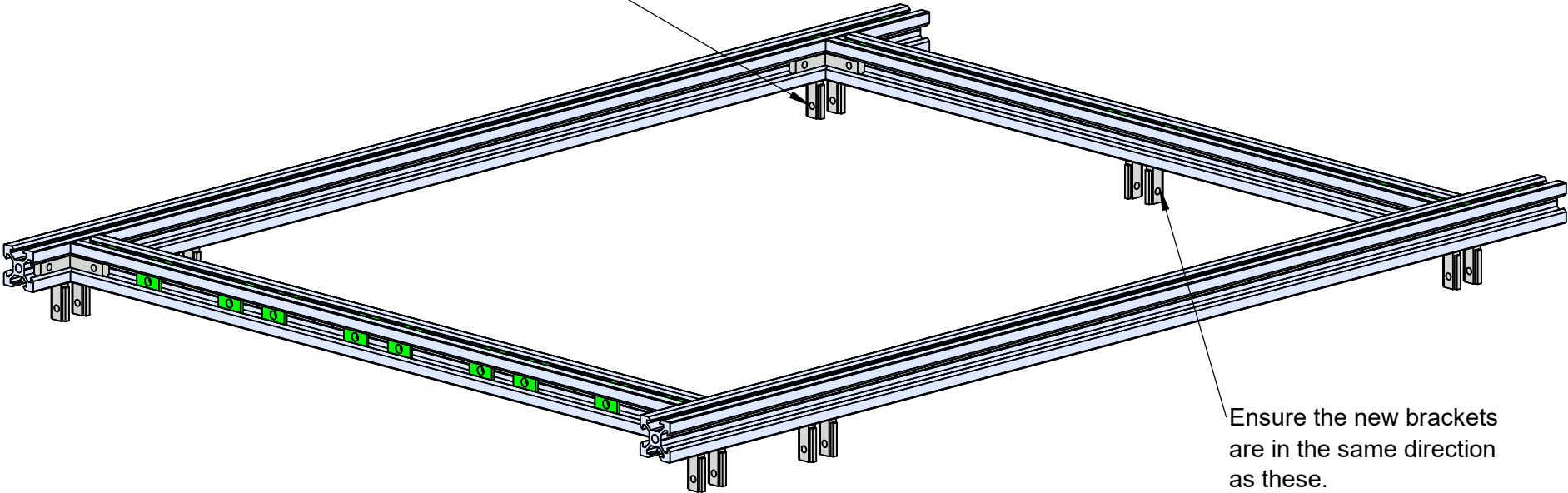|	Upper Frame Assembly 6/6		
CC BY	Created by: Joshua Vasquez	last edited: 3/15/2021	
	SCALE: 1:4	SHEET 19 OF 28	

B

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.

