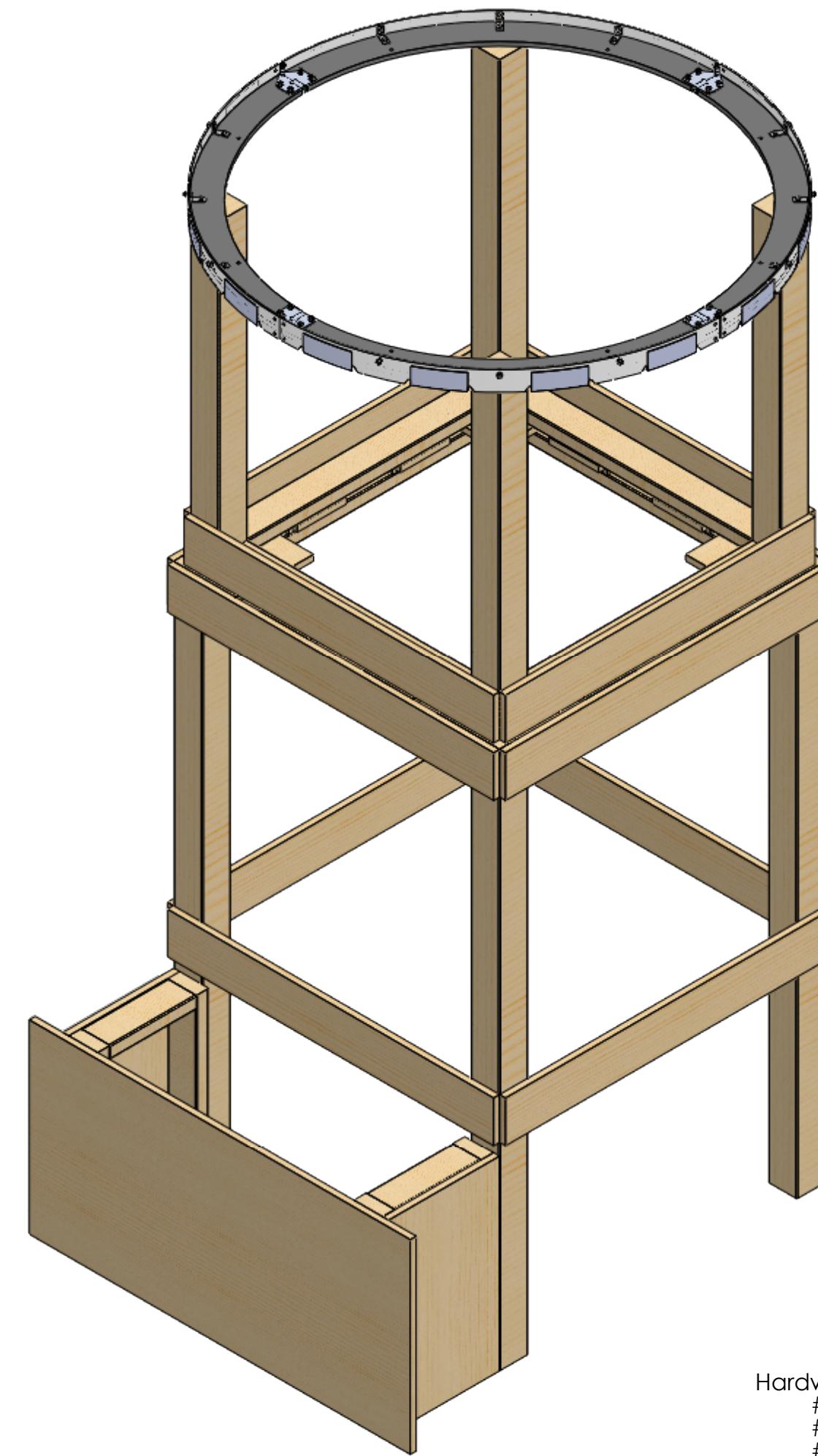


Note: If you are planning to disassemble frequently, you may want to consider using bolted connections instead of screws. It is helpful to consider ceiling height ability to move assembly through doors before fastening sub-assemblies together.



Hardware Needed:  
 #8 x 1.25" Long Screw - Qty 16  
 #8 x 2.5" Long Screw - Qty 20  
 #10 x 3.5" Long Screw - Qty 8

ITEM NO.	PART NUMBER	DESCRIPTION	
1	TE-22010	Hub - Simple Build - Fender Assembly	1
2	TE-22040	Hub - Simple Build - Upper Hub Base Assembly	1
3	TE-22030-AM	Hub - Simple Build - Upper Hub Goal Assembly for AM Ring AM-4672	1

UNLESS OTHERWISE SPECIFIED:		
TEAM	NAME	DATE
DRAWN	KAMC	1/4/2022
<b>PROPRIETARY AND CONFIDENTIAL</b>		
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.		
<b>COMMENTS:</b>		
REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING		

 **FIRST**  
**ROBOTICS**  
**COMPETITION**  **SOLIDWORKS**  
Modeling Solutions Partner

TITLE: Hub - Simple Build - Full Upper Hub for AndyMark Ring AM-4672 + 1/4 Fender Assembly

SIZE DWG. NO. REV  
**C** TE-22002-AM

SCALE: 1:12 SHEET 1 OF 3

4

3

2

1

D

D

C

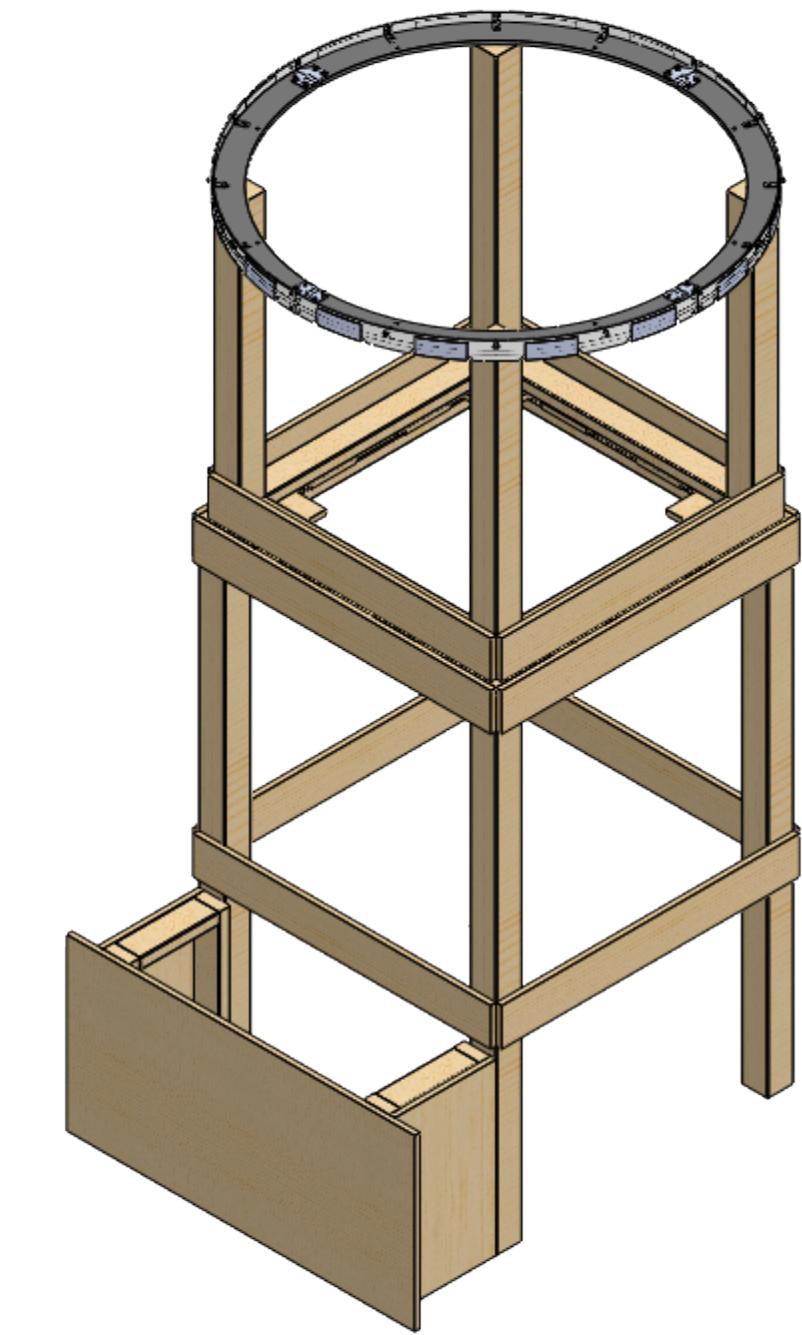
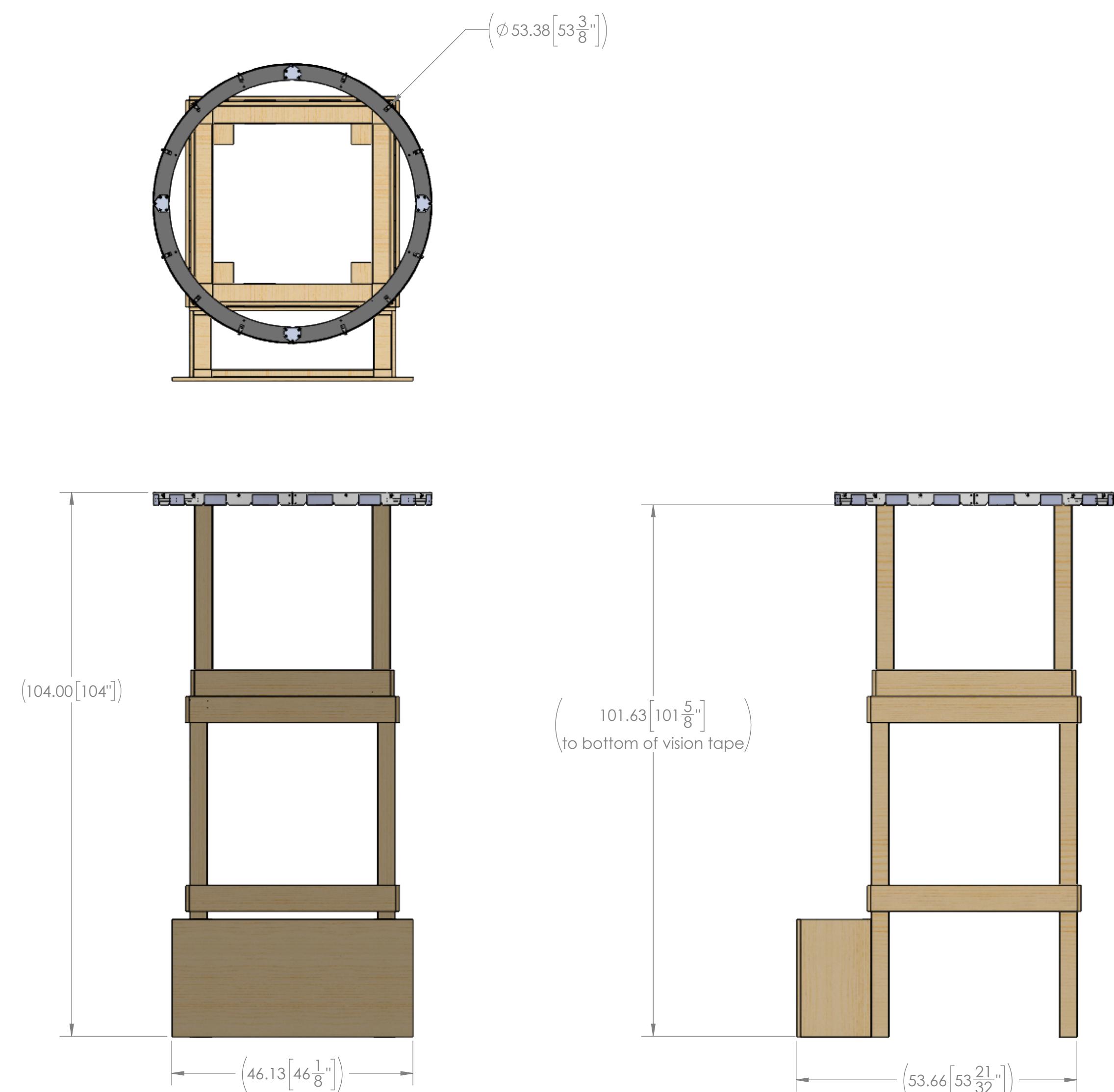
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	1/4/2022	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
C	TE-22002-AM		
COMMENTS:		SCALE: 1:18	
REMOVE ALL BURRS AND SHARP EDGES.		SHEET 2 OF 3	
DO NOT SCALE DRAWING			

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE: Hub - Simple Build - Full  
Upper Hub for  
AndyMark Ring AM-4672  
+ 1/4 Fender Assembly

SIZE DWG. NO. REV  
C TE-22002-AM

SCALE: 1:18 SHEET 2 OF 3

4

3

2

1

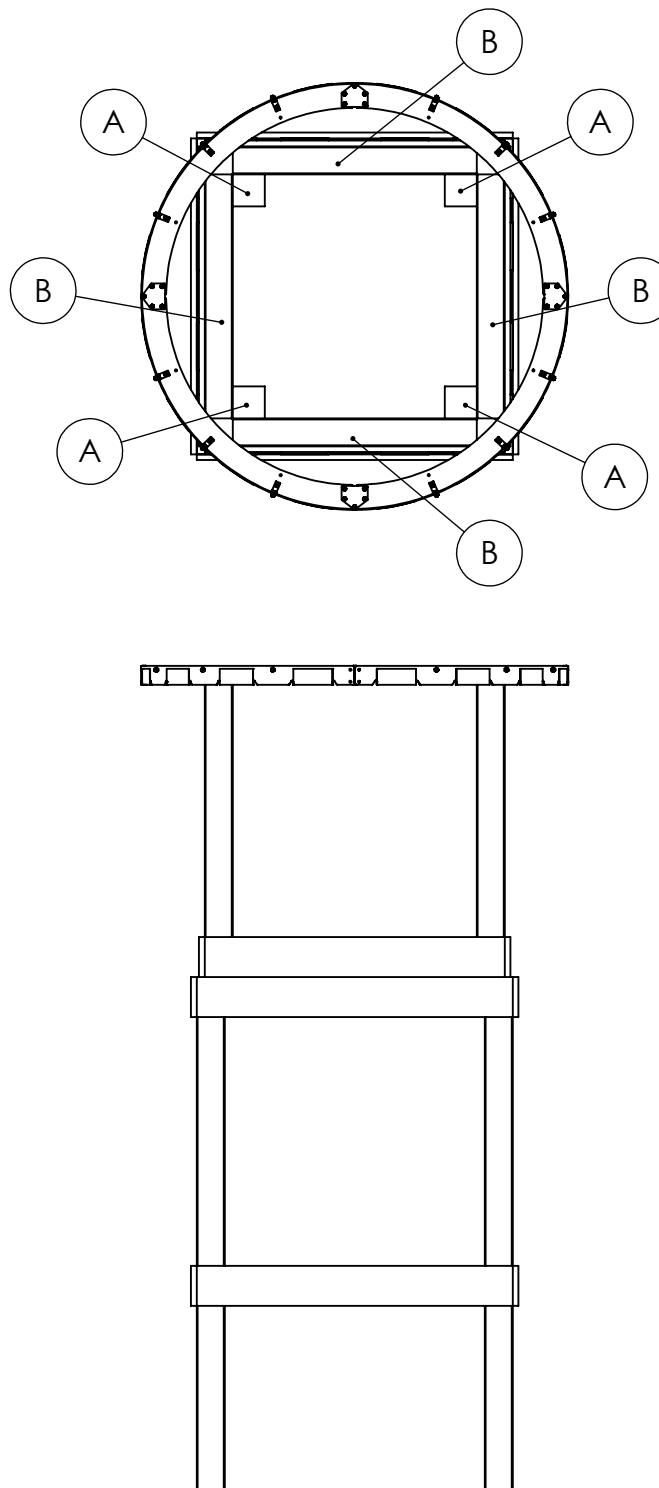
4

3

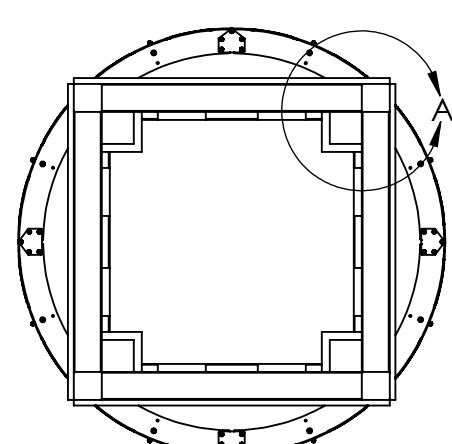
2

1

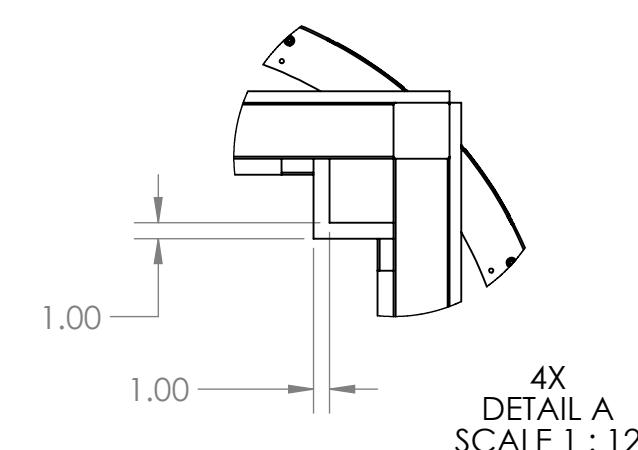
Step 1



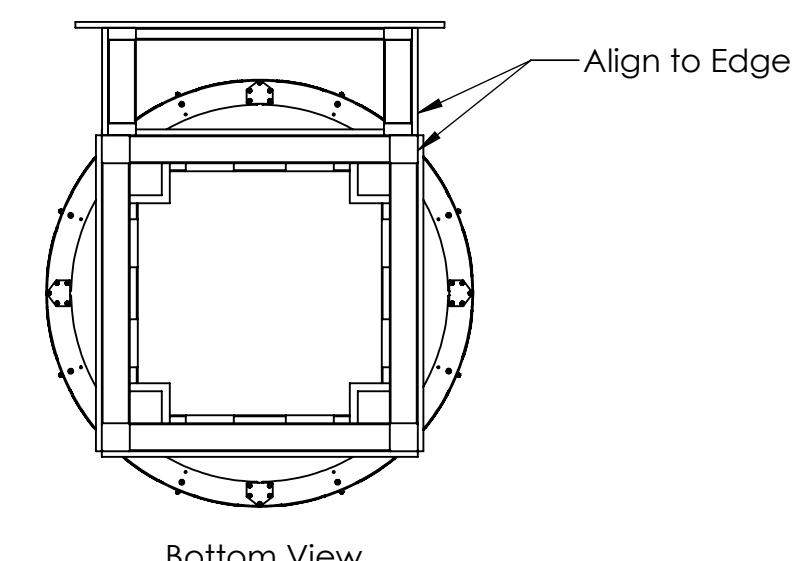
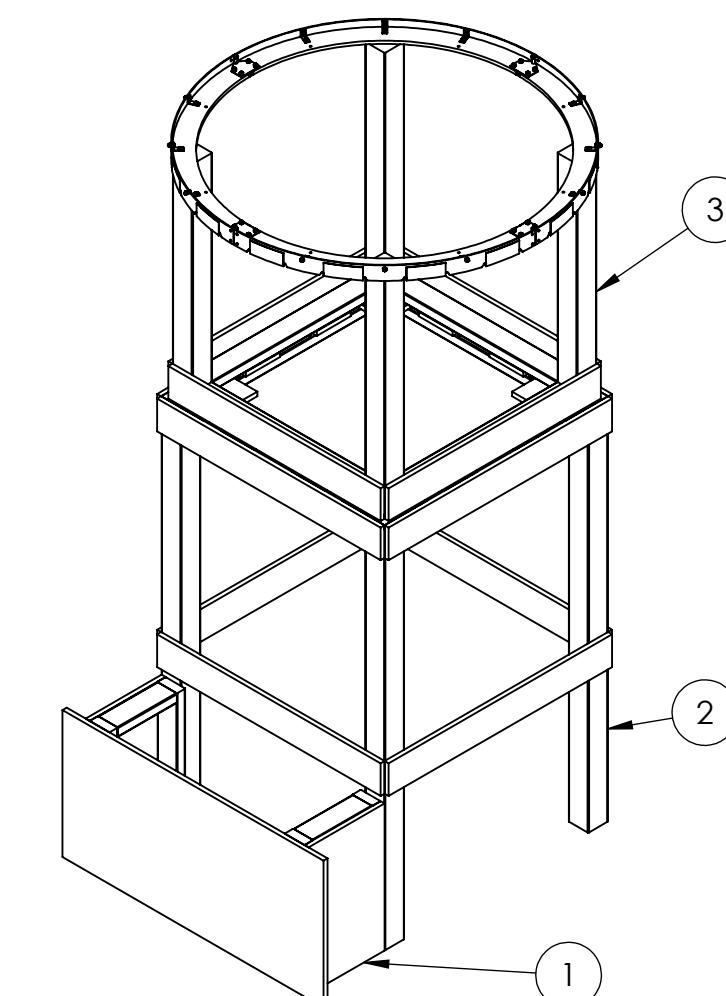
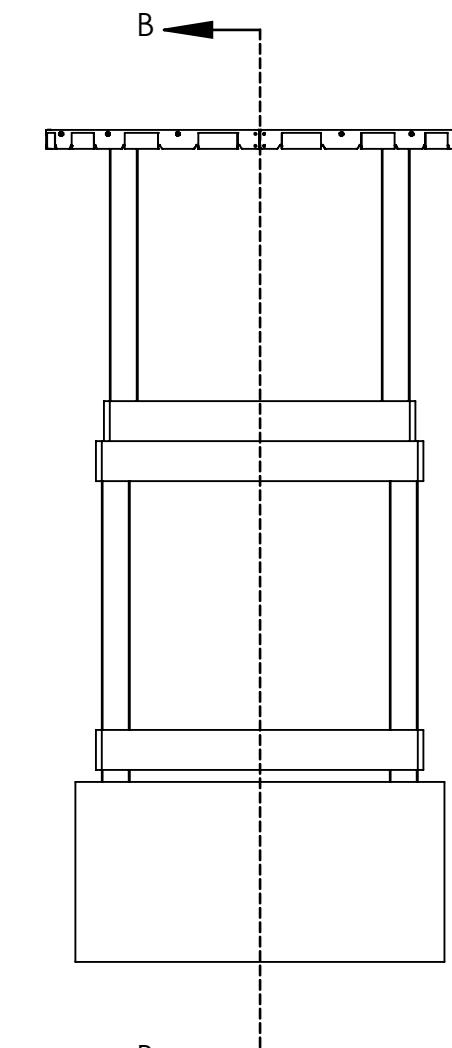
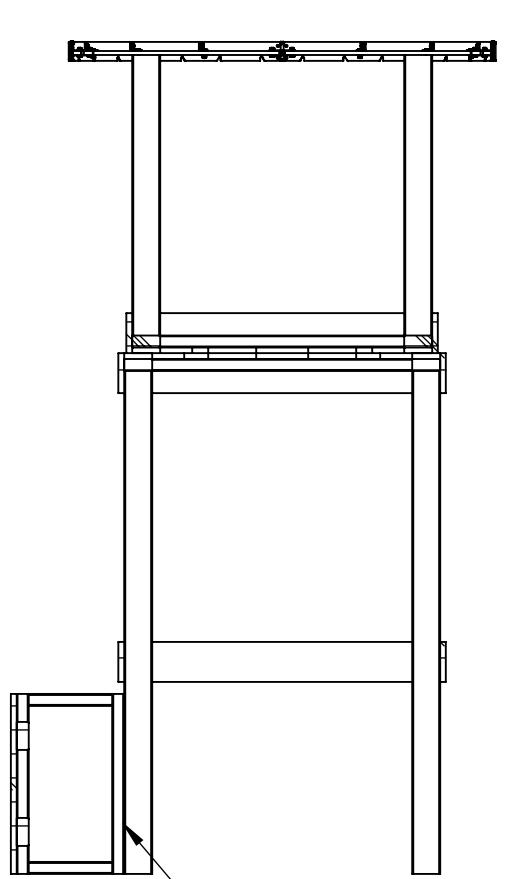
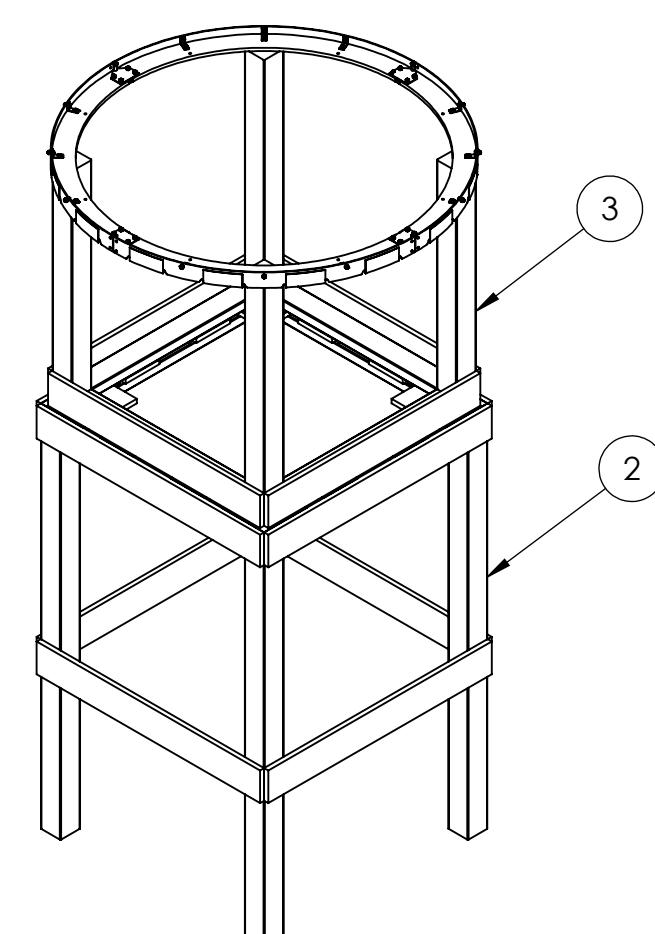
Bottom View



1. Align **(3)** to **(2)** as shown. Note the dimensions in Detail A.
2. Connect using 1.25" and 2.5" Long Screws. It is recommended to use 4x 1.25" long screws into each area indicated by **(A)**. It is recommended to use 5x 2.5" long screws into each area indicated by **(B)**.