A

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

Upper Frame Bracket Loose Assembly
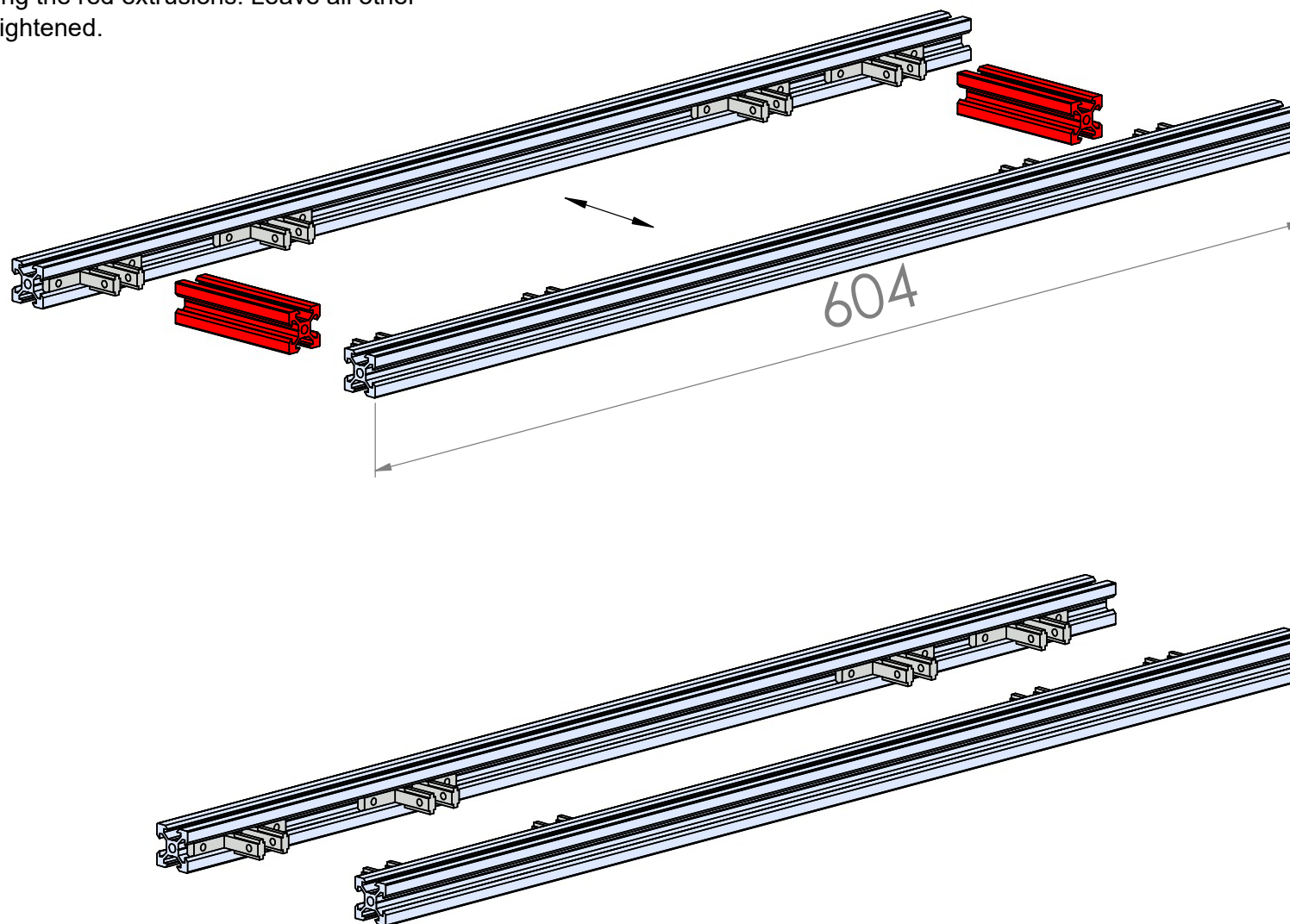
Created by: Joshua Vasquez

last edited: 3/15/2021

SCALE: 1:3

B

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.

604

B

A

A

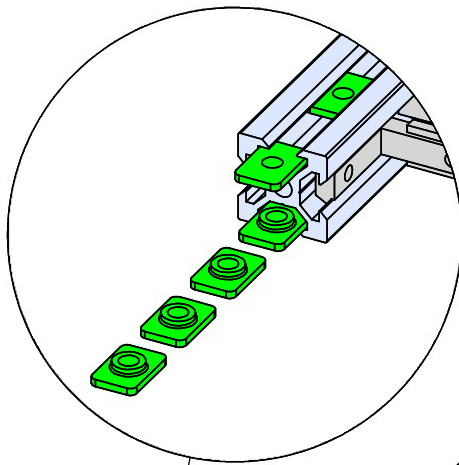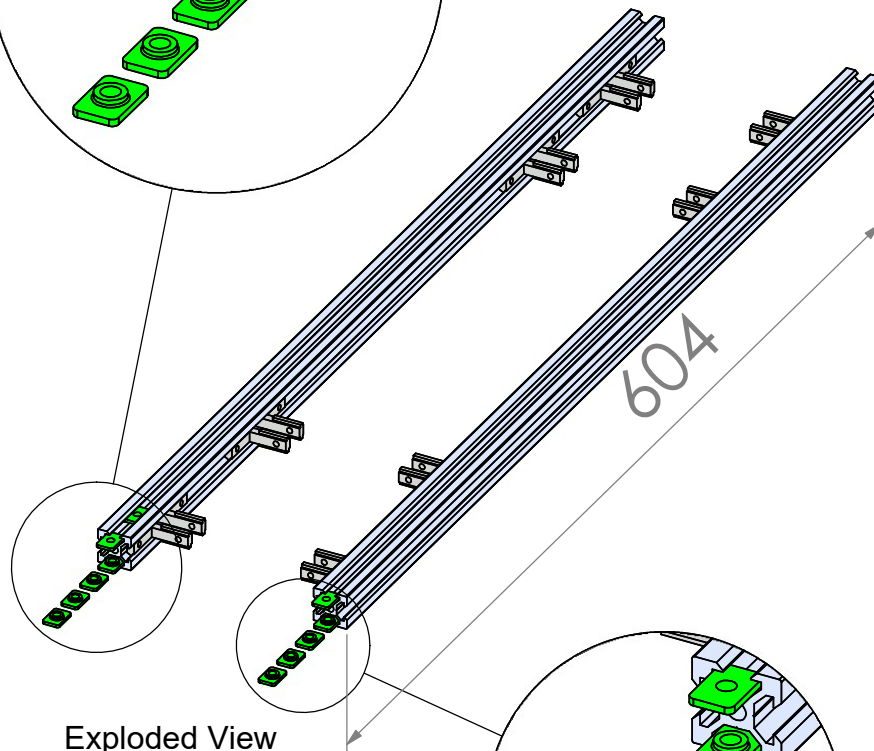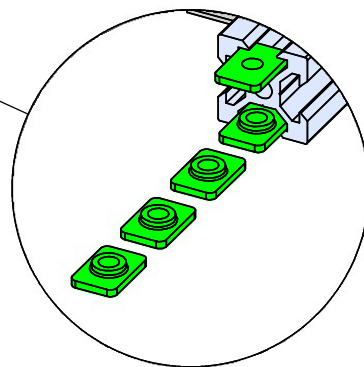| Lower Frame Loose Assembly 1/8		
CC BY	Created by: Joshua Vasquez	last edited: 3/15/2021
	SCALE: 1:4	SHEET 21 OF 28

B

On the left side slide in:
- **2** Stamped T Nuts on **top**
- **4** Stampted T Nuts on the **bottom**

Exact locations will be set later.

604

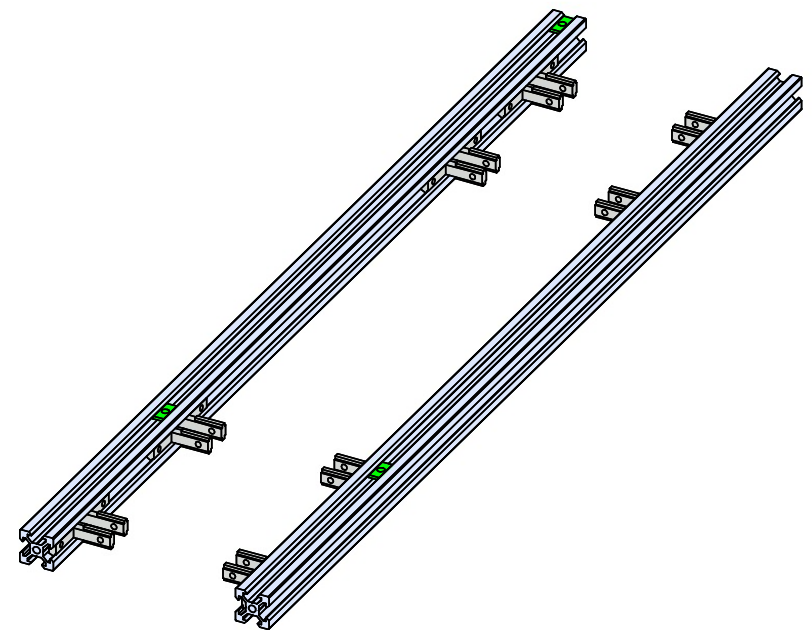Exploded View

Assembled View

Set these assemblies aside for now.

On the right side slide in:
- **1** Stamped T Nut on **top**
- **4** Stampted T Nuts on the **bottom**

Exact locations will be set later.