Step 2



1. Align **(1)** to Step 1 , as shown.
2. Connect using 3.5" long screws. It is recommended to use 4x screws into each vertical leg of **(2)** . The screw head should be on the 2"x4" lumber of **(1)** .

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	1/4/2022	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	TE-22002-AM	
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING	SCALE: 1:24	SHEET 3 OF 3	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

TITLE: Hub - Simple Build - Full  
Upper Hub for  
AndyMark Ring AM-4672  
+ 1/4 Fender Assembly

SIZE DWG. NO. REV  
**C** TE-22002-AM

SCALE: 1:24 SHEET 3 OF 3

4

3

2

1

4

3

2

1

D

D

C

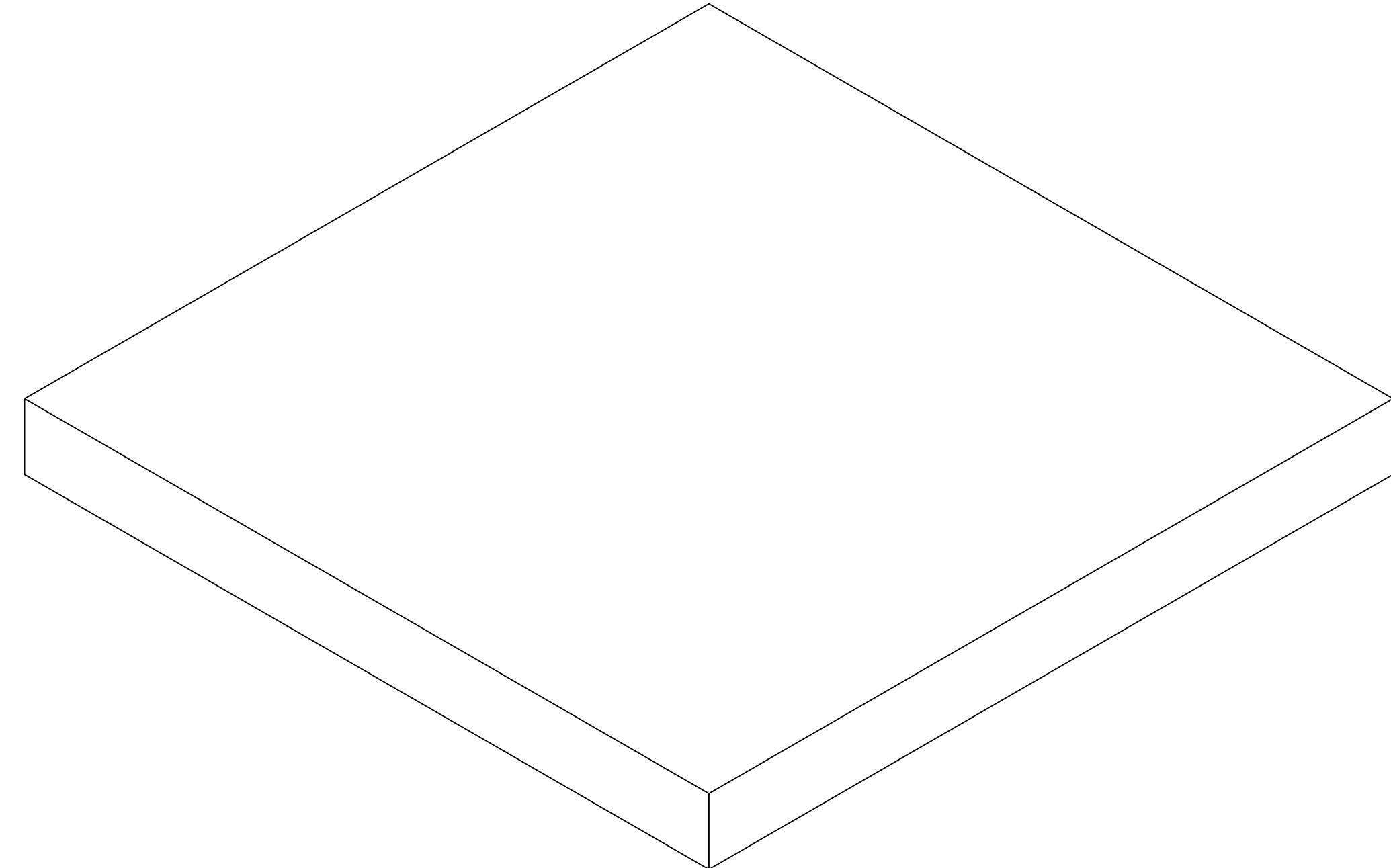
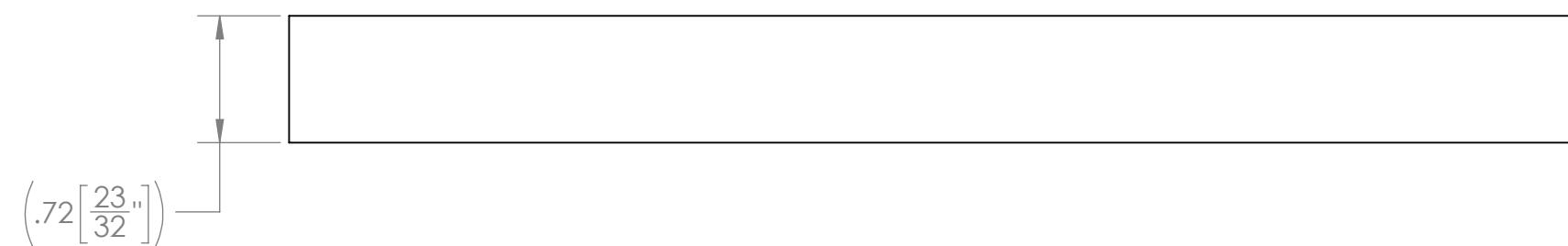
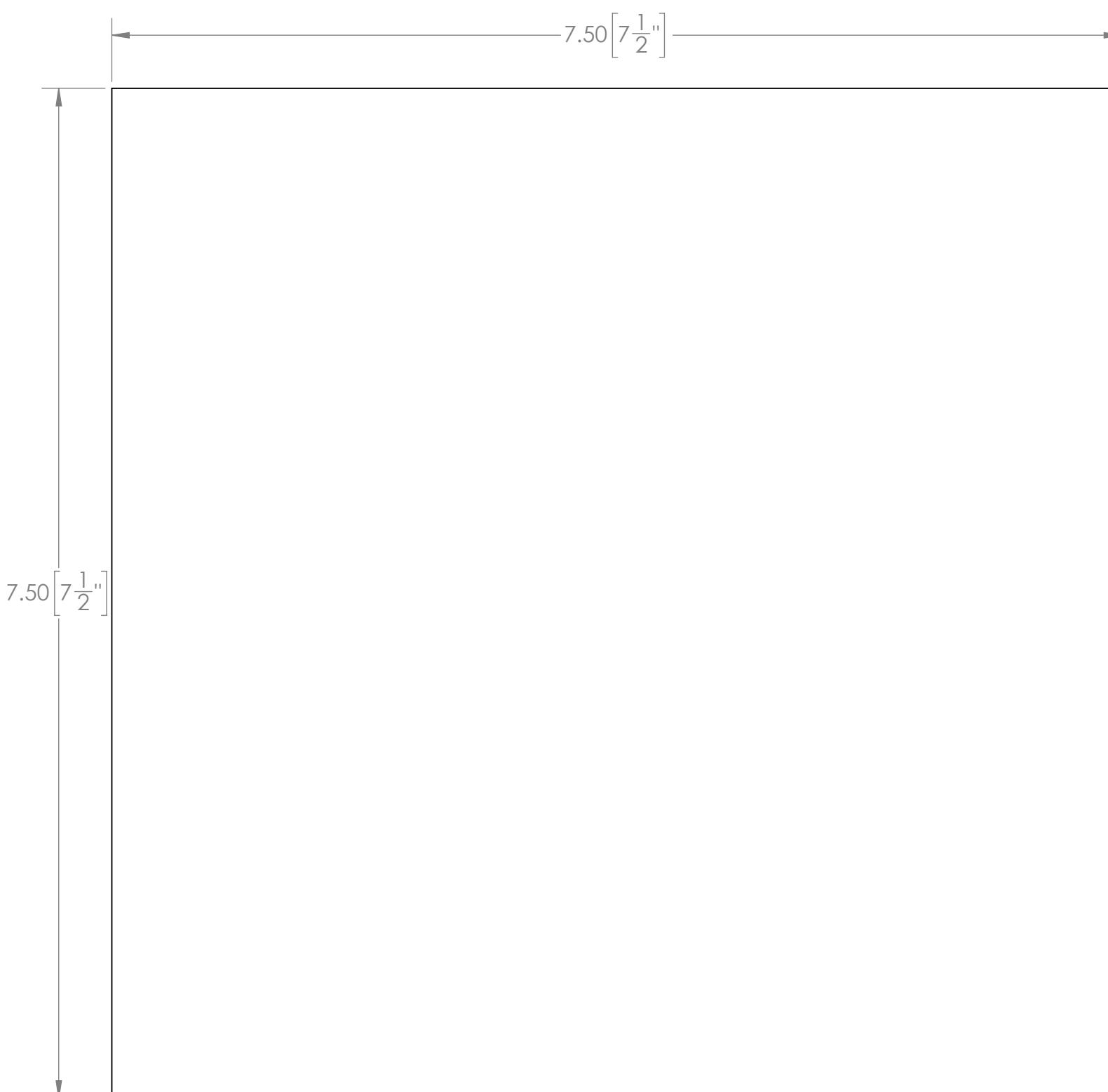
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL  $\pm 1/16$ ANGULAR: MACH  $\pm 1^\circ$  BEND  $\pm 1^\circ$ TWO PLACE DECIMAL  $\pm .13$ THREE PLACE DECIMAL  $\pm .125$ 

TEAM NAME DATE

DRAWN KAMC 12/29/2021



SOLIDWORKS Modeling Solutions Partner

**PROPRIETARY AND CONFIDENTIAL**

THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST<sup>®</sup>. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST<sup>®</sup> IS PROHIBITED.

**MATERIAL/FINISH:**

3/4" Plywood

**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

**TITLE:** Hub - Simple Build - Upper Hub Square Connection Plate  
**SIZE** DWG. NO. REV  
**C** TE-22005

SCALE: 1:1 SHEET 1 OF 1

4

3

2

1

4

3

2

1

D

D

C

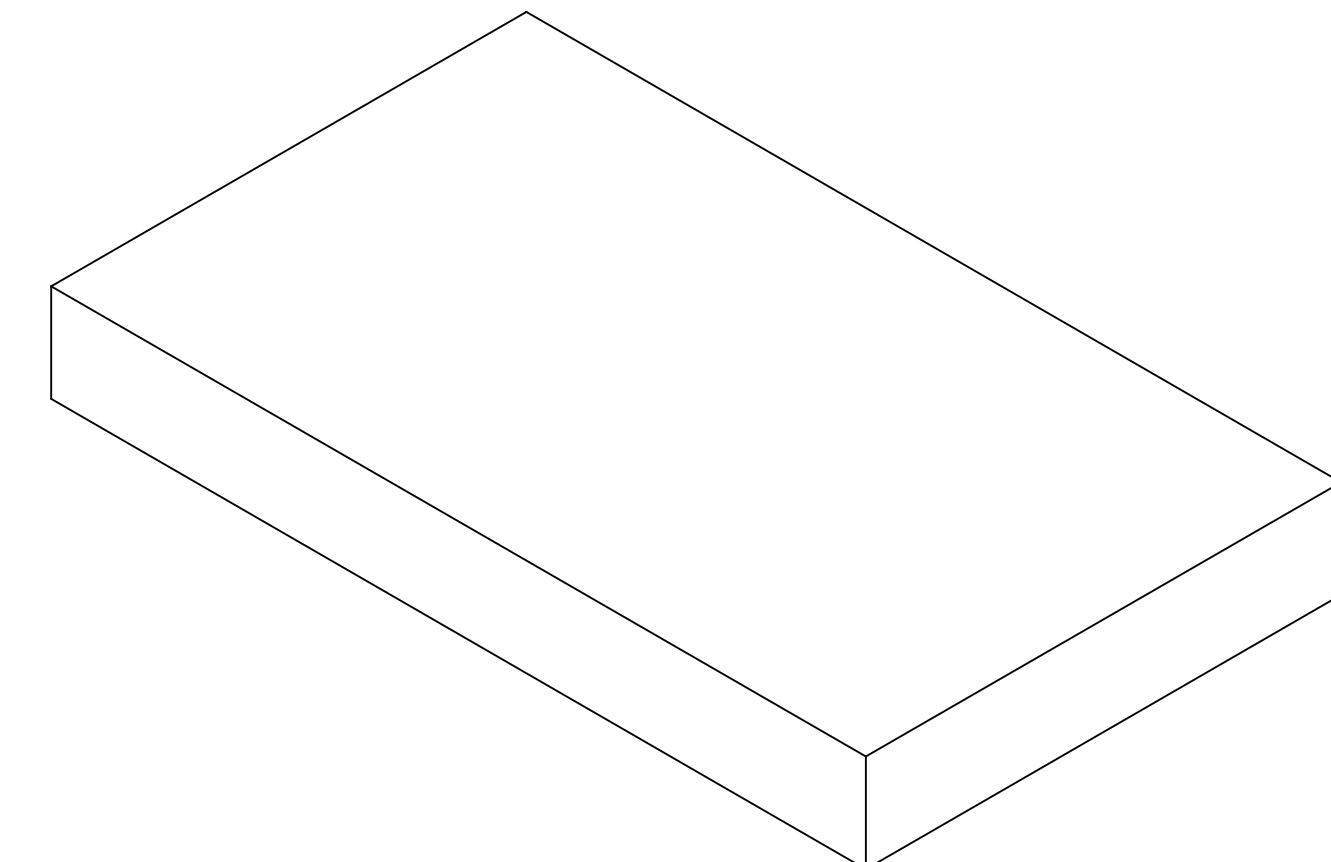
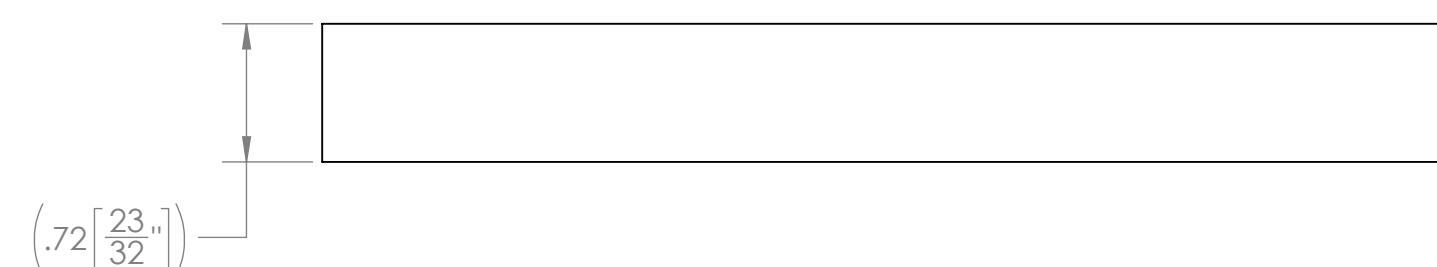
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$	DRAWN	KAMC	12/29/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 3/4" Plywood	SIZE	DWG. NO.	REV
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	C	TE-22006	
DO NOT SCALE DRAWING	SCALE: 1:1	SHEET 1 OF 1	

4

3

2

1

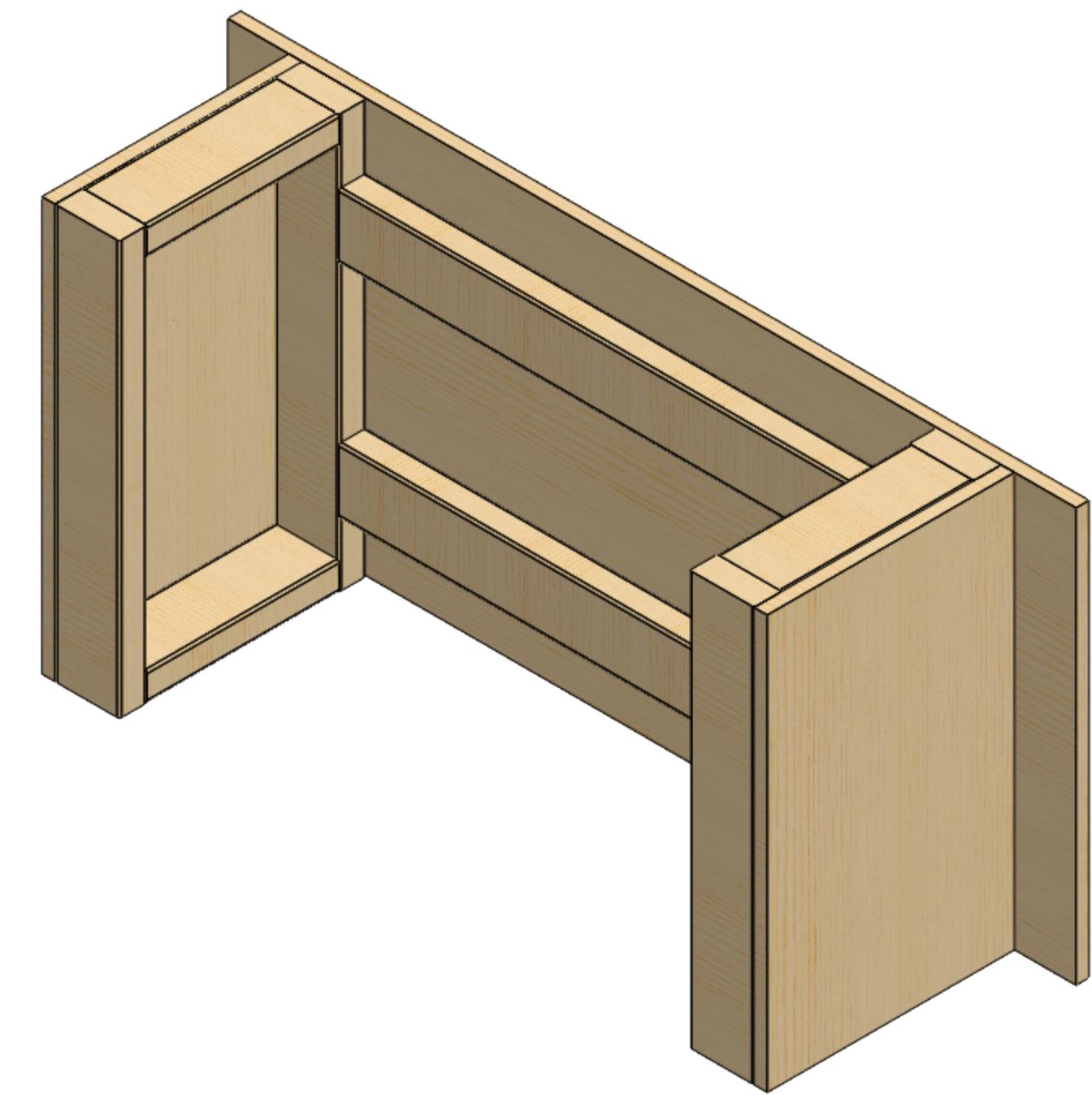
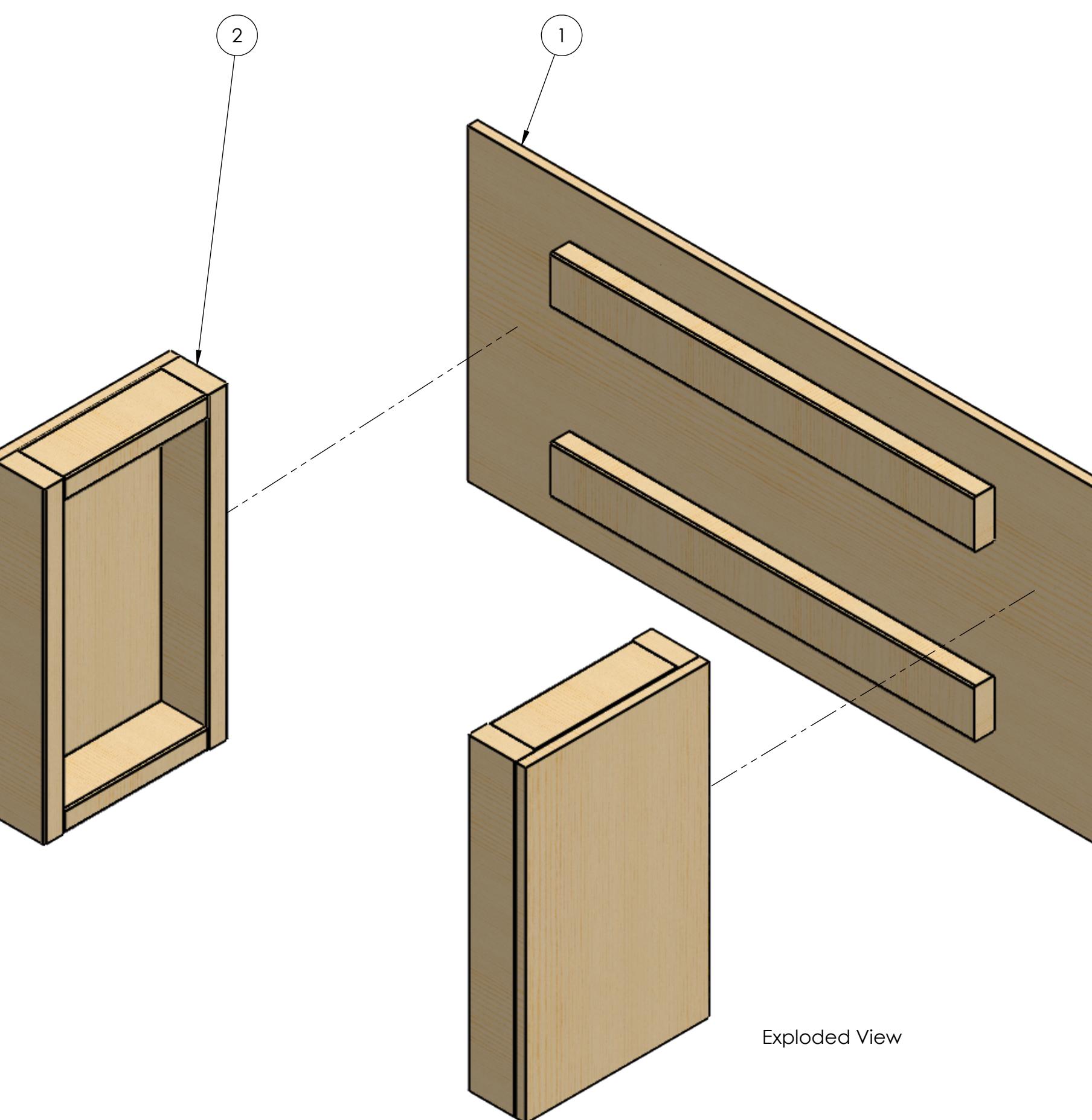
4

3

2

1

D



Hardware Needed:  
#8 x 2" Long Screw - Qty 10

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TE-22013	HUB - Basic Build - Fender Front Assembly	1
2	TE-22017	HUB - Basic Build - Fender Side Assembly	2

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES  
TOLERANCES:  
FRACTIONAL  $\pm 1/16$   
ANGULAR: MACH  $\pm 1^\circ$  BEND  $\pm 1^\circ$   
TWO PLACE DECIMAL  $\pm .13$   
THREE PLACE DECIMAL  $\pm .125$

MATERIAL/FINISH:

COMMENTS:  
REMOVE ALL BURRS AND SHARP EDGES.