A

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

Lower Frame Loose Assembly 2/8

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Joshua Vasquez

last edited:
3/15/2021

SCALE: 1:4

SHEET 22 OF 28

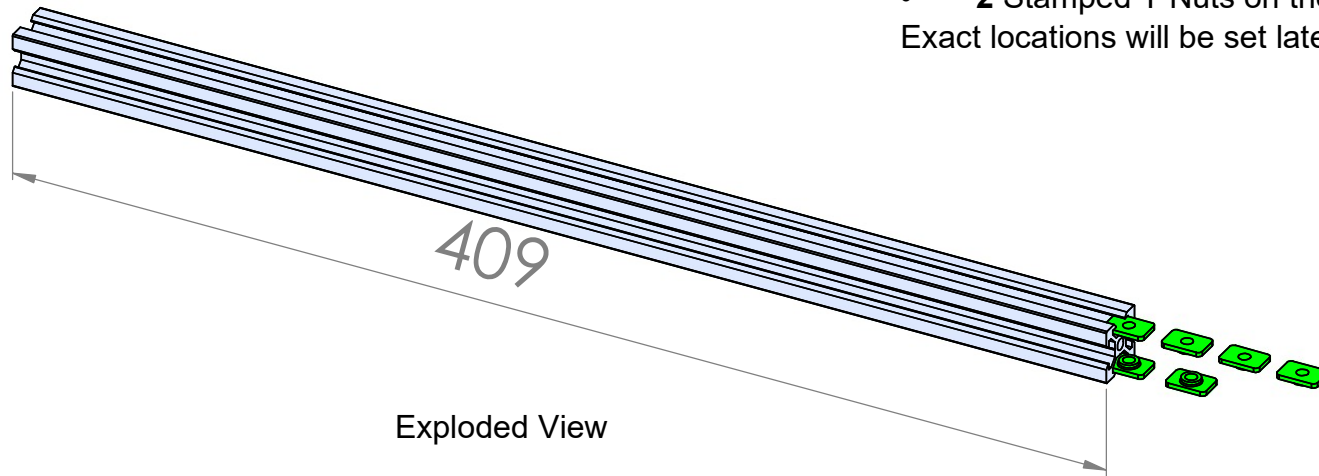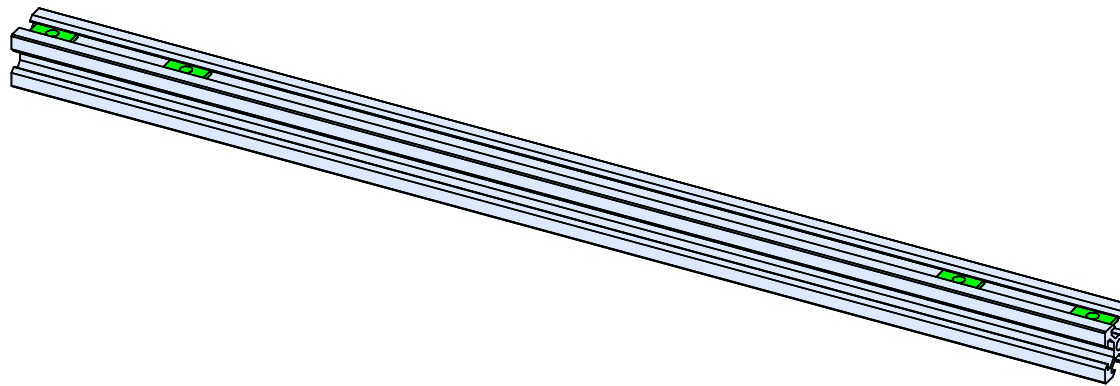Front Extrusion

Slide in:
- **4** Stamped T Nuts on **top**
- **2** Stamped T Nuts on the **bottom**

Exact locations will be set later.

409

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 Nuts	6
3	T Nut Backing Spring	6

Lower Frame Loose Assembly 3/8

Created by:
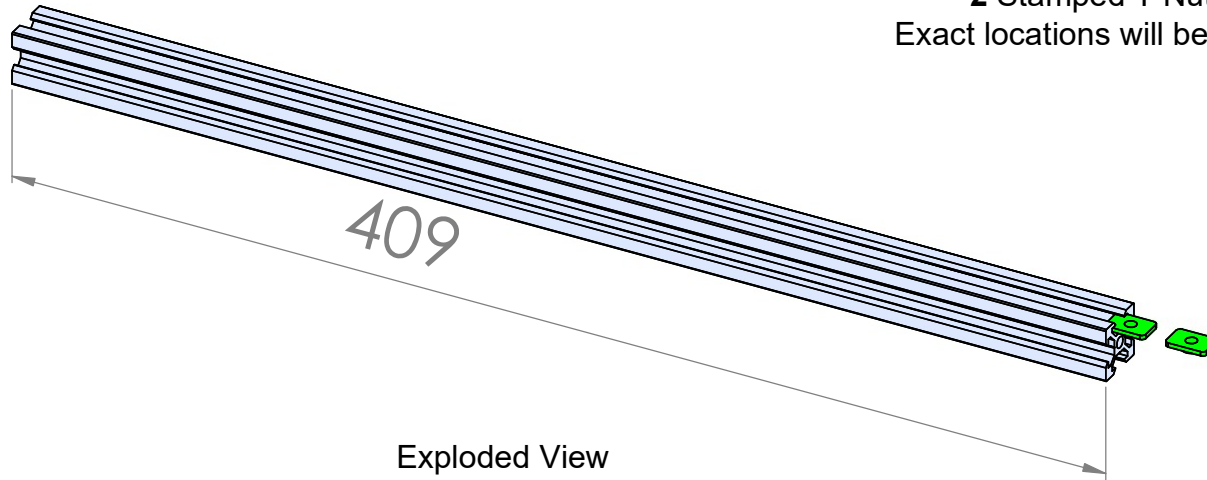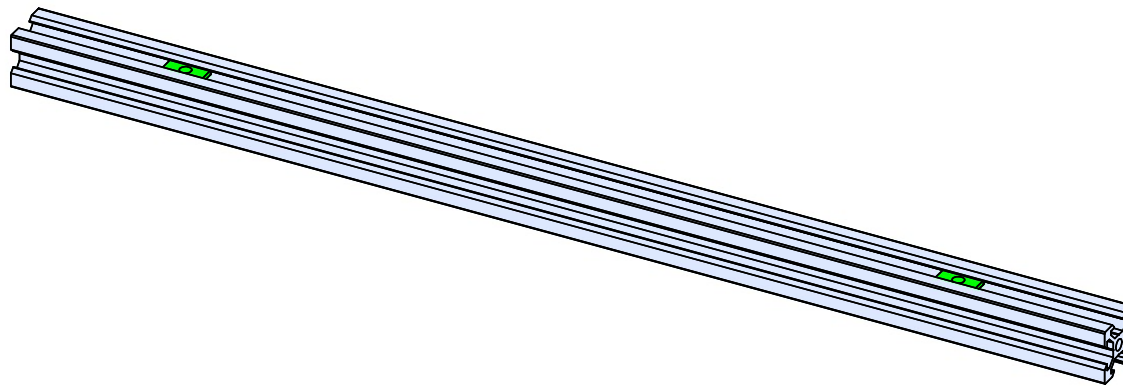Joshua Vasquez

last edited:
3/15/2021

SCALE: 2:5

Inner Front Extrusion

409

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 Nuts	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