DO NOT SCALE DRAWING

2

D

C

B

A

TEAM NAME DATE  
DRAWN KAMC 12/30/2021

FIRST ROBOTICS COMPETITION DS SOLIDWORKS  
Modeling Solutions Partner

TITLE: Hub - Simple Build - Fender Assembly

SIZE DWG. NO. REV  
**C** TE-22010

SCALE: 1:6 SHEET 1 OF 3

4

3

2

1

4

3

2

1

D

D

C

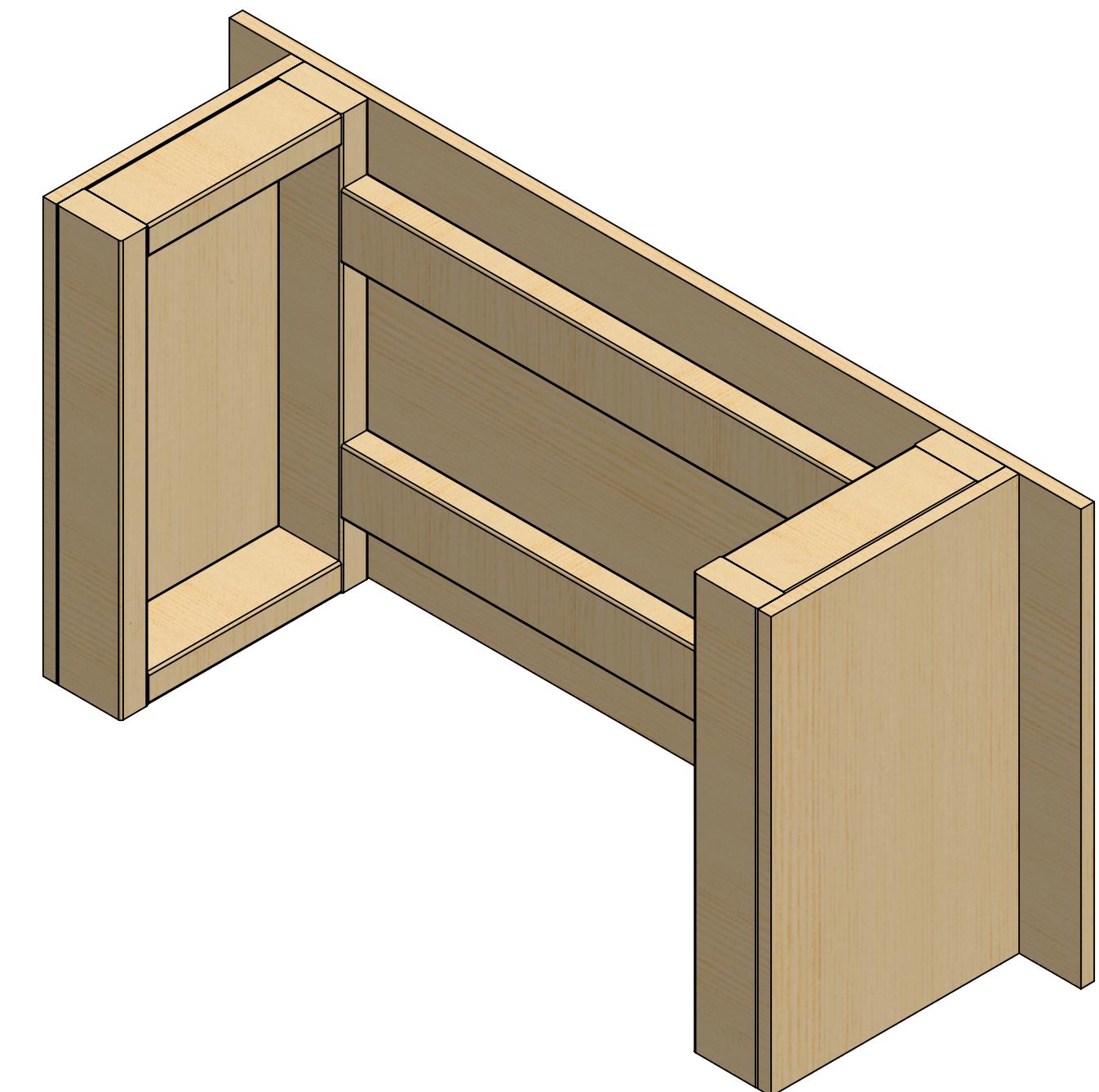
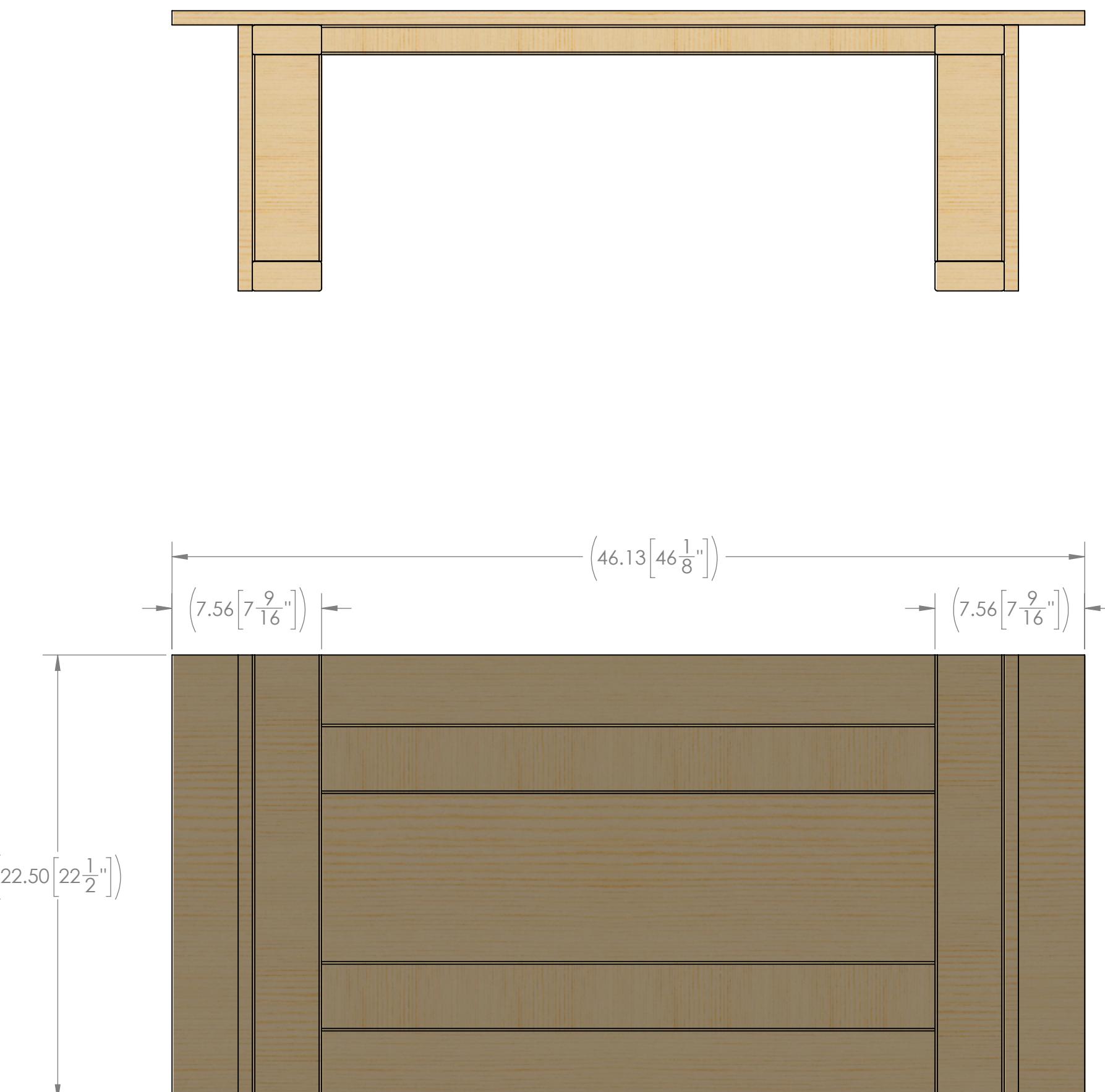
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/30/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
<b>MATERIAL/FINISH:</b>			
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
 <b>FIRST ROBOTICS COMPETITION</b>  <b>SOLIDWORKS</b> Modeling Solutions Partner			
TITLE: <b>Hub - Simple Build - Fender Assembly</b>			
SIZE DWG. NO. REV			
<b>C</b> TE-22010			
SCALE: 1:6 SHEET 2 OF 3			

4

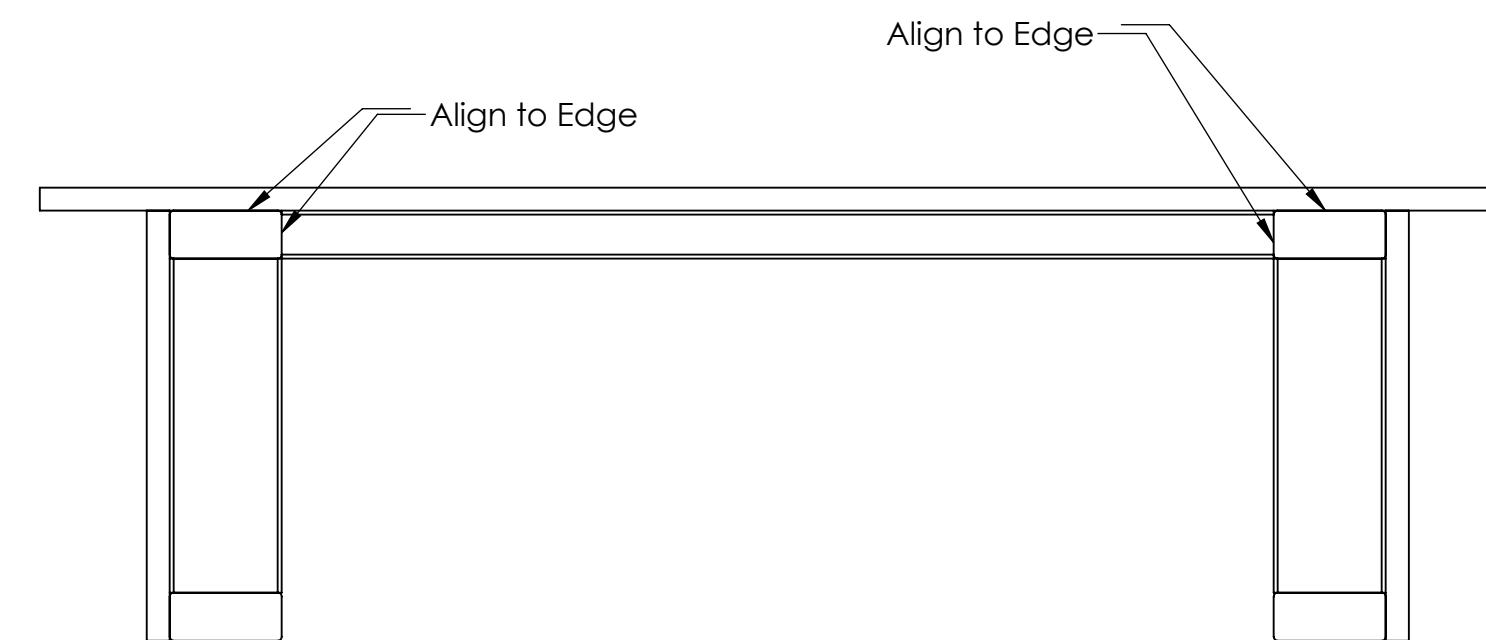
3

2

1

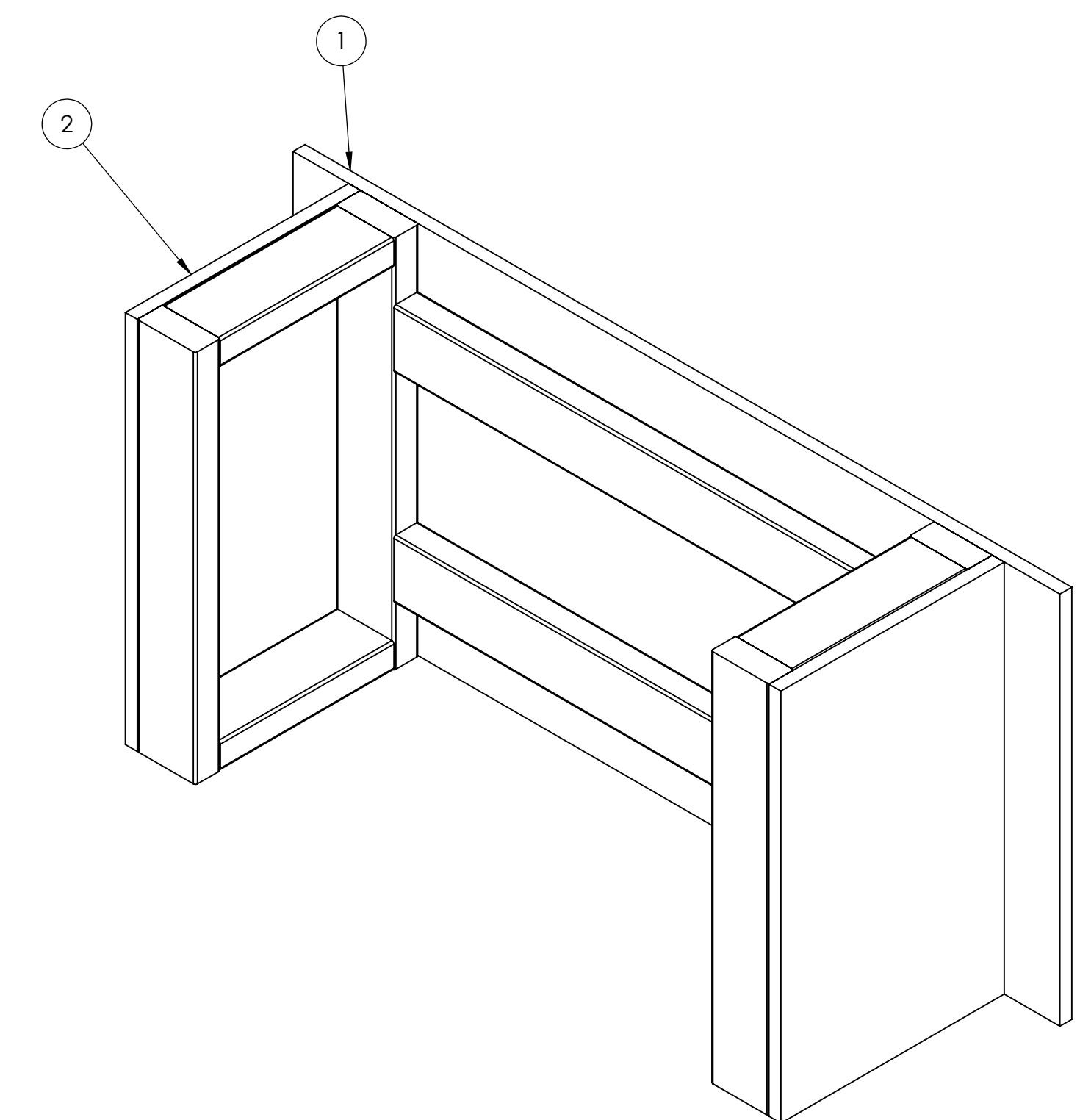
D

Step 1



Step 1:

1. Align 2x (2) to (1) as shown.
2. Connect using 2" long screws. It is recommended to use 5x screws into each (2).



B

A

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/30/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	TE-22010	
COMMENTS:		SCALE: 1:6	
REMOVE ALL BURRS AND SHARP EDGES.		SHEET 3 OF 3	
DO NOT SCALE DRAWING			

4

3

2

1

D

C

B

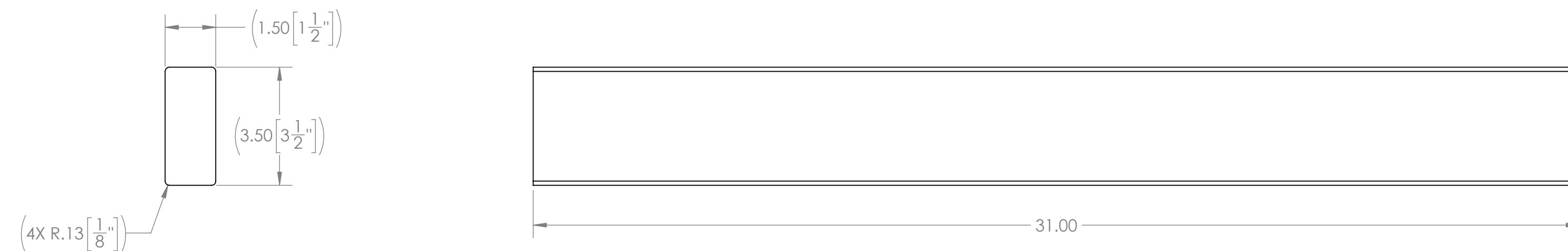
A

D

C

B

A



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$	DRAWN	KAMC	12/29/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 2"x4" Lumber	SIZE	DWG. NO.	REV
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	C	TE-22011	
DO NOT SCALE DRAWING	SCALE: 1:3	SHEET 1 OF 1	

4

3

2

1

4

3

2

1

D

D

C

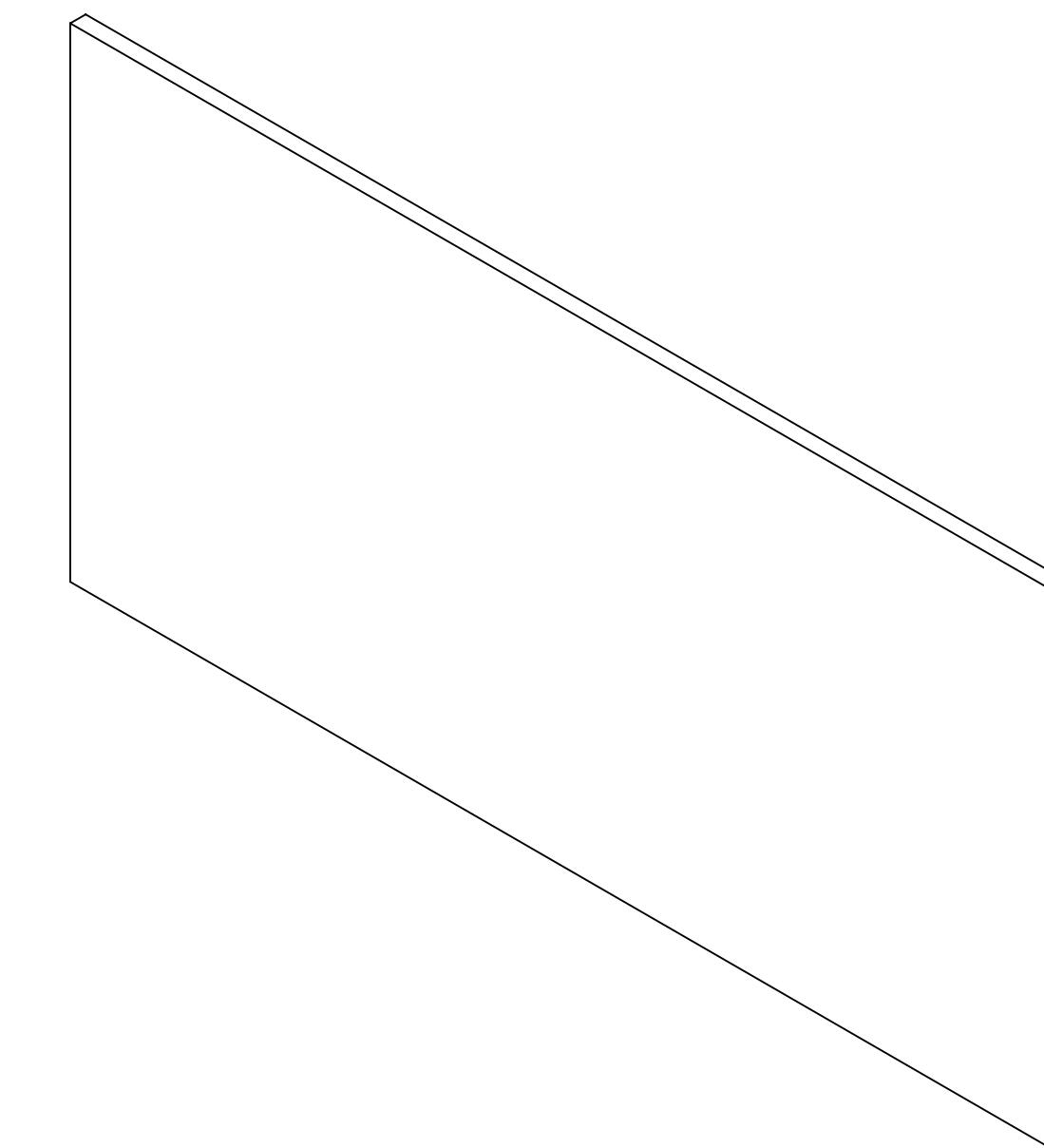
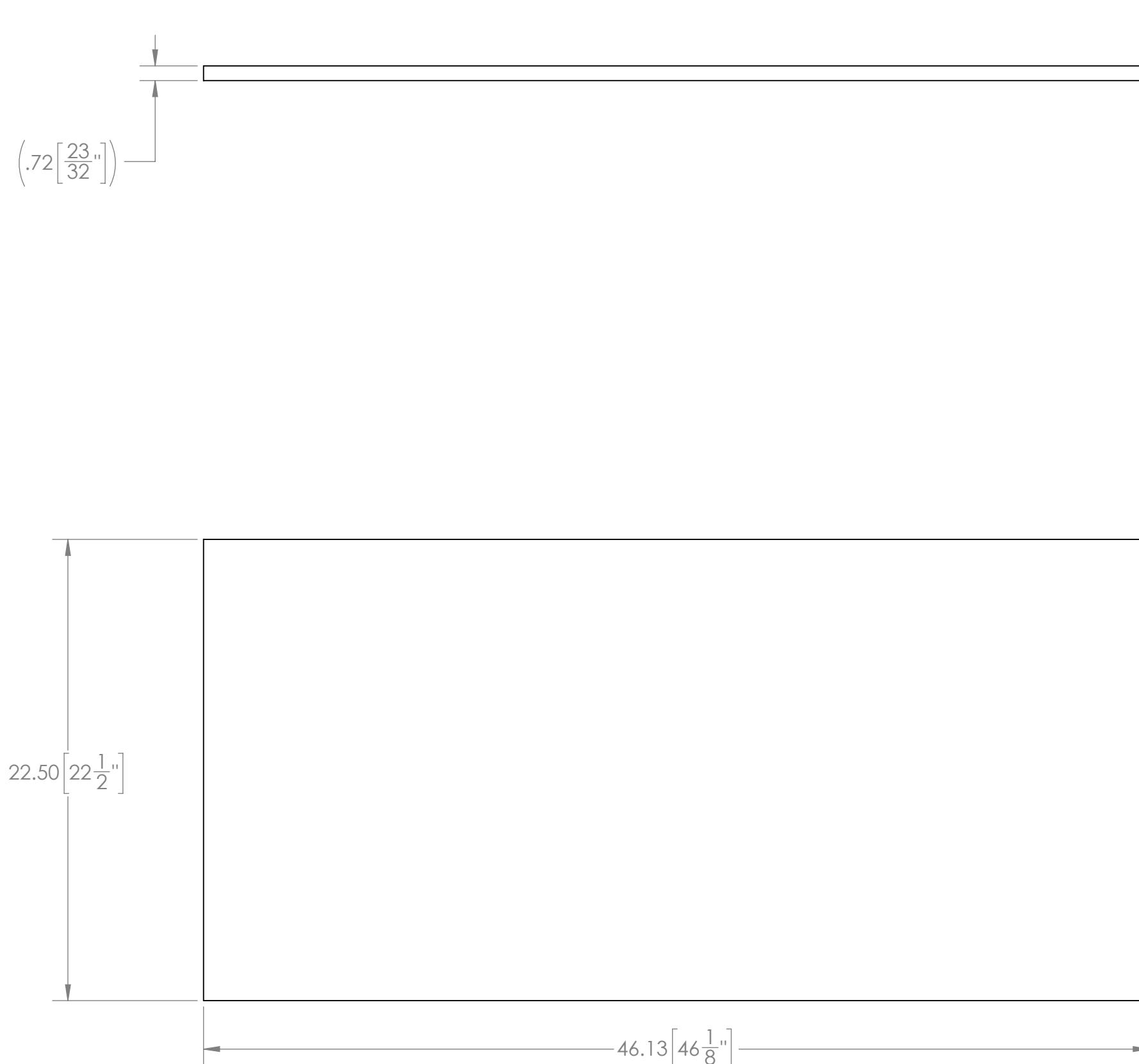
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$	DRAWN	KAMC	12/29/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 3/4" Plywood	SIZE	DWG. NO.	REV
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	C	TE-22012	
DO NOT SCALE DRAWING	SCALE: 1:6	SHEET 1 OF 1	