B

409

Exploded View

Assembled View

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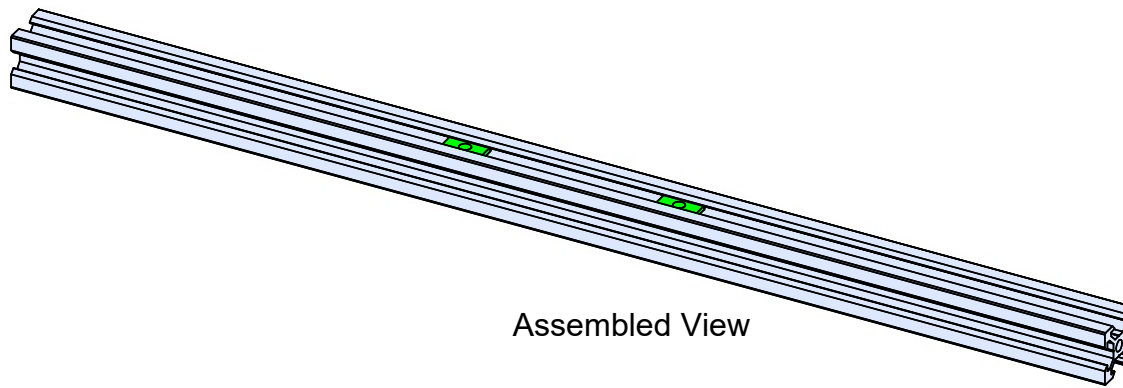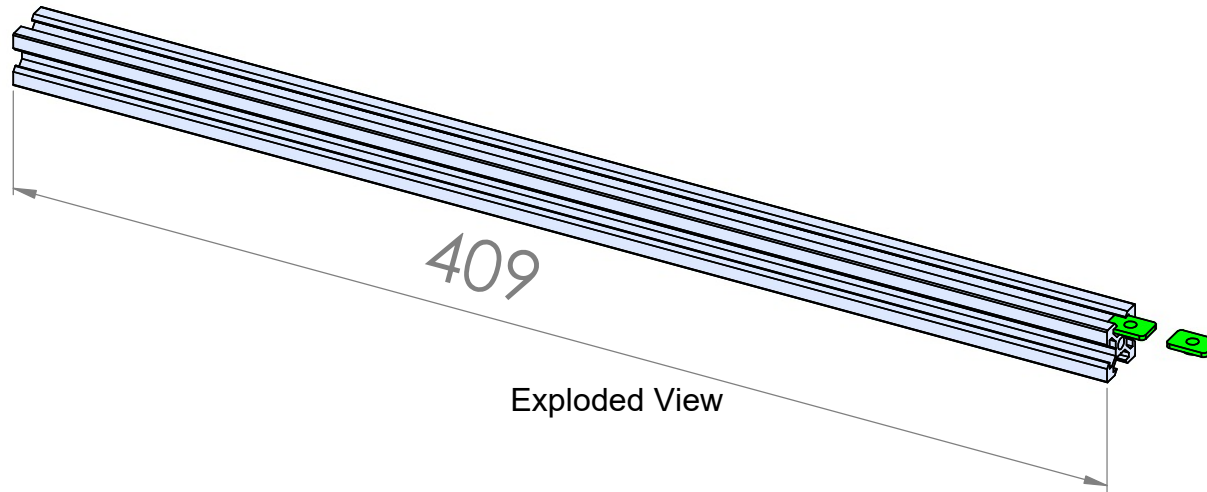
ITEM NO.	DESCRIPTION	
1	409mm TSlot Extrusion	1
2	M5 Stamped Slide-In T Nuts	2
3	T Nut Backing Spring	2