4

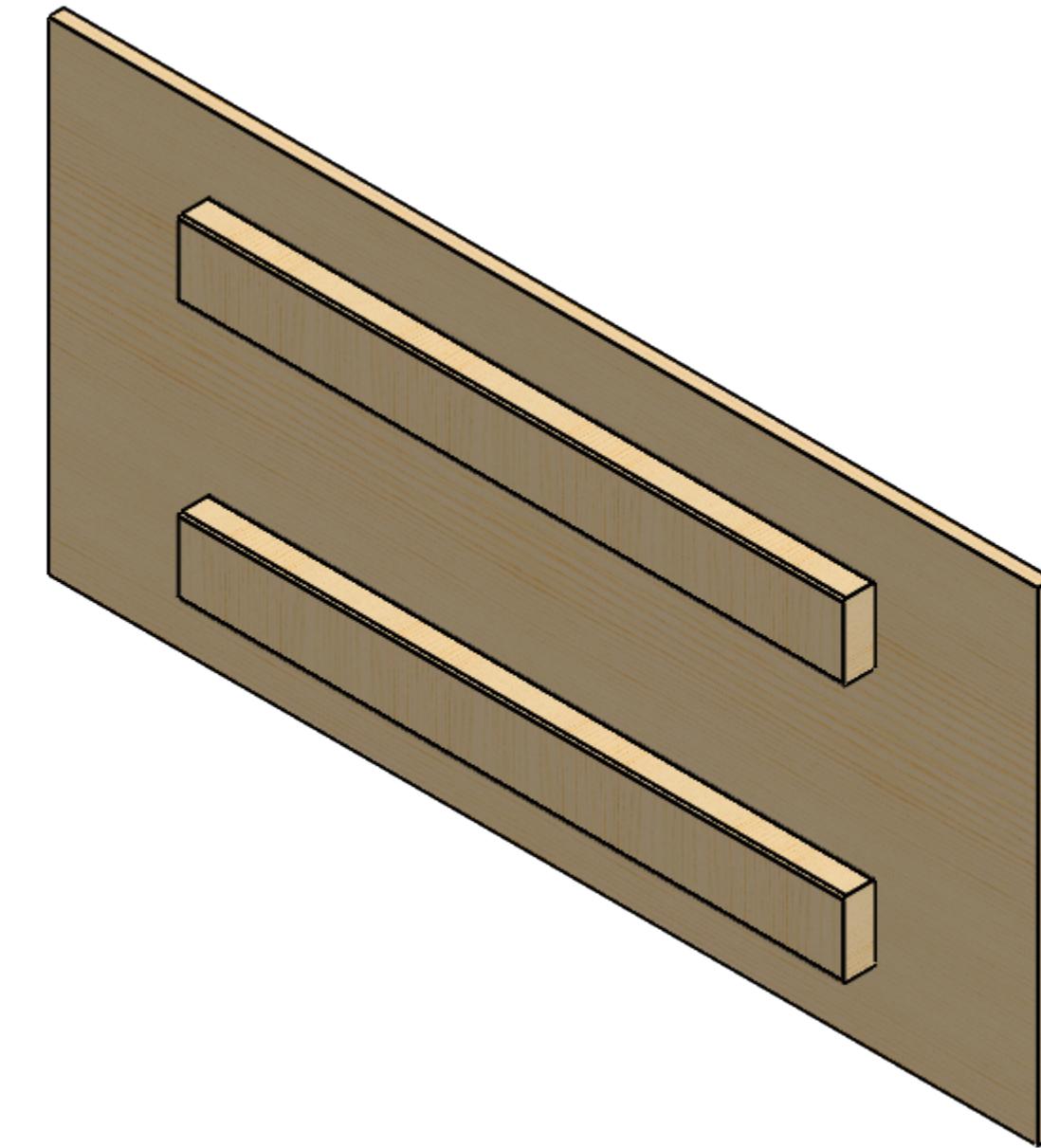
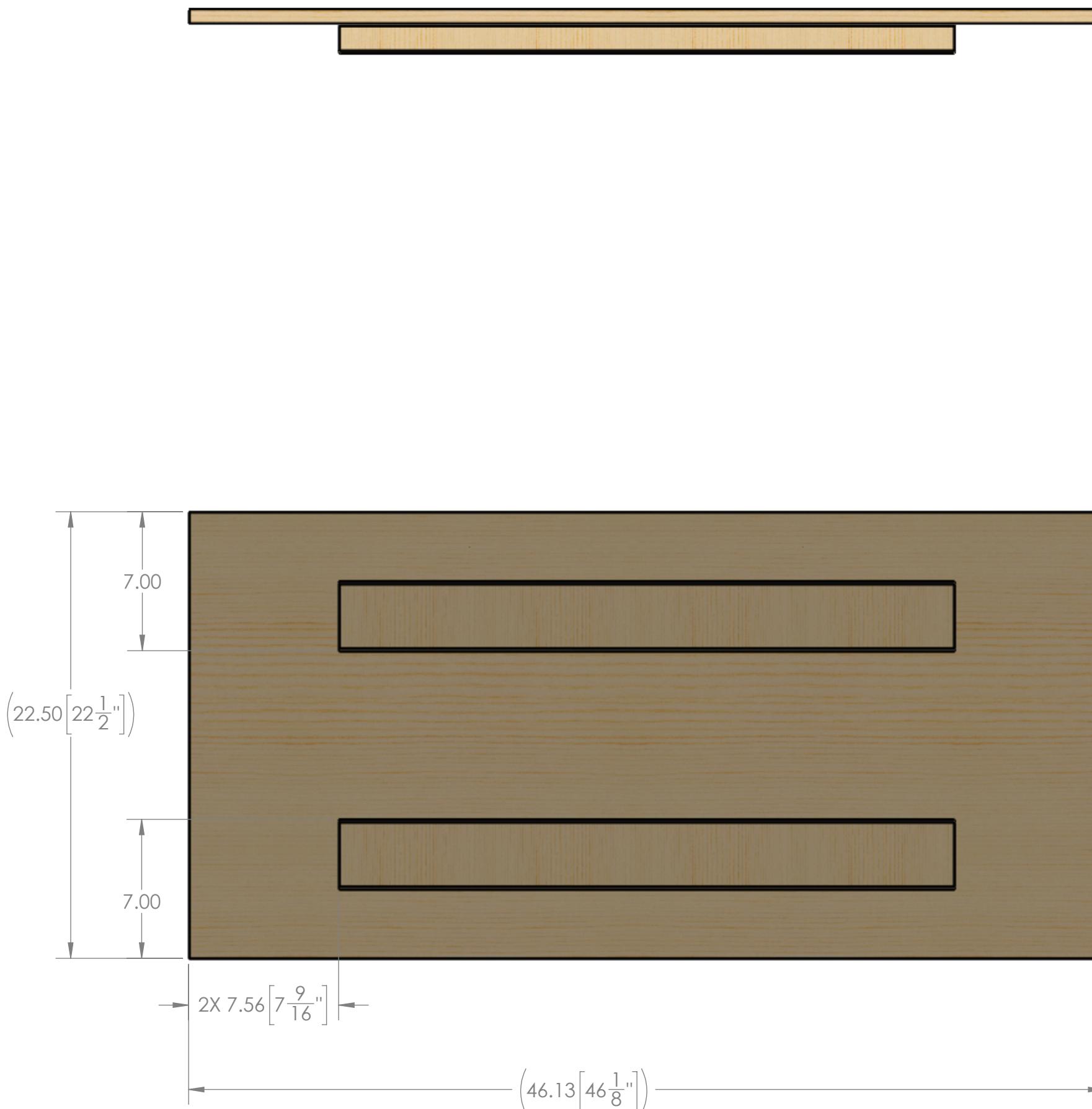
3

2

1



D



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/30/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	TE-22013	
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.		
DO NOT SCALE DRAWING	SCALE: 1:6	SHEET 2 OF 2	

D

C

B

A

4

3

2

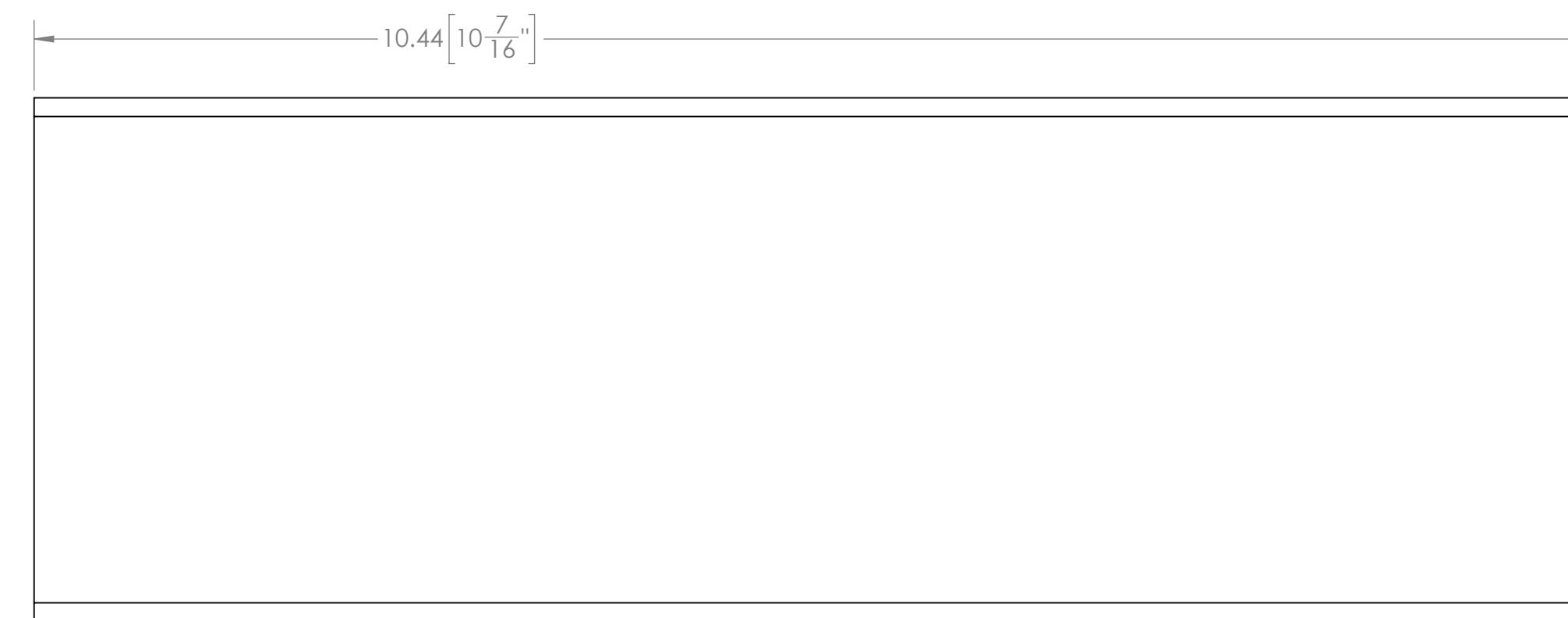
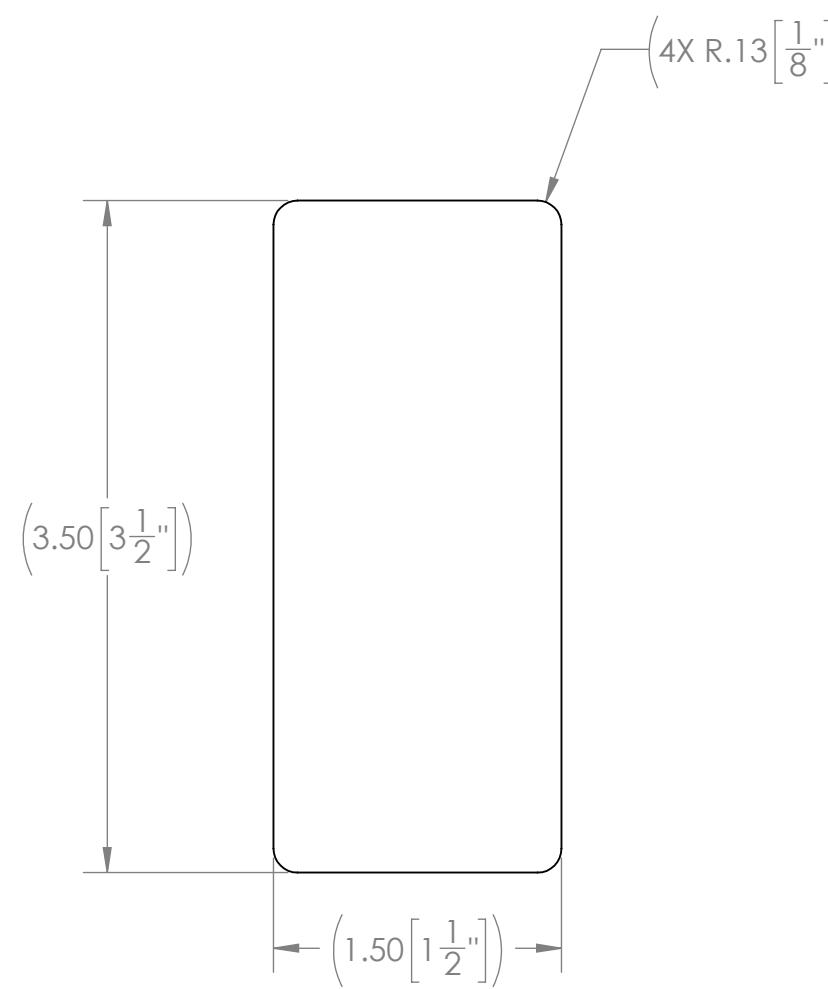
1

D

C

B

A



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/29/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
2"x4" Lumber	C	TE-22014	
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:1	SHEET 1 OF 1	

 **FIRST  
ROBOTICS  
COMPETITION**  **SOLIDWORKS**  
Modeling Solutions Partner

4

3

2

1

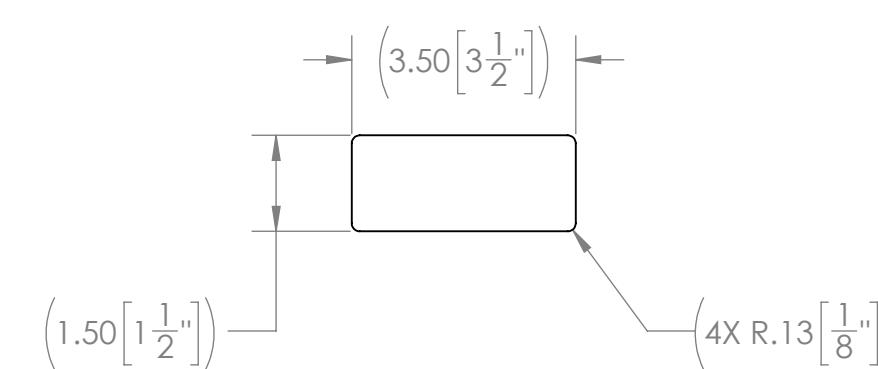
D

C

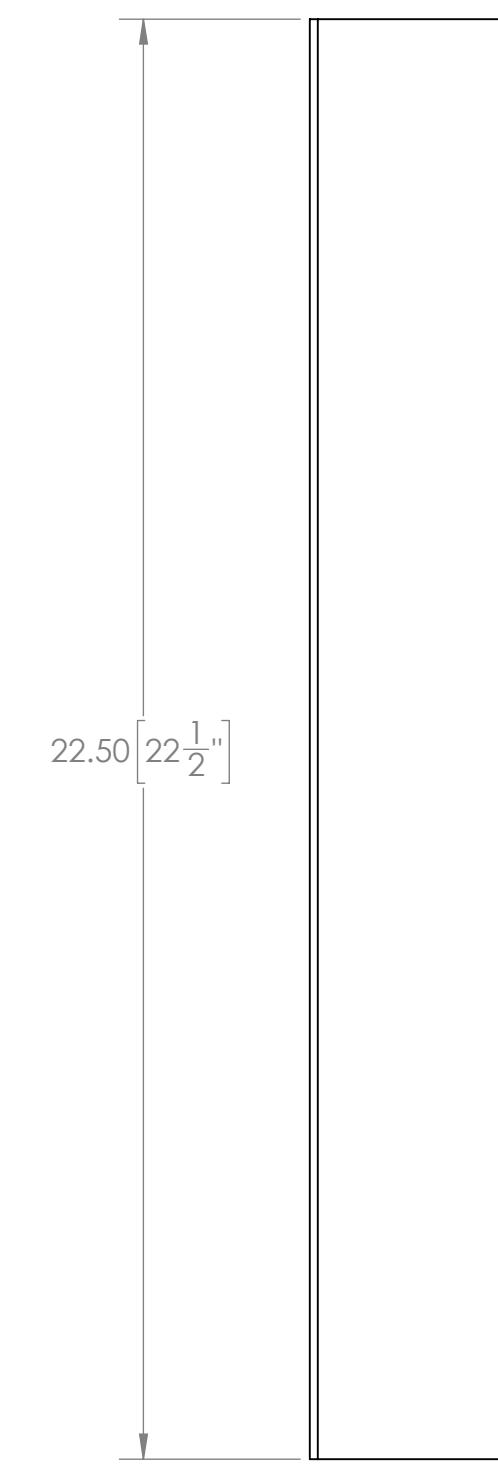
B

A

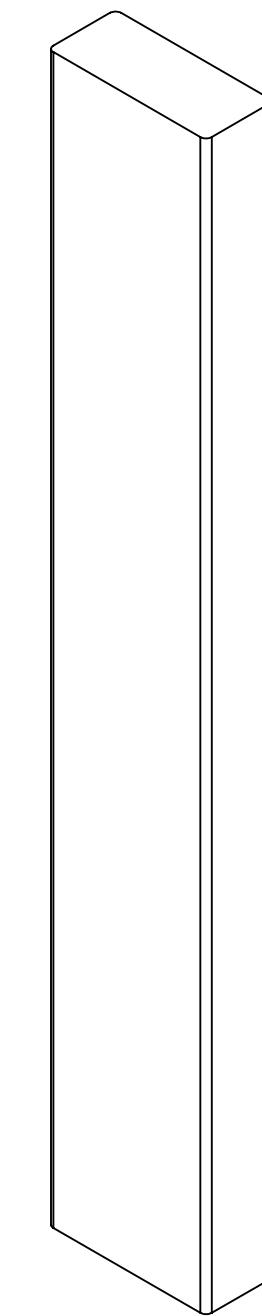
D



C



B



A

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$	DRAWN	KAMC	12/29/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 2"x4" Lumber	SIZE	DWG. NO.	REV
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	C	TE-22015	
DO NOT SCALE DRAWING	SCALE: 1:3	SHEET 1 OF 1	

 **FIRST  
ROBOTICS  
COMPETITION**  **SOLIDWORKS**  
Modeling Solutions Partner

4

3

2

1

D

 $(.72\left[\frac{23}{32}\right])$  $13.44\left[13\frac{7}{16}\right]$ 

C

22.50 $\left[22\frac{1}{2}\right]$ 

B

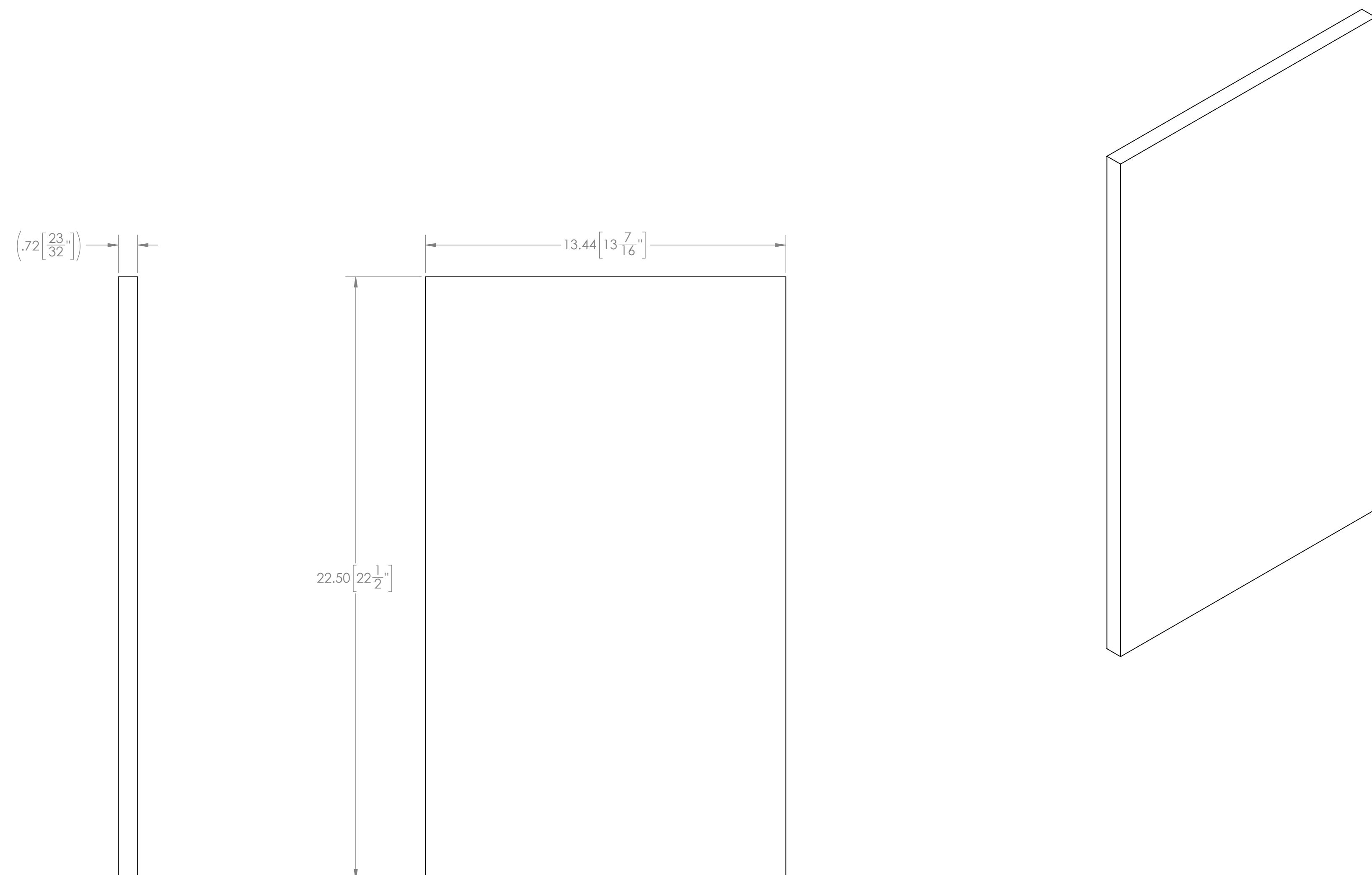
A

D

C

B

A



UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES  
TOLERANCES:  
FRACTIONAL  $\pm 1/16$   
ANGULAR: MACH  $\pm 1^\circ$  BEND  $\pm 1^\circ$   
TWO PLACE DECIMAL  $\pm .13$   
THREE PLACE DECIMAL  $\pm .125$

MATERIAL/FINISH:

3/4" Plywood

DO NOT SCALE DRAWING

TEAM NAME DATE

DRAWN KAMC 12/29/2021



TITLE: HUB - Simple Build -  
Fender Side

SIZE DWG. NO. REV

C TE-22016

SCALE: 1:3 SHEET 1 OF 1

4

3

2

1

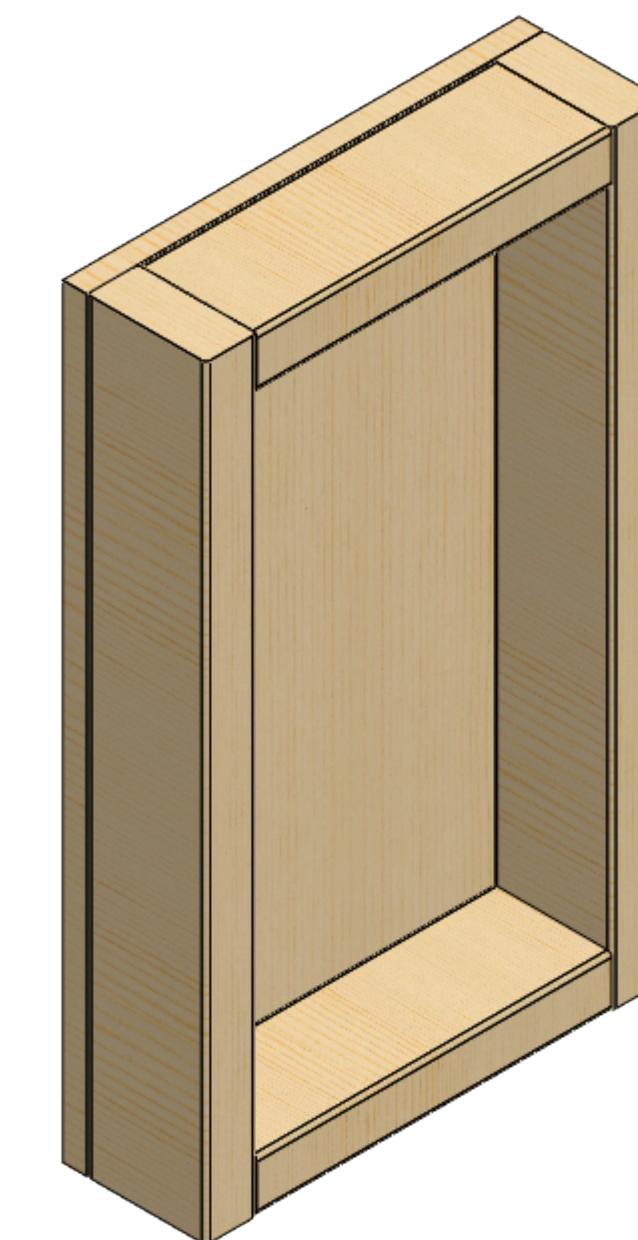
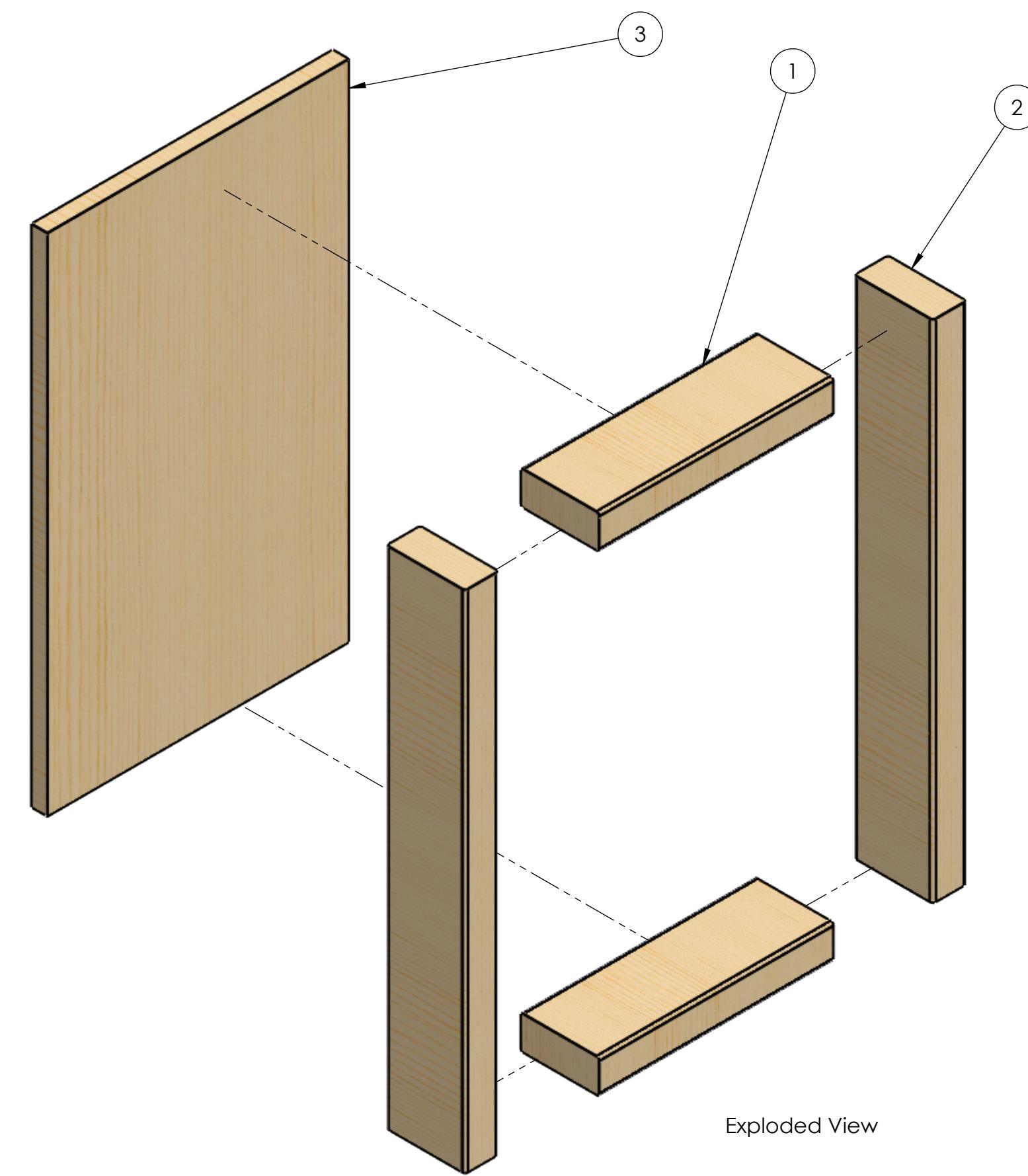
4

3

2

1

D



Hardware:  
#8 x 2" Long Screw - Qty 16  
#8 x 2.5" Long Screw - Qty 8

ITEM NO.	PART NUMBER	DESCRIPTION	
1	TE-22014	HUB - Simple Build - Fender Side Horizontal 2x4	2
2	TE-22015	HUB - Simple Build - Fender Vertical 2x4	2
3	TE-22016	HUB - Simple Build - Fender Side	1

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES  
TOLERANCES:  
FRACTIONAL  $\pm 1/16$   
ANGULAR: MACH  $\pm 1^\circ$  BEND  $\pm 1^\circ$   
TWO PLACE DECIMAL  $\pm .13$   
THREE PLACE DECIMAL  $\pm .125$

MATERIAL/FINISH:

TEAM	NAME	DATE	 
DRAWN	KAMC	12/30/2021	
PROPRIETARY AND CONFIDENTIAL			TITLE: HUB - Basic Build - Fender Side Assembly
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST IS PROHIBITED.			
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.			
SIZE	DWG. NO.	REV	C TE-22017
SCALE: 1:4		SHEET 1 OF 3	

4

3

2

1

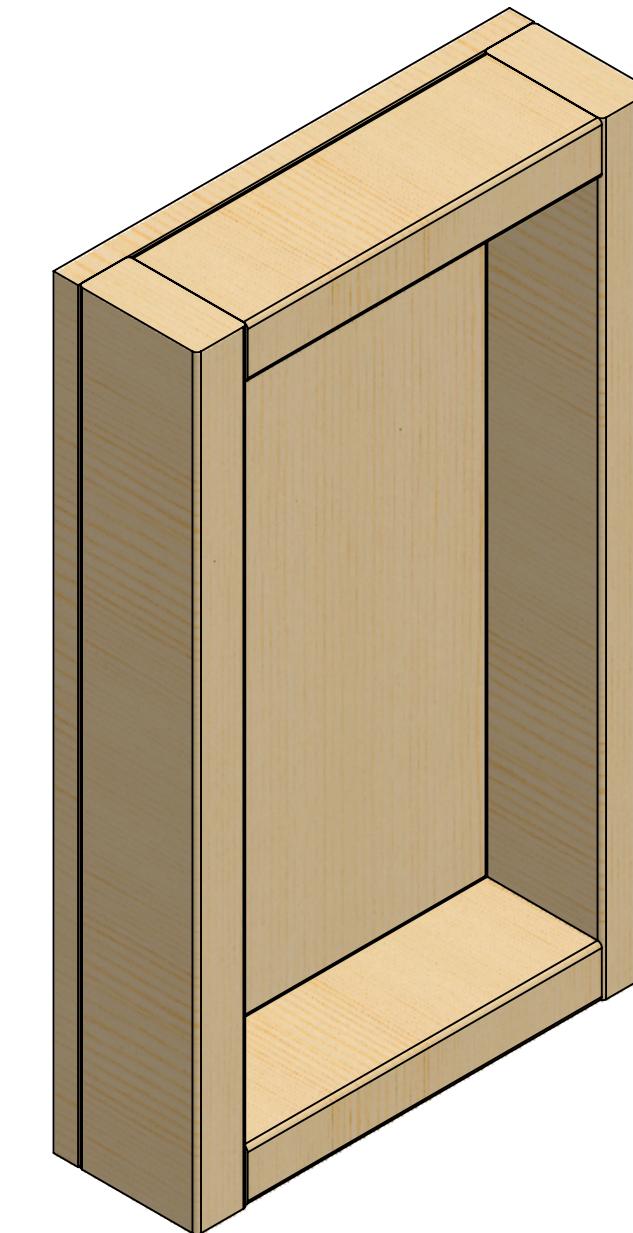
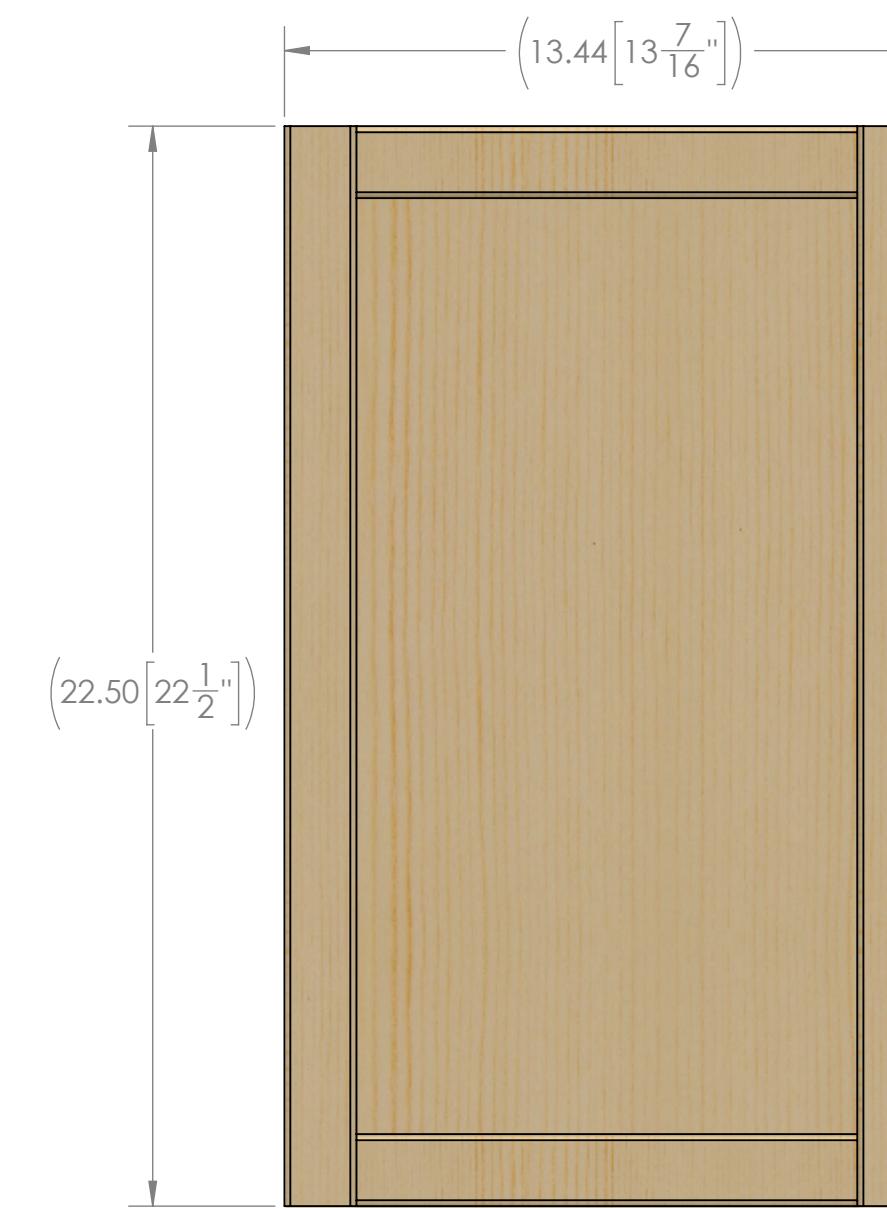
4

3

2

1

D



C

B

A

D

C

B

A

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/30/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
<b>MATERIAL/FINISH:</b>			
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST  
ROBOTICS  
COMPETITION**  SOLIDWORKS  
Modeling Solutions Partner

TITLE: **HUB - Basic Build -  
Fender Side Assembly**

SIZE DWG. NO. REV  
**C TE-22017**

SCALE: 1:4 SHEET 2 OF 3

4

3

2

1

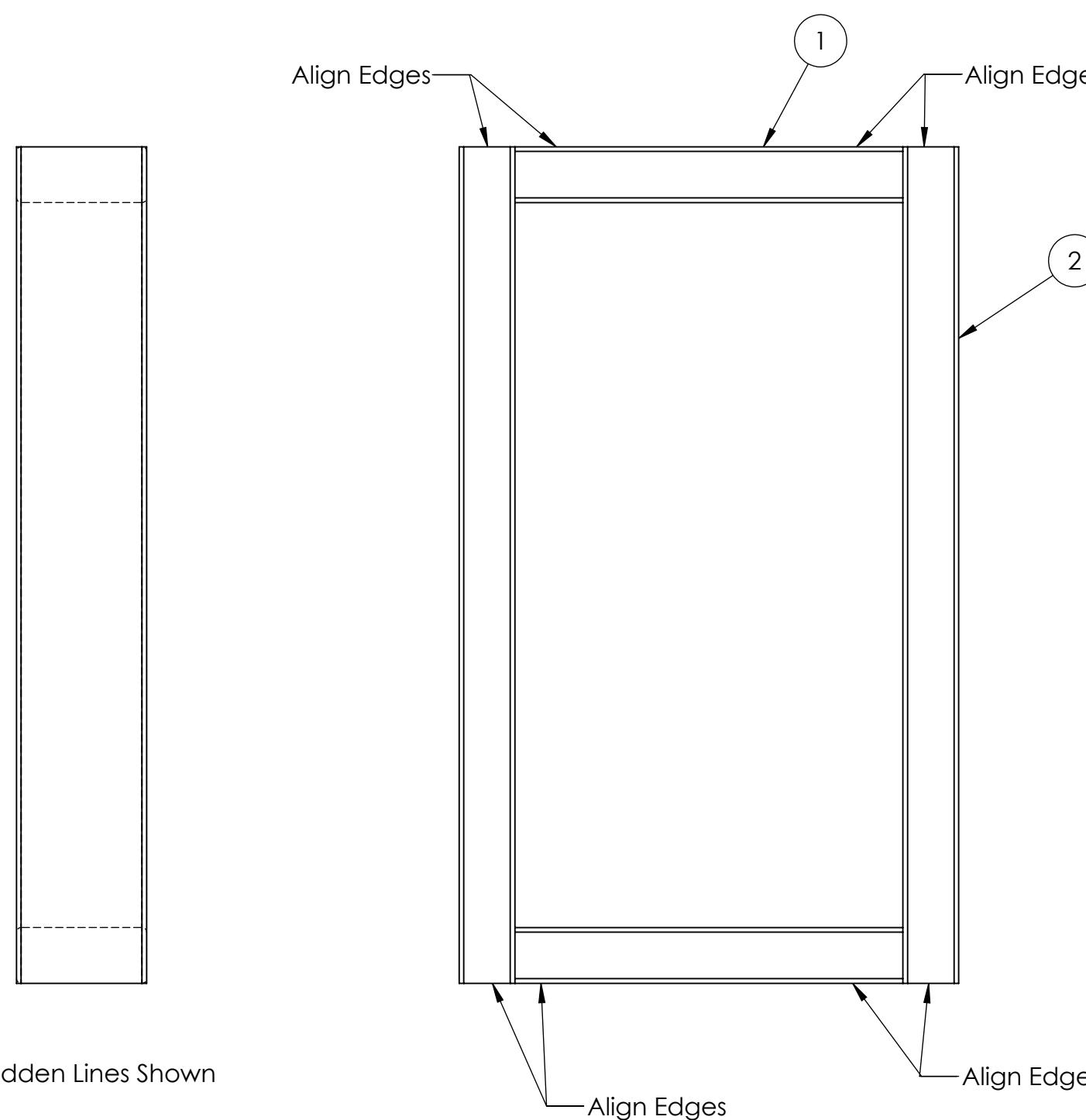
4

3

2

1

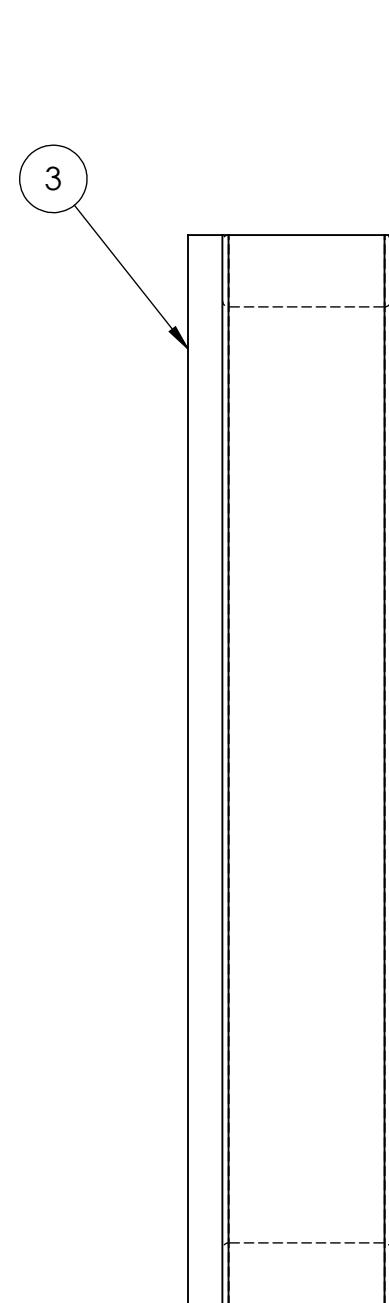
Step 1



Hidden Lines Shown

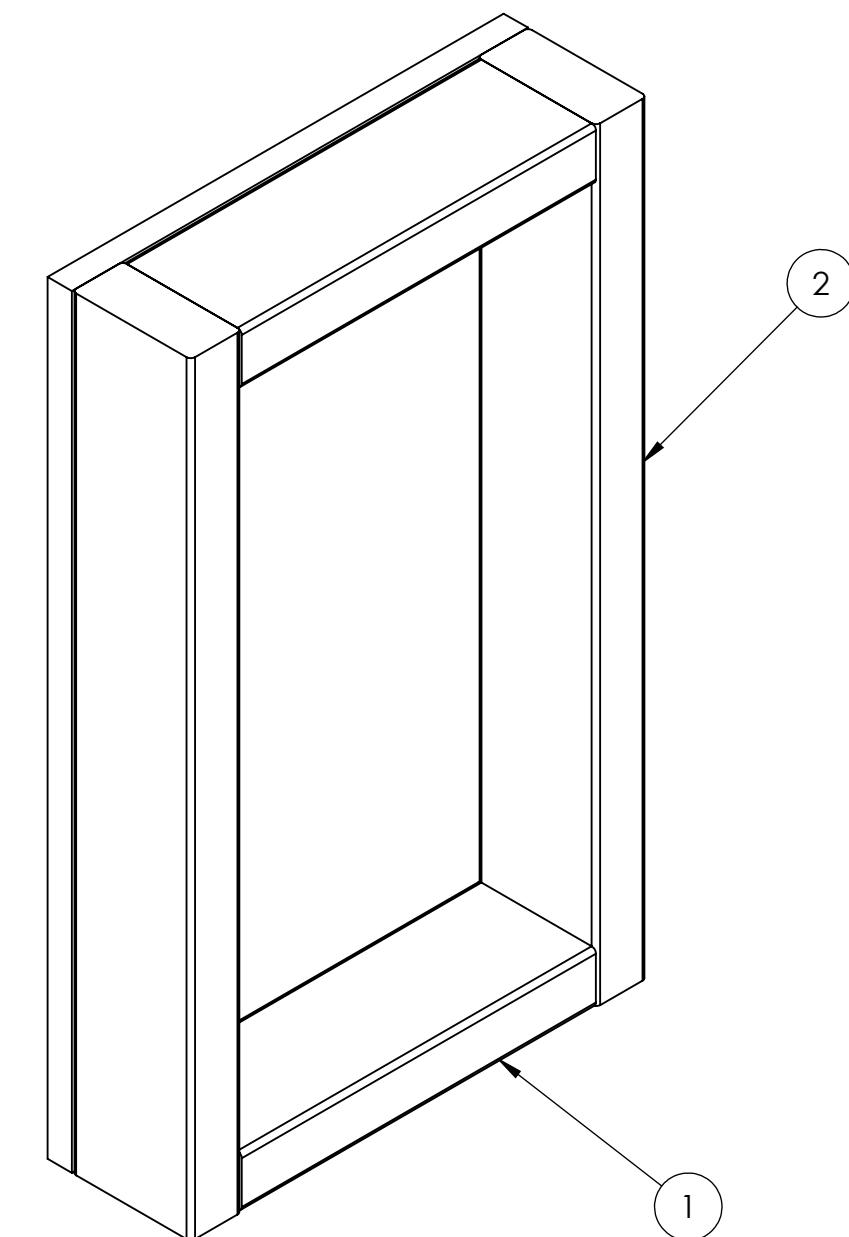
1. Align 2x 1 and 2x 2, as shown.
2. Attach using 2.5" long screws. It is recommended to use 2x screws into each interface between a 2 and 1.

Step 2



Hidden Lines Shown

1. Align 3 to the assembly made in Step 1, as shown.
2. Attach using 2" Long Screws. It is recommended to use 5x screws into each 2 and 3x screws into each 1.



1. Align 3 to the assembly made in Step 1, as shown.
2. Attach using 2" Long Screws. It is recommended to use 5x screws into each 2 and 3x screws into each 1.

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/30/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SIZE	DWG. NO.	REV
C	TE-22017		
SCALE: 1:4		SHEET 3 OF 3	

 **FIRST  
ROBOTICS  
COMPETITION**  **SOLIDWORKS**  
Modeling Solutions Partner

TITLE: **HUB - Basic Build -  
Fender Side Assembly**

SIZE DWG. NO. REV  
**C** TE-22017

4

3

2

1

4

3

2

1

D

D

C

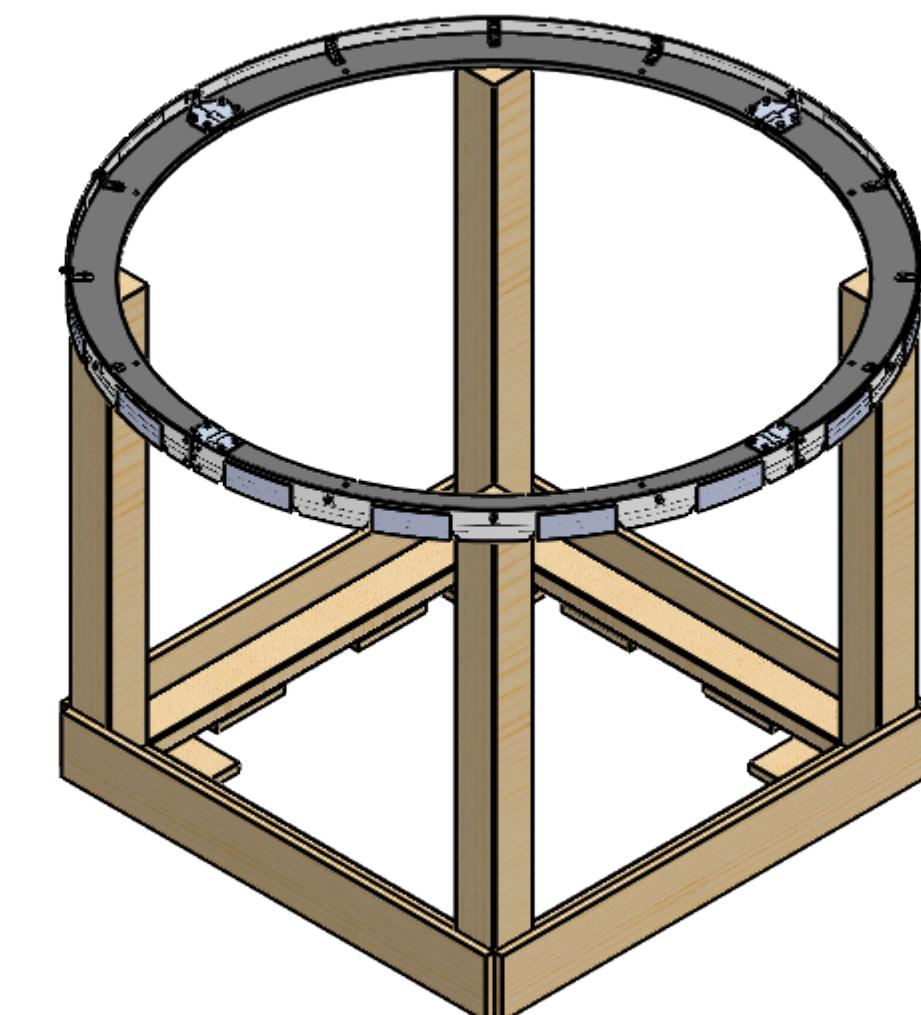
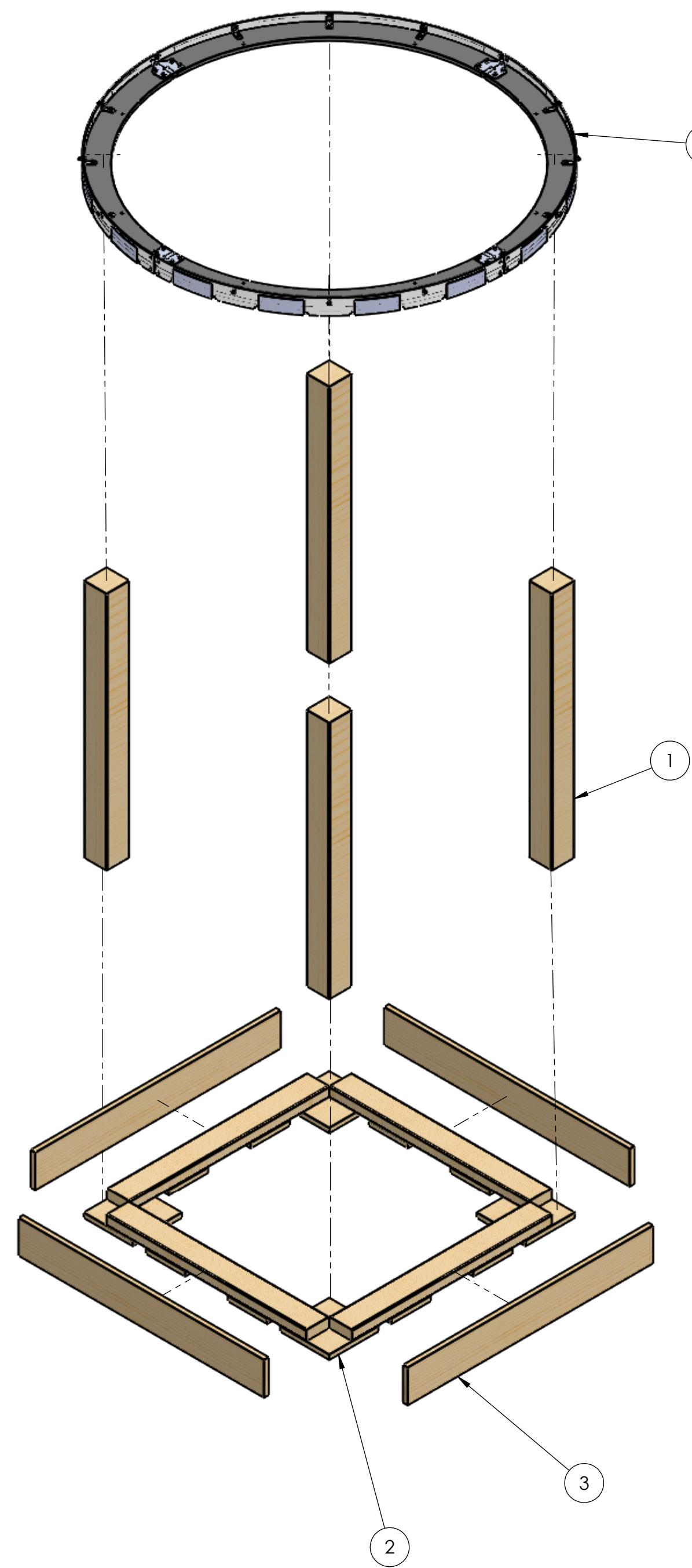
C

B

B

A

A



Note: Use Assembly TE-22030-AM if pairing with AndyMark's AM-4672 Assembly

Hardware Needed:  
 #8 x 1.25" Long Screw - Qty 12  
 #8 x 2" Long Screw - Qty 60

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TE-22036-AM	Hub - Simple Build - Upper Hub Goal 4x4 for AM Ring AM-4672	4
2	TE-22038	Hub - Simple Build - Upper Hub Goal Bottom Assembly	1
3	TE-22037	Hub - Simple Build - Upper Hub Goal Rectangle Connection Plate	4
4	AM-4672	AndyMark Produced - Upper Hub Vision Ring	1

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL  $\pm\frac{1}{16}$

ANGULAR: MACH  $\pm 1^\circ$

BEND  $\pm 1^\circ$

TWO PLACE DECIMAL  $\pm .13$

THREE PLACE DECIMAL  $\pm .125$

MATERIAL/FINISH:

DO NOT SCALE DRAWING

TEAM      NAME      DATE

DRAWN      KAMC      12/30/2021



SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
 Hub - Simple Build - Upper  
 Hub Goal Assembly for AM  
 Ring AM-4672

SIZE      DWG. NO.      REV

C      TE-22030-AM

SCALE: 1:12      SHEET 1 OF 4

4

3

2

1

4

3

2

1

D

D

C

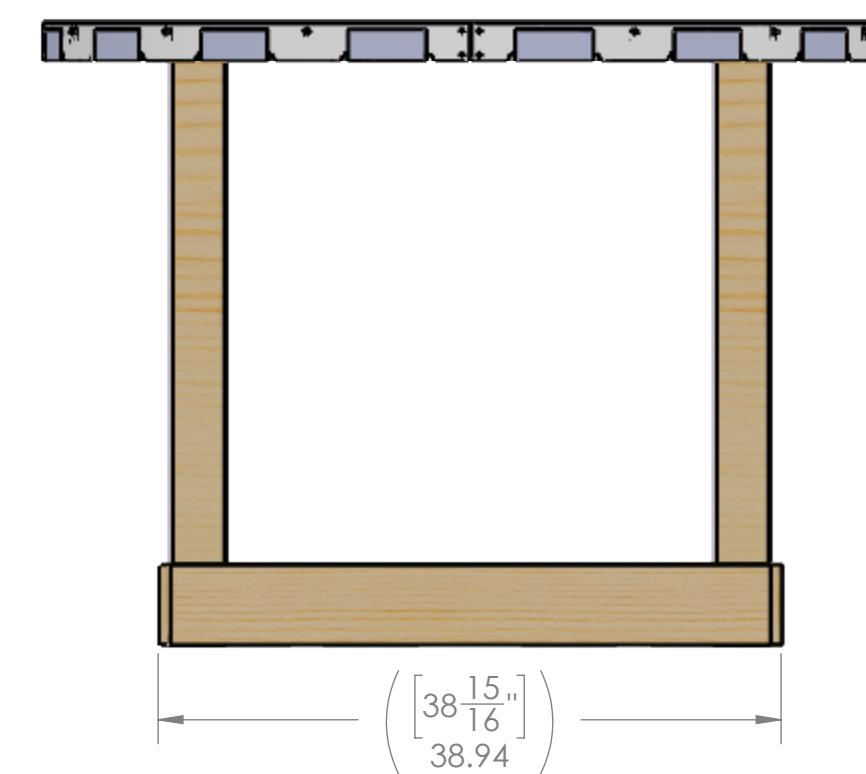
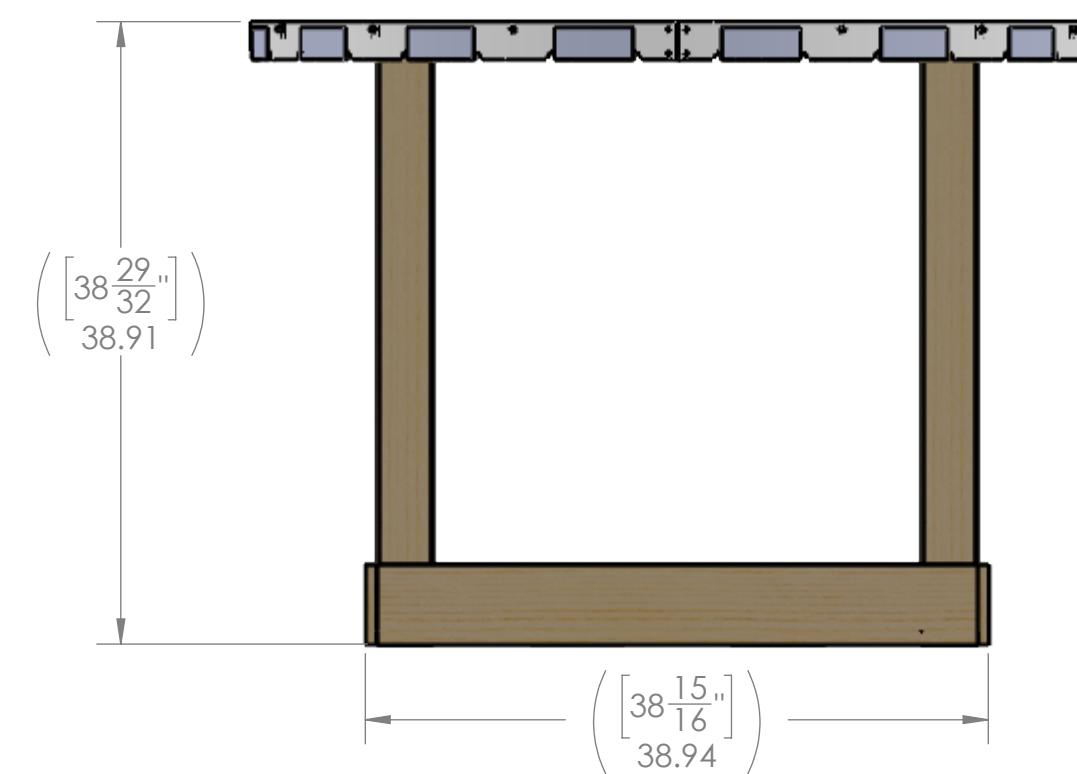
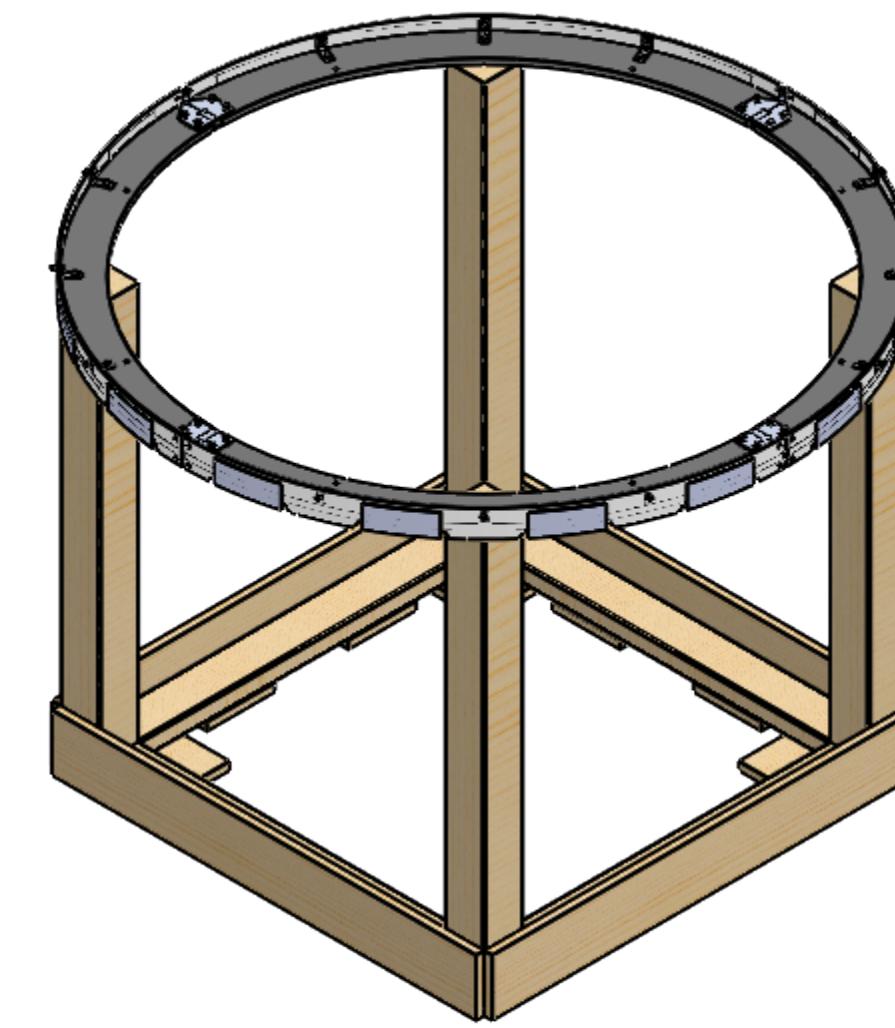
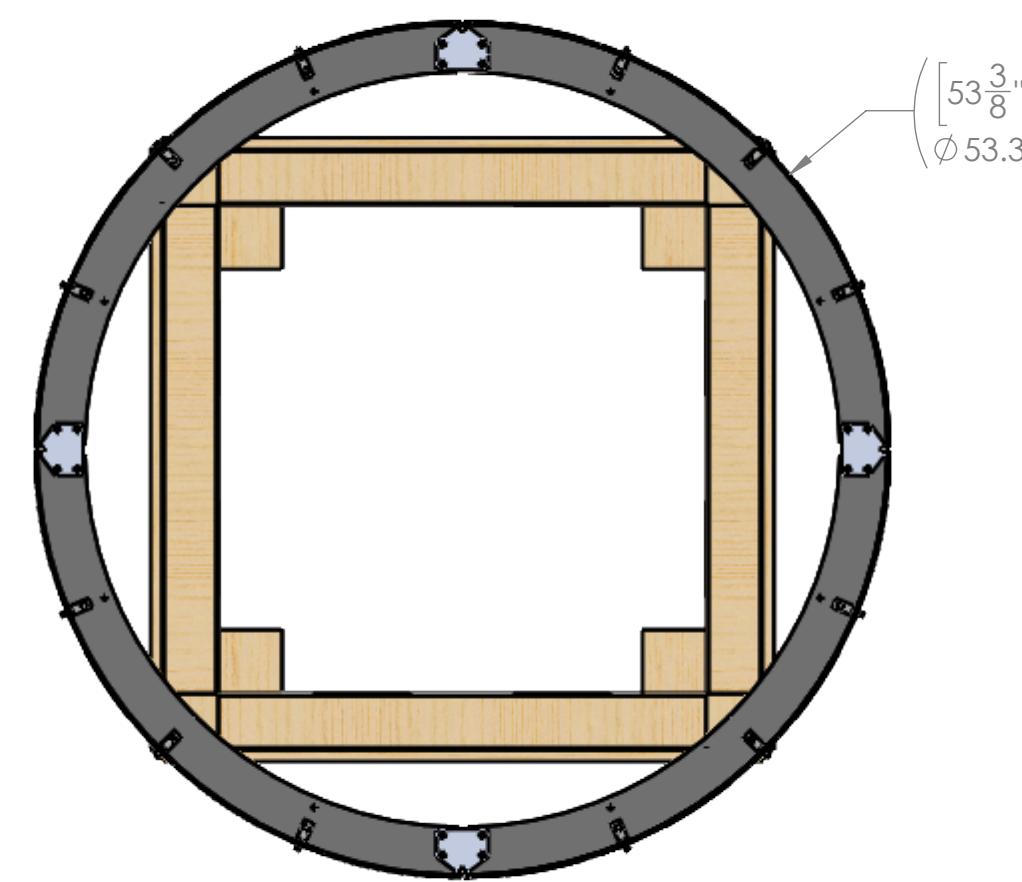
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$	DRAWN	KAMC	12/30/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
<b>MATERIAL/FINISH:</b>			
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

 **FIRST ROBOTICS COMPETITION**  SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
Hub - Simple Build - Upper  
Hub Goal Assembly for AM  
Ring AM-4672

SIZE DWG. NO. REV

**C** TE-22030-AM

SCALE: 1:12 SHEET 2 OF 4

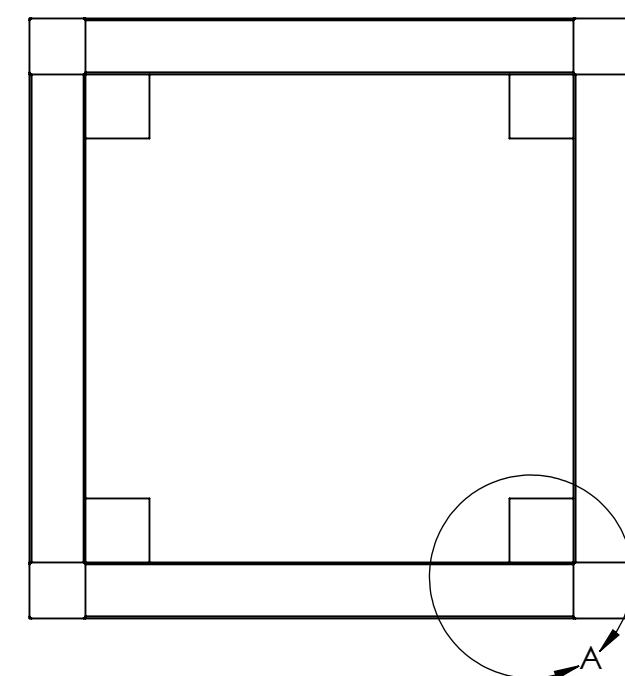
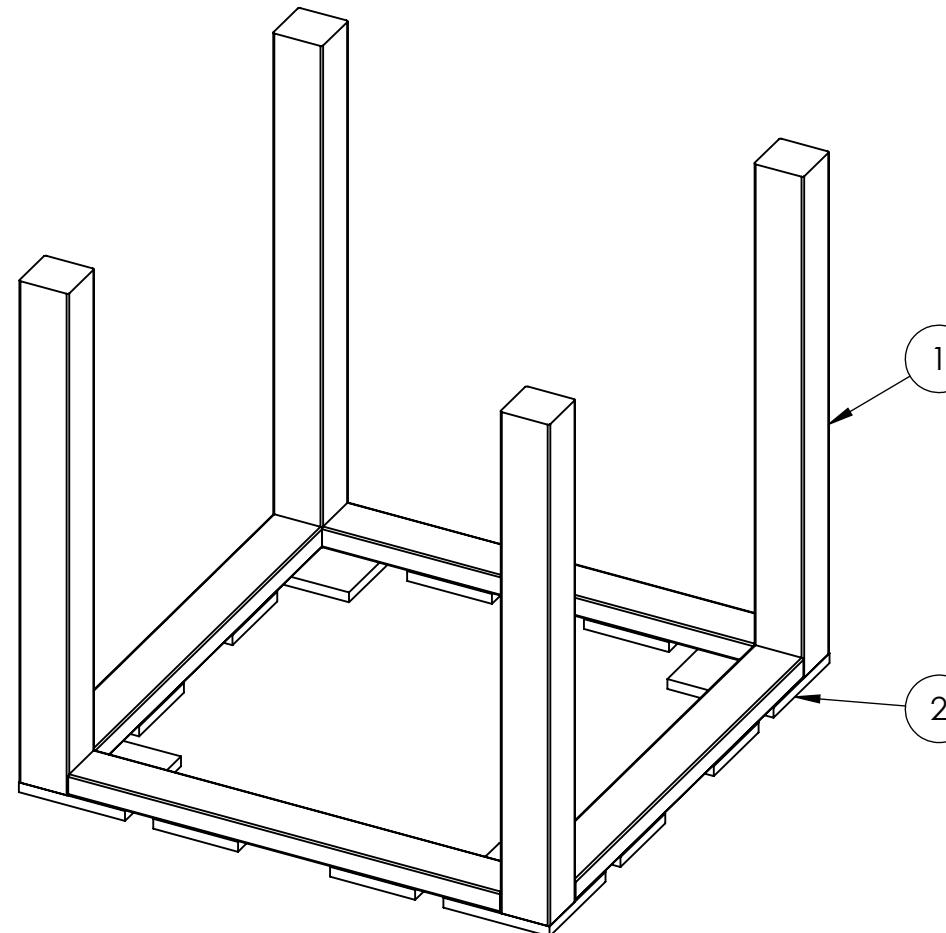
4

3

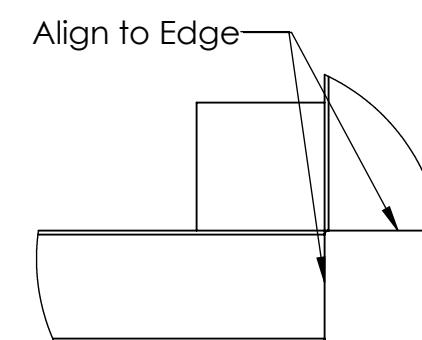
2

1

Step 1

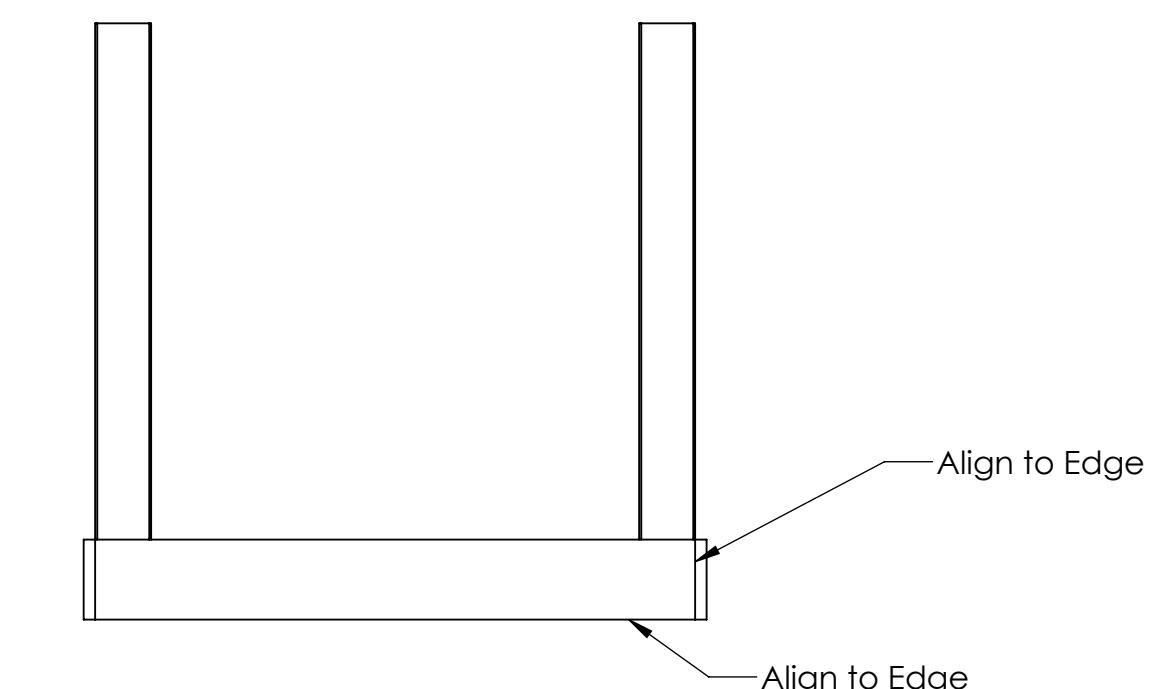
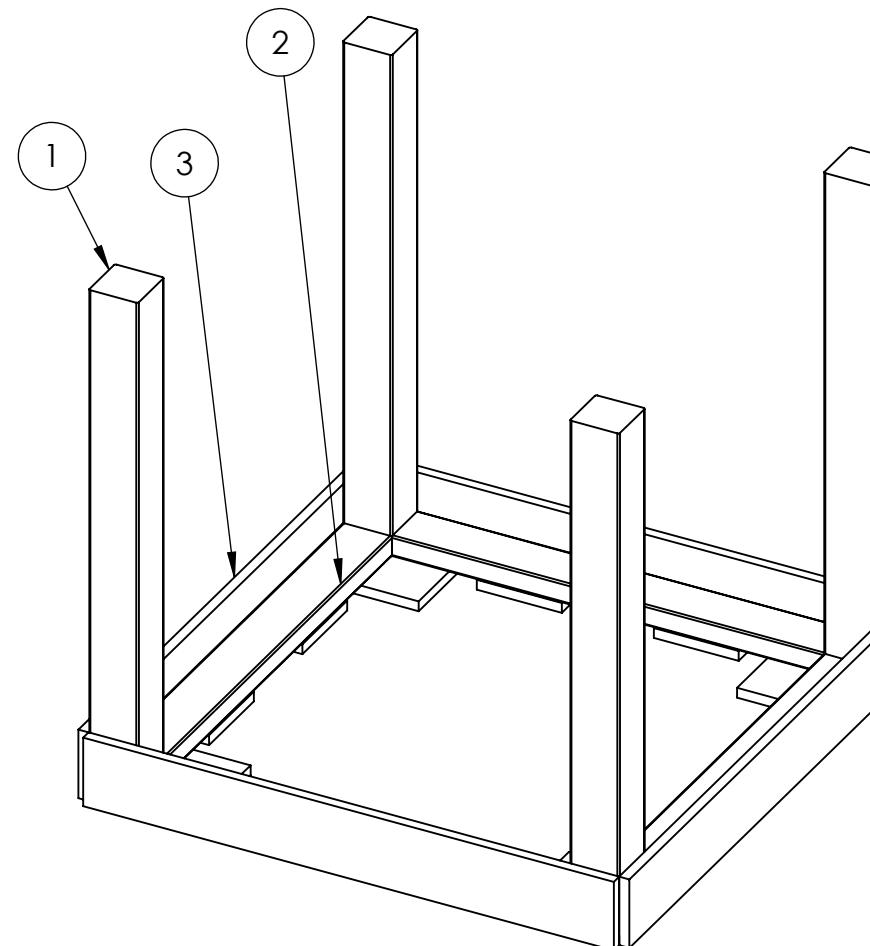


1. Align 4x (1) to (2), as shown.
2. Connect using 2" Long Screws. It is recommended to use 4x screws per (1).



4X  
DETAIL A  
SCALE 1 : 6

Step 2



1. Align 4x (3) to Step 1, as shown.
2. Attach (3) to (1) using 2" Long Screws. It is recommended to use x8 screws per (3), x4 into each (1).
3. Attach (3) to the 2"x4" Lumber of (2) using 1.25" Long Screws. It is recommended to use x3 screws per (3). Be careful to center the screw into the 2"x4" Lumber to avoid splitting the wood.