Lower Frame Loose Assembly 5/8

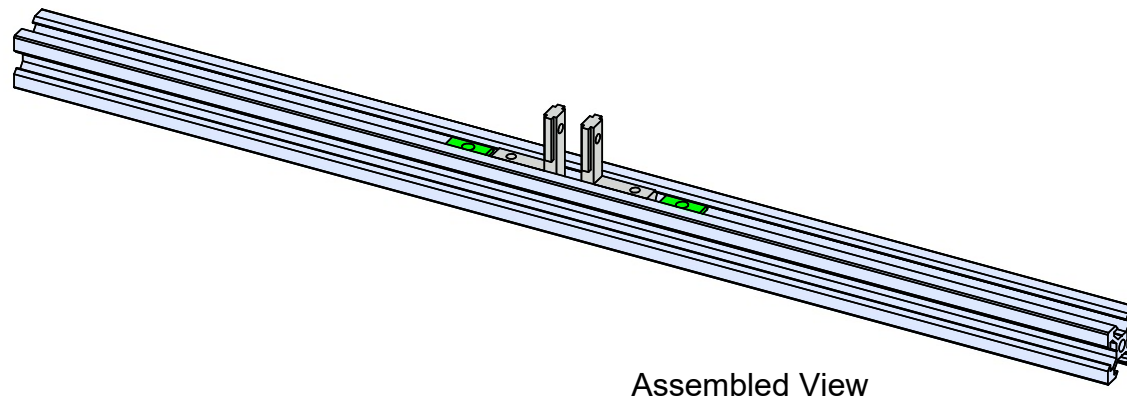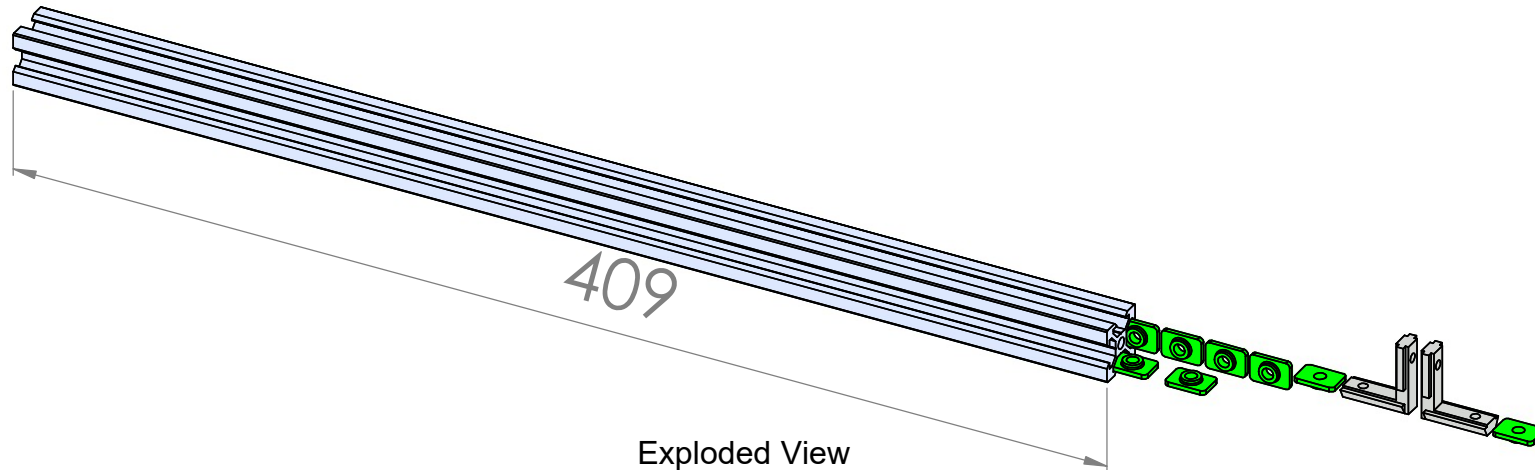|	Created by:	last edited:
CC BY	Joshua Vasquez	3/15/2021
	SCALE: 2:5	SHEET 25 OF 28

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.

B

409

Exploded View

Assembled View

Set this assembly aside for now.

A

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

Lower Frame Loose Assembly 6/8

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Joshua Vasquez	3/15/2021
SCALE: 2:5	SHEET 26 OF 28

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

B

2 T Nuts and 2 brackets on top; 2 T Nuts on bottom;
4 T Nuts in back

2 T Nuts on top

50
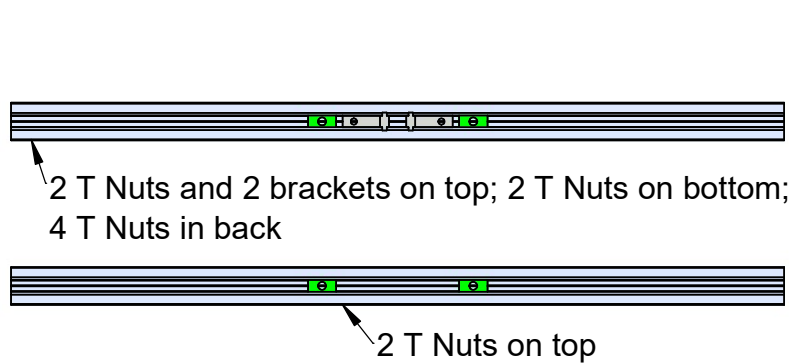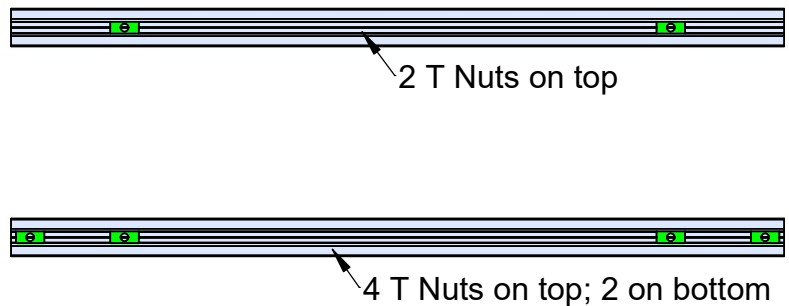
Double Check that the correct number of nuts are installed in the right spots!

This assembly is a hassle to open up later.

2 T Nuts on top

25

A

2 T Nuts on top; 2 on bottom

4 T Nuts on top; 2 on bottom

1 T Nut on top; 2 on bottom

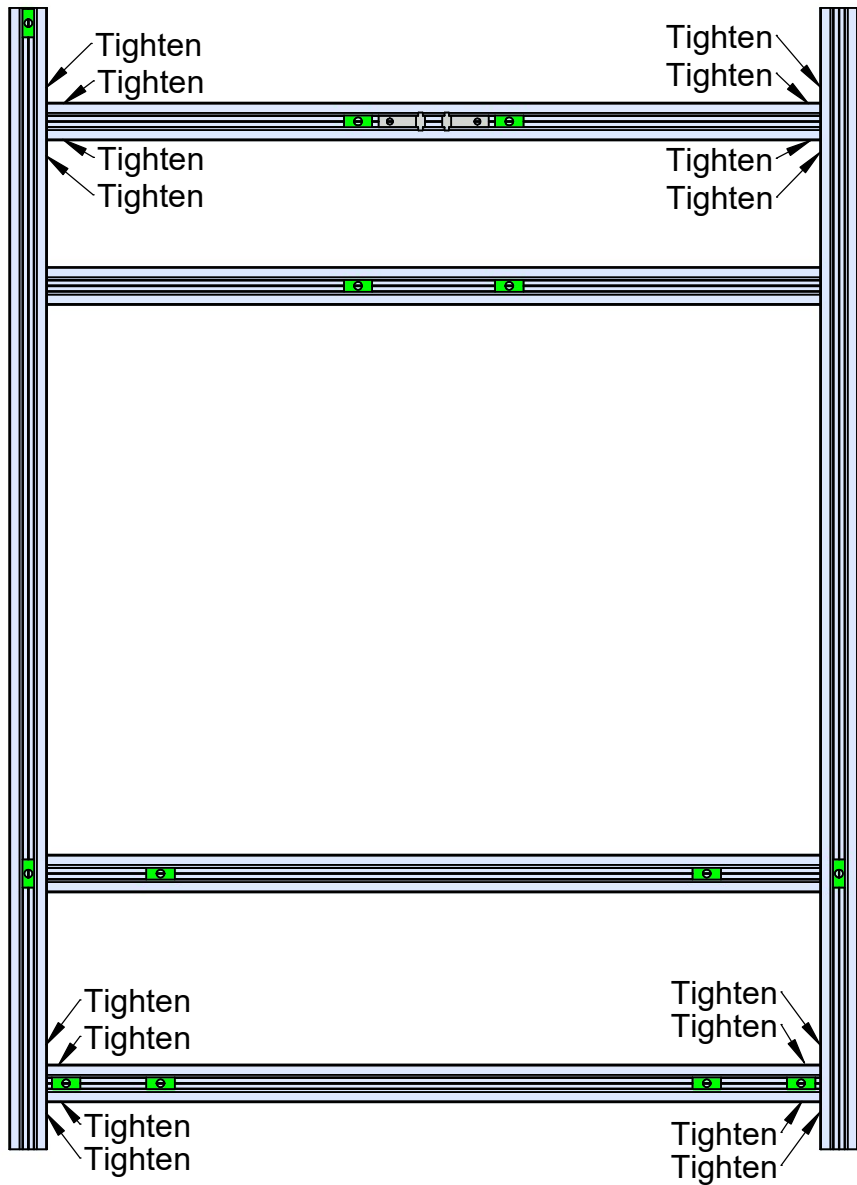| Lower Frame Loose Assembly 7/8		
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	SCALE: 1:4	SHEET 27 OF 28

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

B

Tighten
Tighten

Tighten
Tighten

Tighten
Tighten

Tighten
Tighten

B

Tighten
Tighten

Tighten
Tighten

Tighten
Tighten

Tighten
Tighten

A

The Lower Frame is Complete!

A

Lower Frame Loose Assembly 8/8		
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