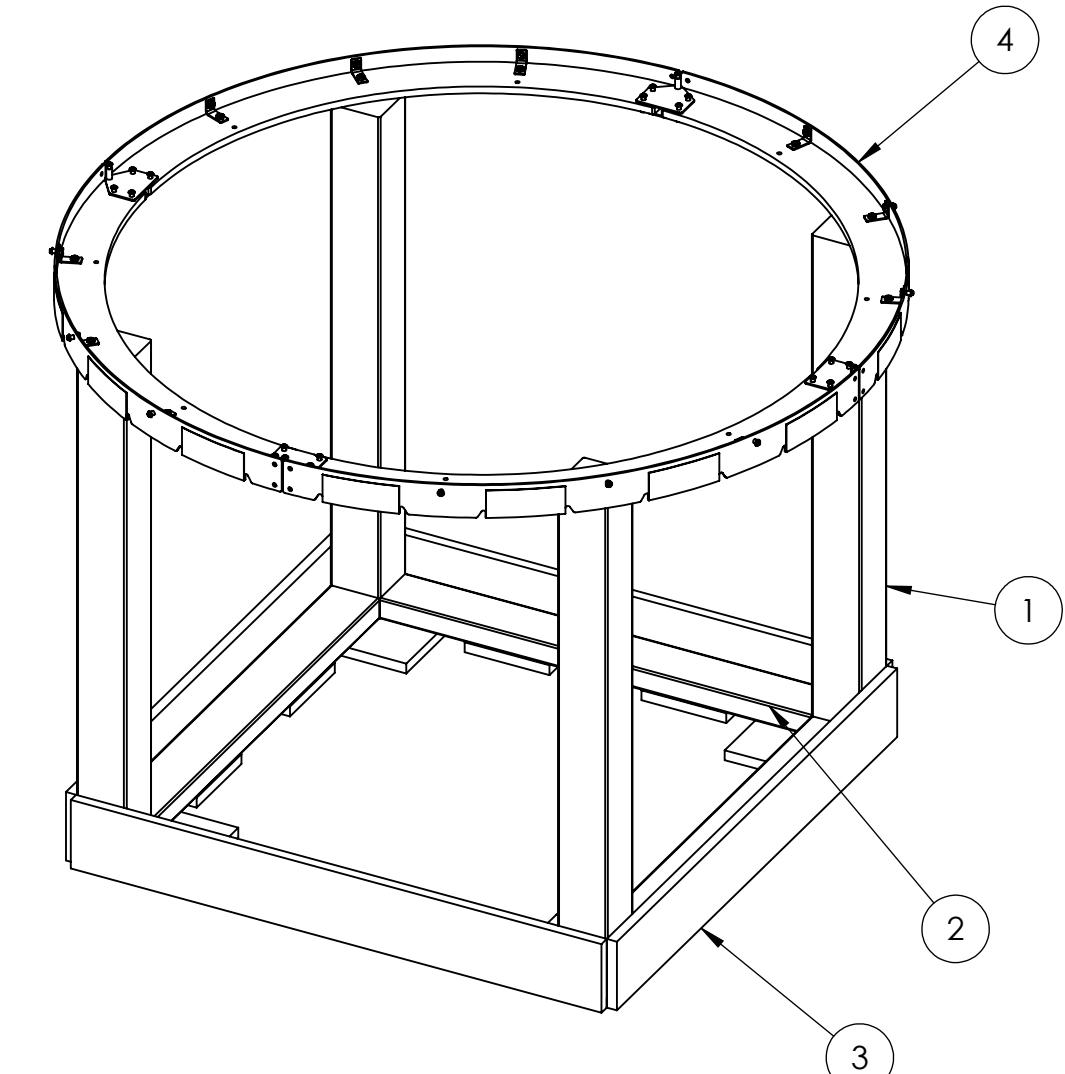
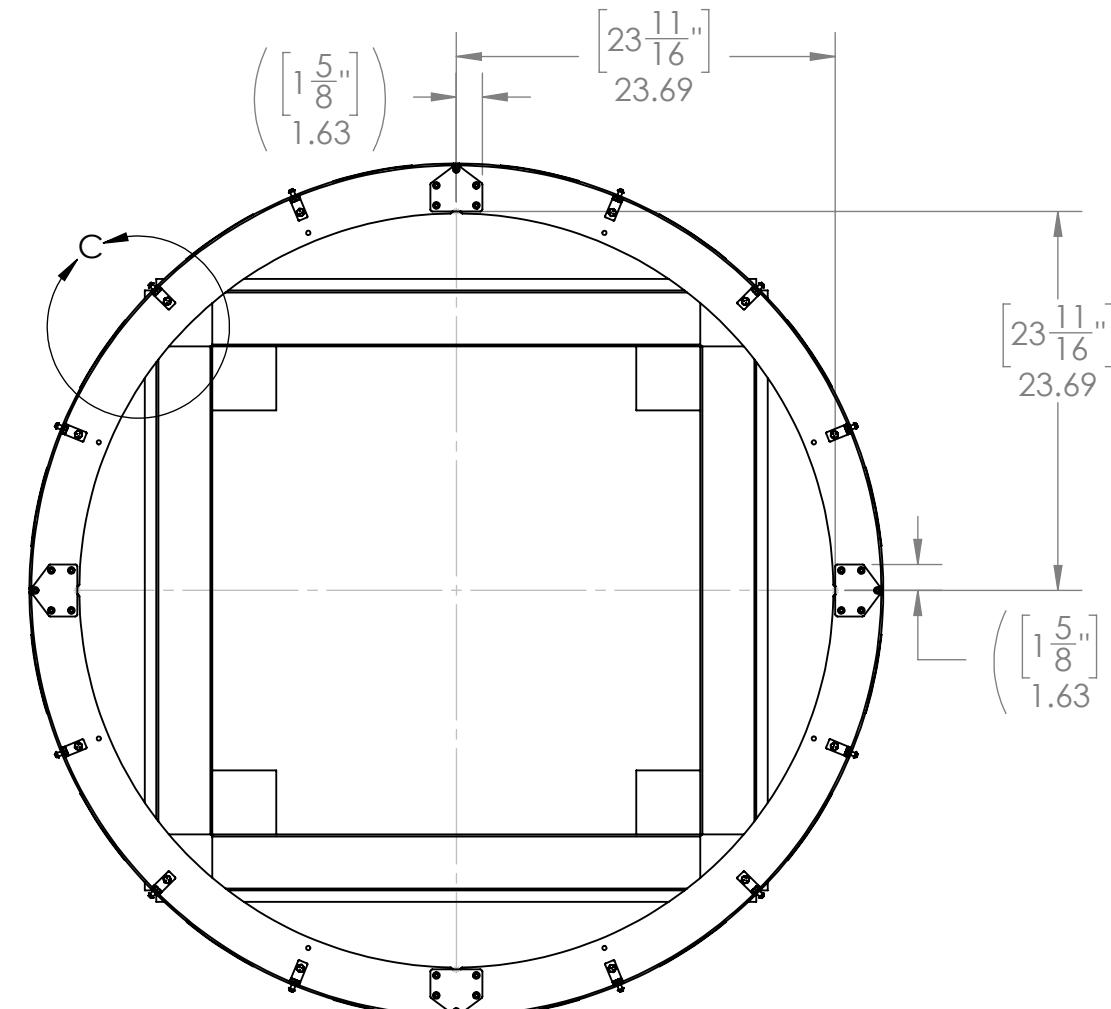
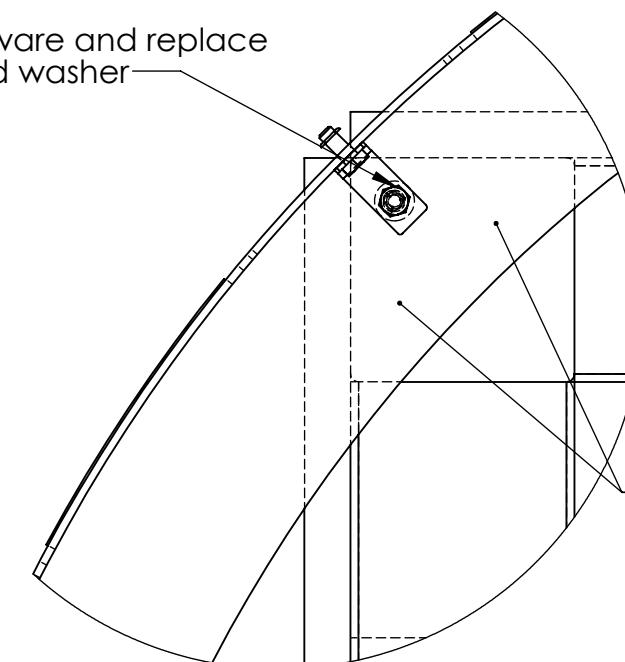
UNLESS OTHERWISE SPECIFIED:		TEAM	NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN	KAMC	12/30/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$				
PROPRIETARY AND CONFIDENTIAL				
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.				
MATERIAL/FINISH:				
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.				
DO NOT SCALE DRAWING				

SIZE	DWG. NO.	REV	FIRST	ROBOTICS	COMPETITION
					SOLIDWORKS Modeling Solutions Partner
TITLE: Hub - Simple Build - Upper Hub Goal Assembly for AM Ring AM-4672					
C	TE-22030-AM				
SCALE: 1:12					SHEET 3 OF 4

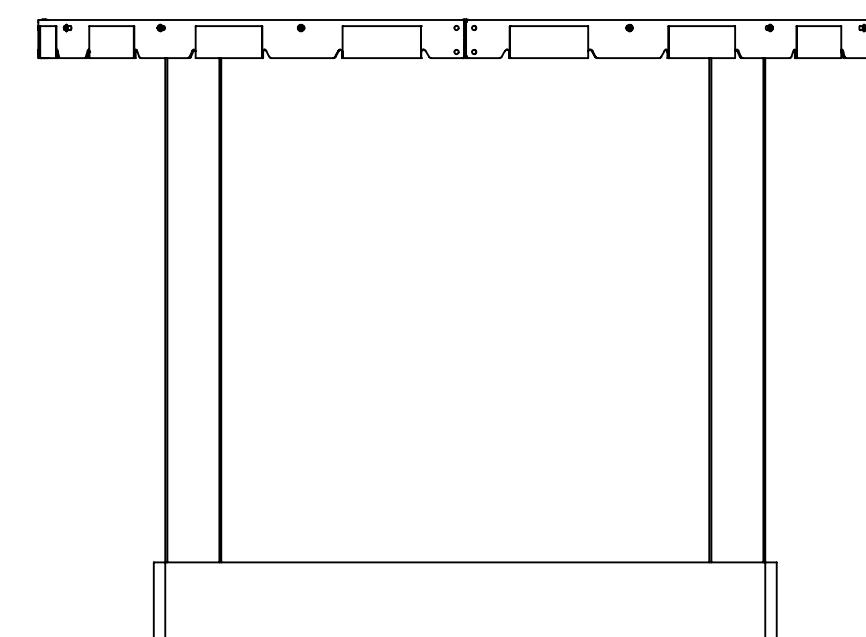
D

Step 3

Remove hardware and replace  
with screw and washer



4X  
DETAIL C  
SCALE 1 : 3  
Hidden Lines Shown



1. Remove center bolt stack from as shown in Detail C.
2. Align to Step 2, as shown.  
Note: Warping may be present on . If this is the case, evenly split the difference from the dimensions provided to center on assembly.
3. Connect using 2" Long Screws and 1/4" Washers. It is recommended to use 1x Washer (salvage from AM-4672) and 1x Screw to replace the removed bolt stack. It is recommended to use an additional 2x screws into the HDPE of into each . Note: drilling under-sized pilot holes into the HDPE may allow for easier assembly.

UNLESS OTHERWISE SPECIFIED:		TEAM	NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN	KAMC	12/30/2021
TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$				
TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$				
MATERIAL/FINISH:	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
COMMENTS:	REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING				

SOLIDWORKS  
Modeling Solutions Partner

**TITLE:** Hub - Simple Build - Upper Hub Goal Assembly for AM Ring AM-4672

**SIZE** DWG. NO. REV

**C** TE-22030-AM

**SCALE:** 1:12 **SHEET** 4 OF 4

4

3

2

1

D

D

C

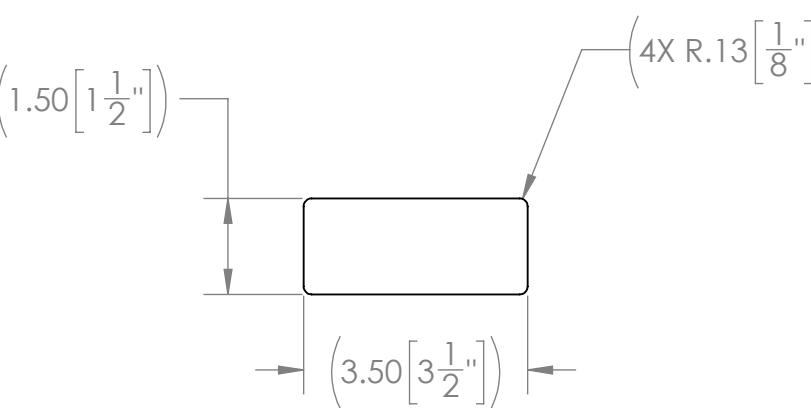
C

B

B

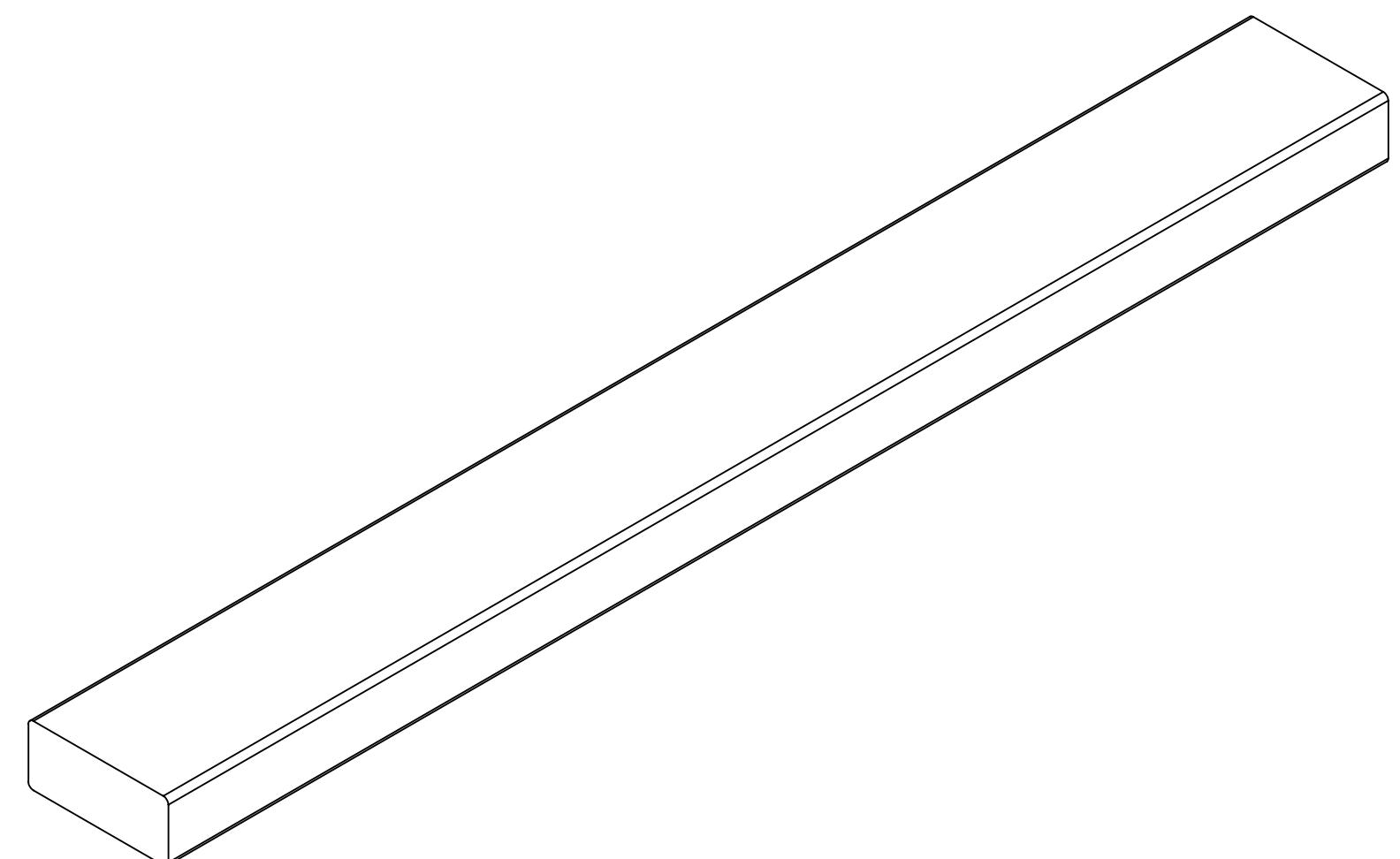
A

A



30.50 [30 1/2"]

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/29/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
2"x4" Lumber	C	TE-22035	
COMMENTS:		SCALE: 1:3	
REMOVE ALL BURRS AND SHARP EDGES.		SHEET 1 OF 1	
DO NOT SCALE DRAWING			



4

3

2

1

4

3

2

1

D

D

C

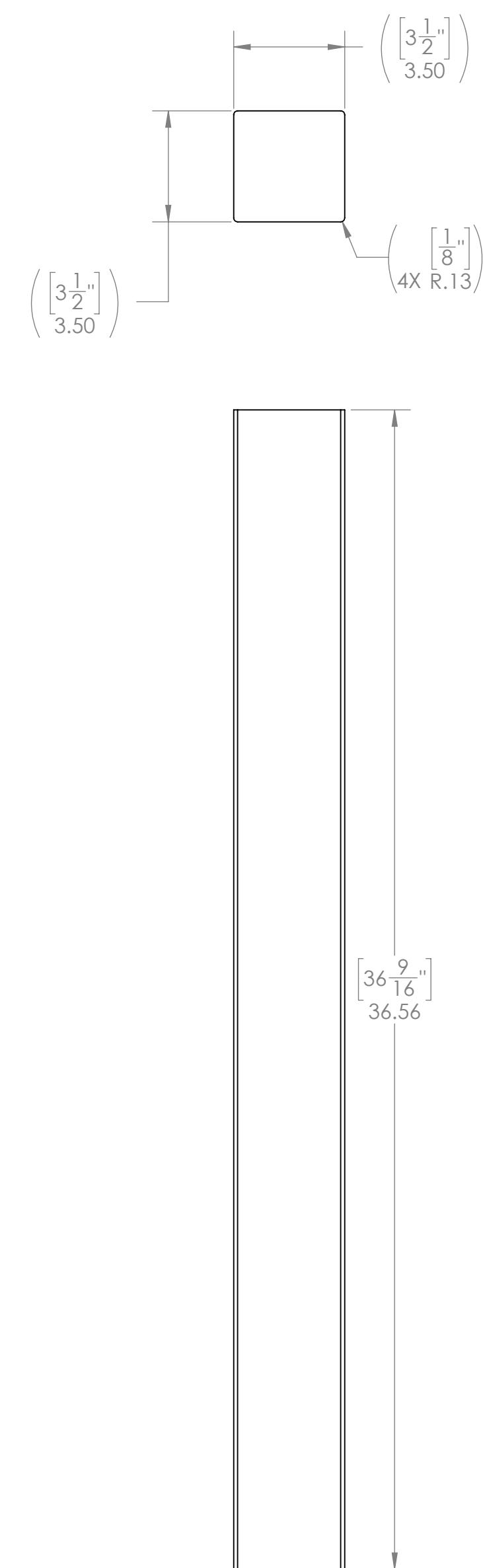
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	KAMC	12/29/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
4"x4" Lumber	C	TE-22036-AM	
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:4	SHEET 1 OF 1	

4

3

2

1

4

3

2

1

D

D

C

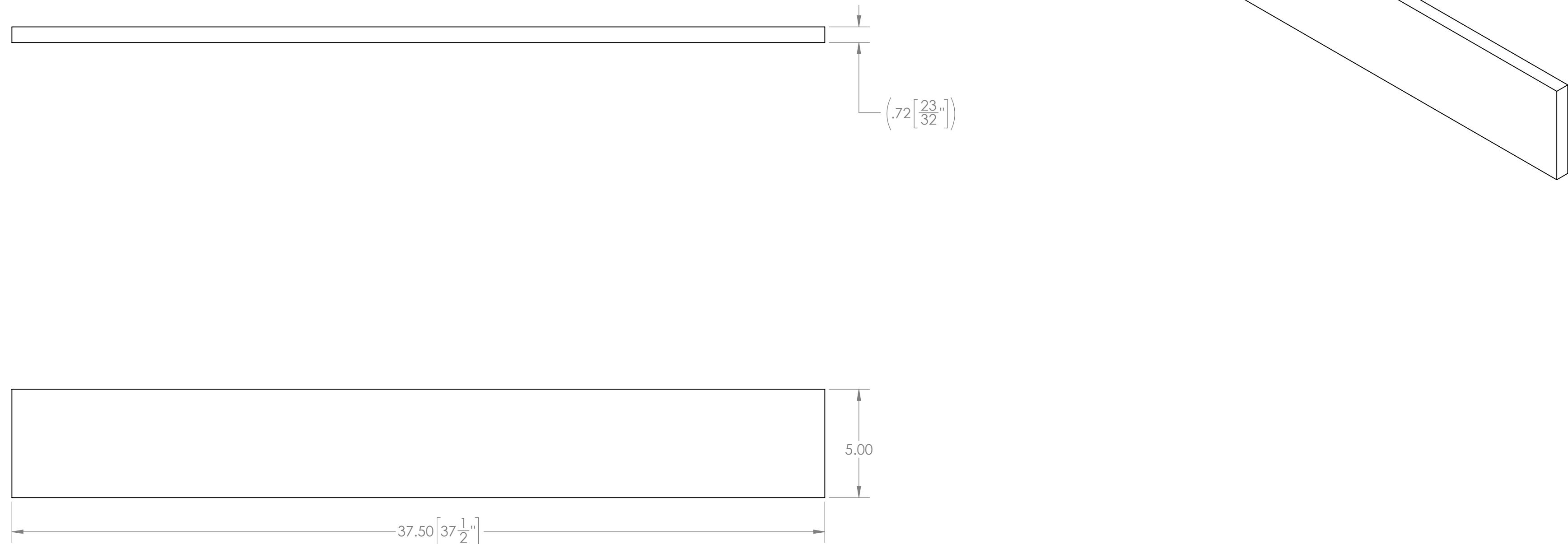
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$	DRAWN	KAMC	12/29/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 3/4" Plywood	SIZE	DWG. NO.	REV
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:4	SHEET 1 OF 1	

 **FIRST  
ROBOTICS  
COMPETITION**  SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
Hub - Simple Build - Upper  
Hub Goal Rectangle  
Connection Plate

SIZE DWG. NO. REV  
**C** TE-22037

4

3

2

1

4

3

2

1

D

D

C

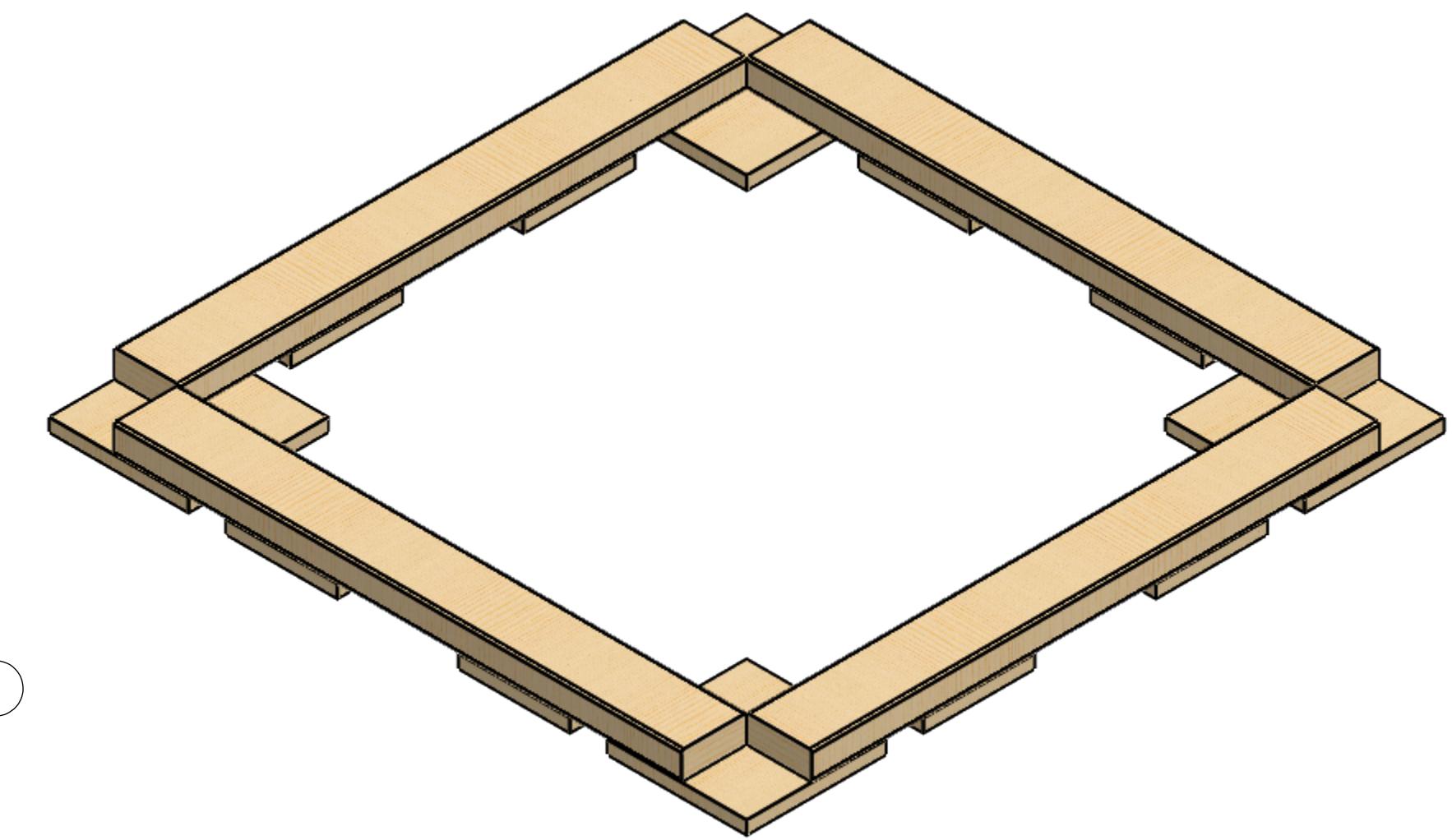
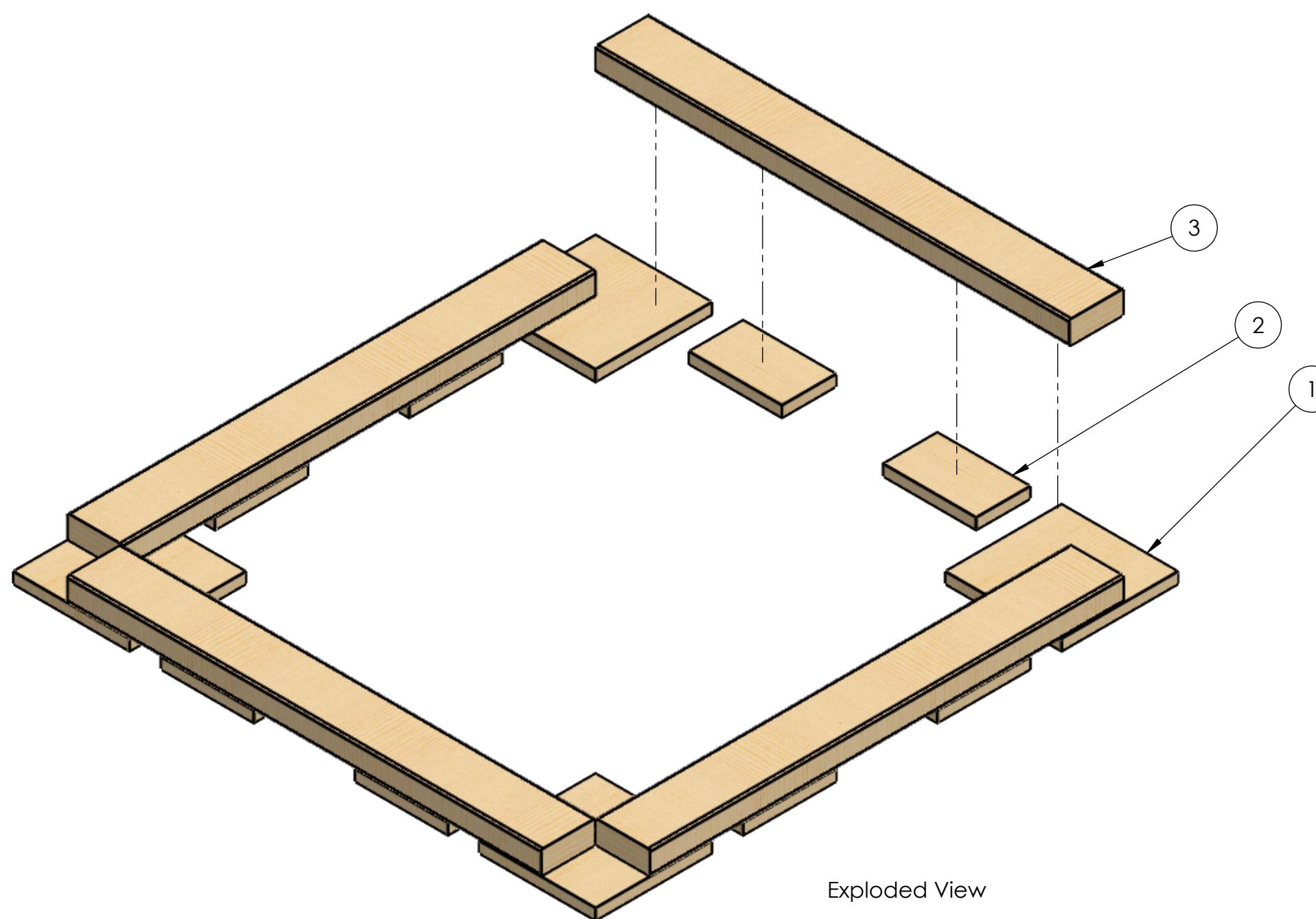
C

B

B

A

A



Hardware Needed:  
#8 x 2" Long Screw - Qty 58

ITEM NO.	PART NUMBER	DESCRIPTION	
1	TE-22005	Hub - Simple Build - Upper Hub Square Connection Plate	4
2	TE-22006	Hub - Simple Build - Upper Hub 2x4 Connection Plate	8
3	TE-22035	Hub - Simple Build - Upper Hub Goal 2x4	4

UNLESS OTHERWISE SPECIFIED:			TEAM	NAME	DATE	 <b>FIRST ROBOTICS COMPETITION</b> <small>SOLIDWORKS Modeling Solutions Partner</small>		
DRAWN	KAMC	12/30/2021						
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$						<b>PROPRIETARY AND CONFIDENTIAL</b> THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST IS PROHIBITED.		
MATERIAL/FINISH:						TITLE: <b>Hub - Simple Build - Upper Hub Goal Bottom Assembly</b>		
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.						SIZE	DWG. NO.	REV
						C	TE-22038	
DO NOT SCALE DRAWING						SCALE: 1:6	SHEET 1 OF 3	

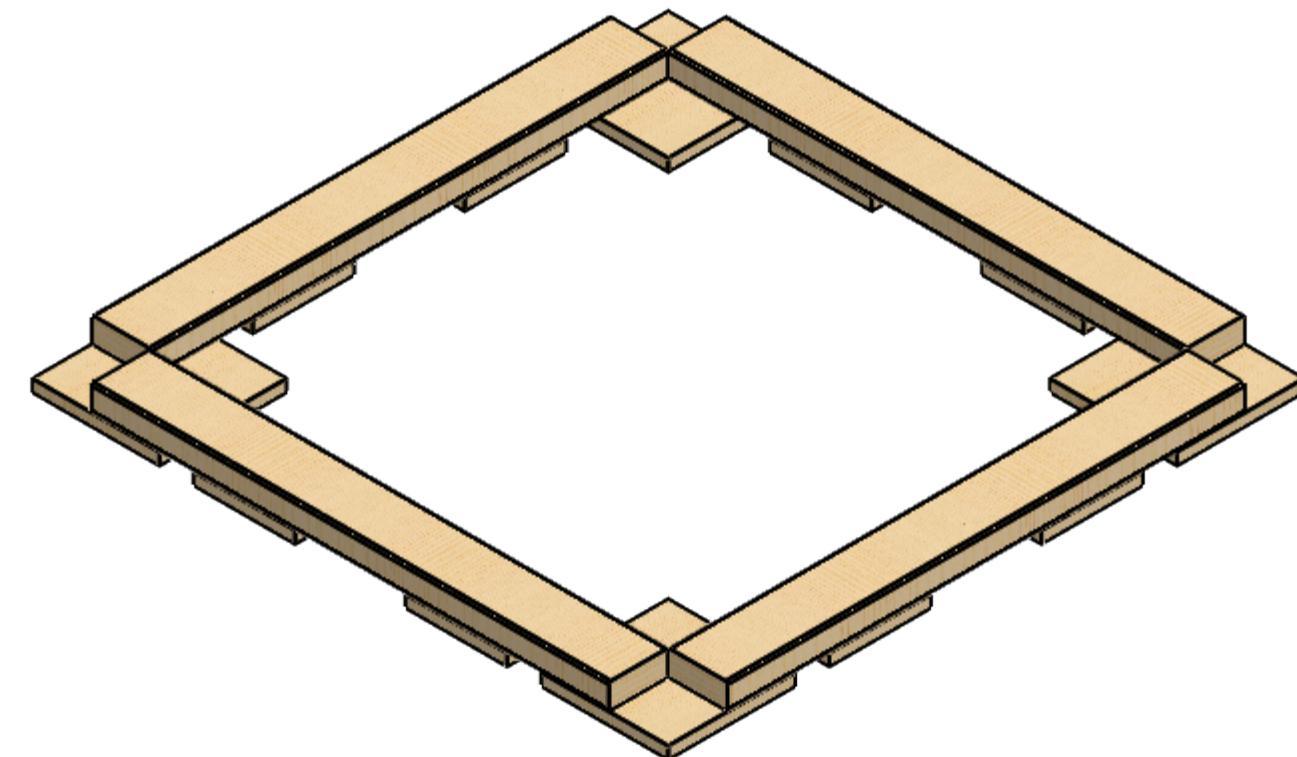
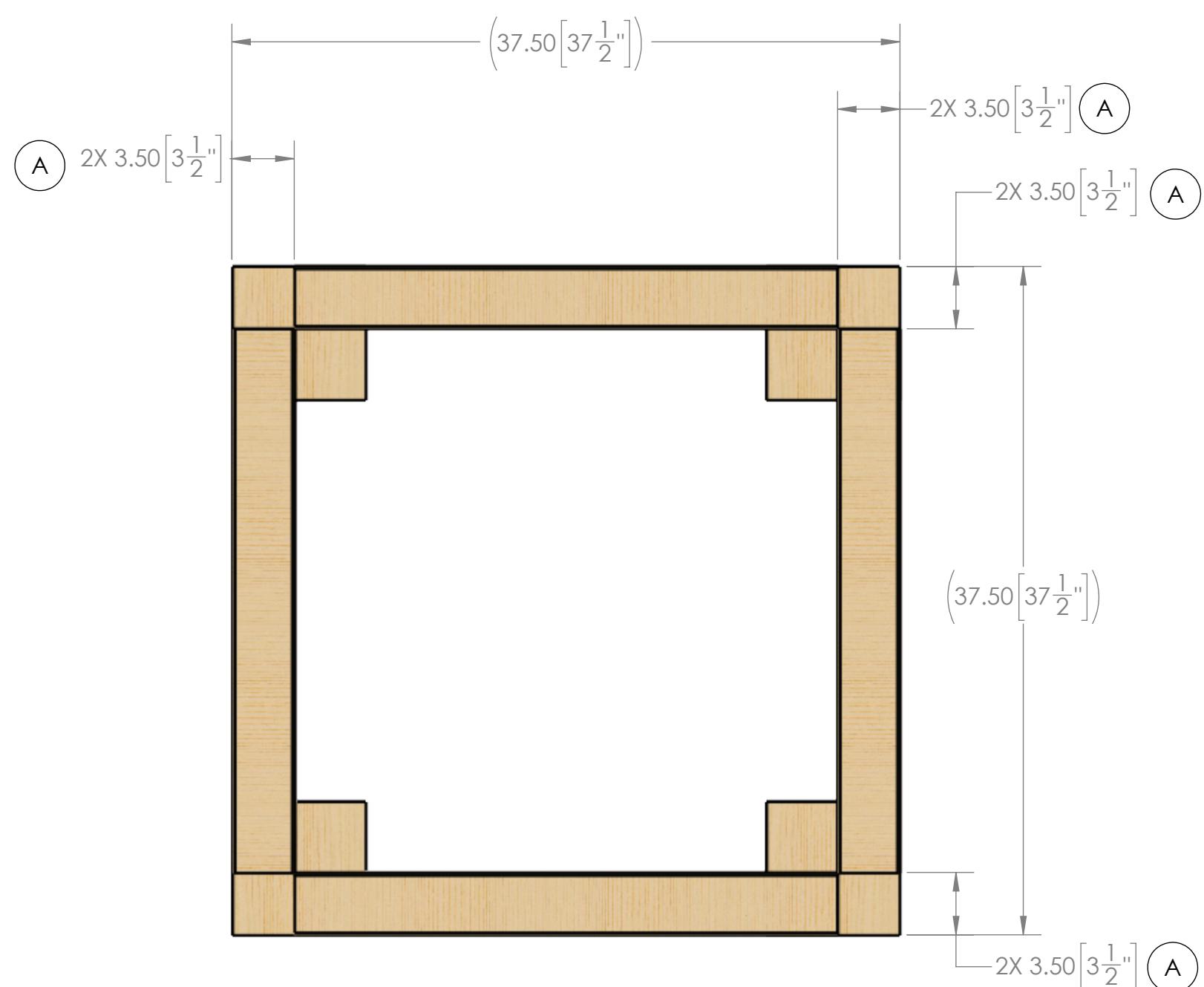
4

3

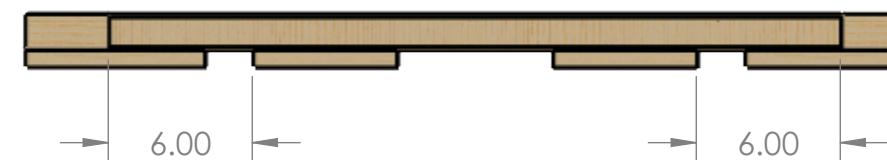
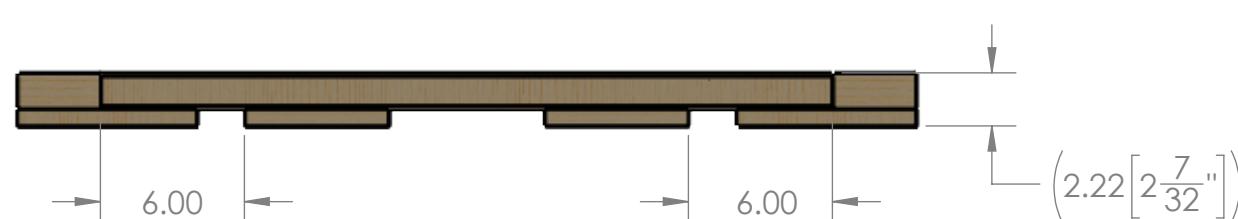
2

1

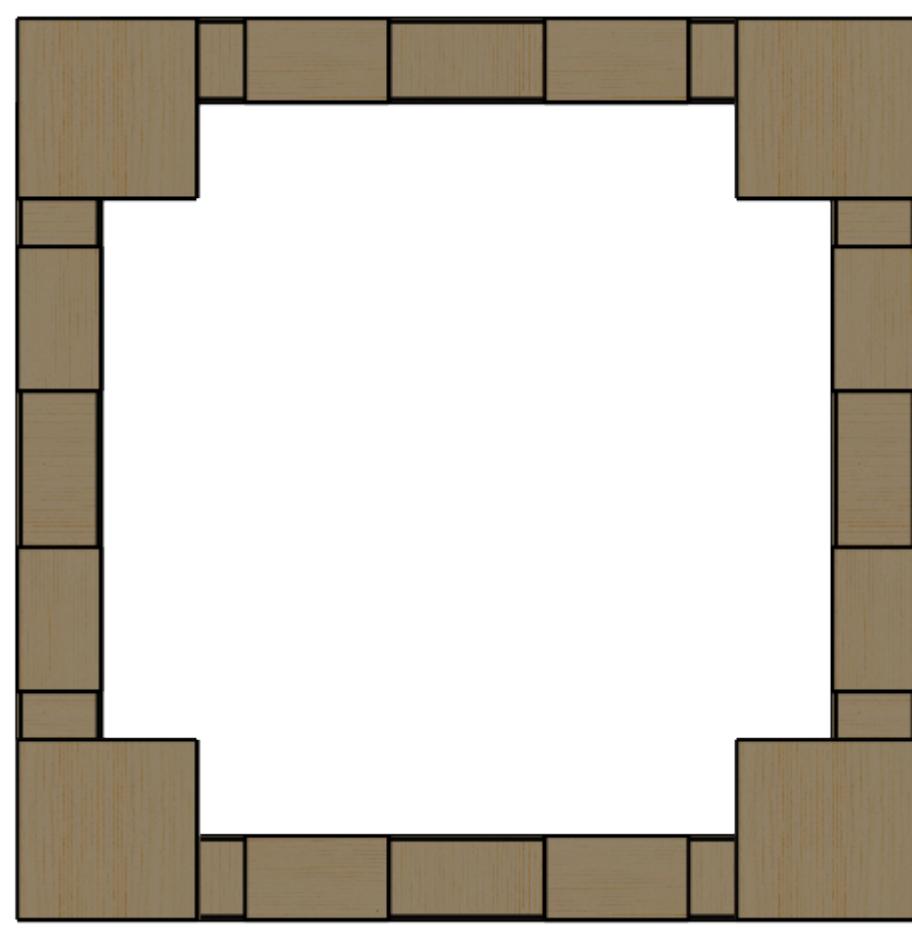
D



C



B

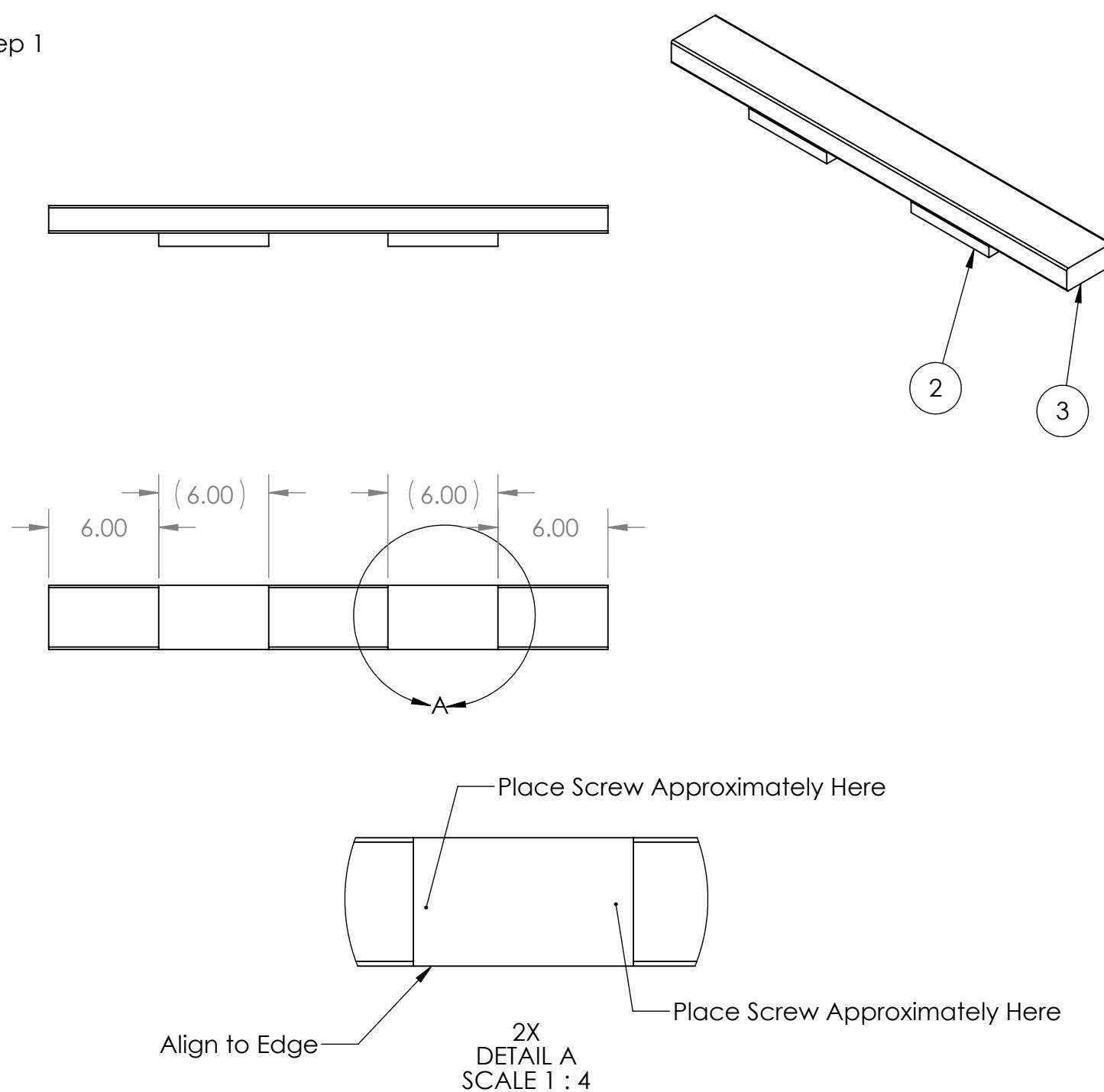


A

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/30/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

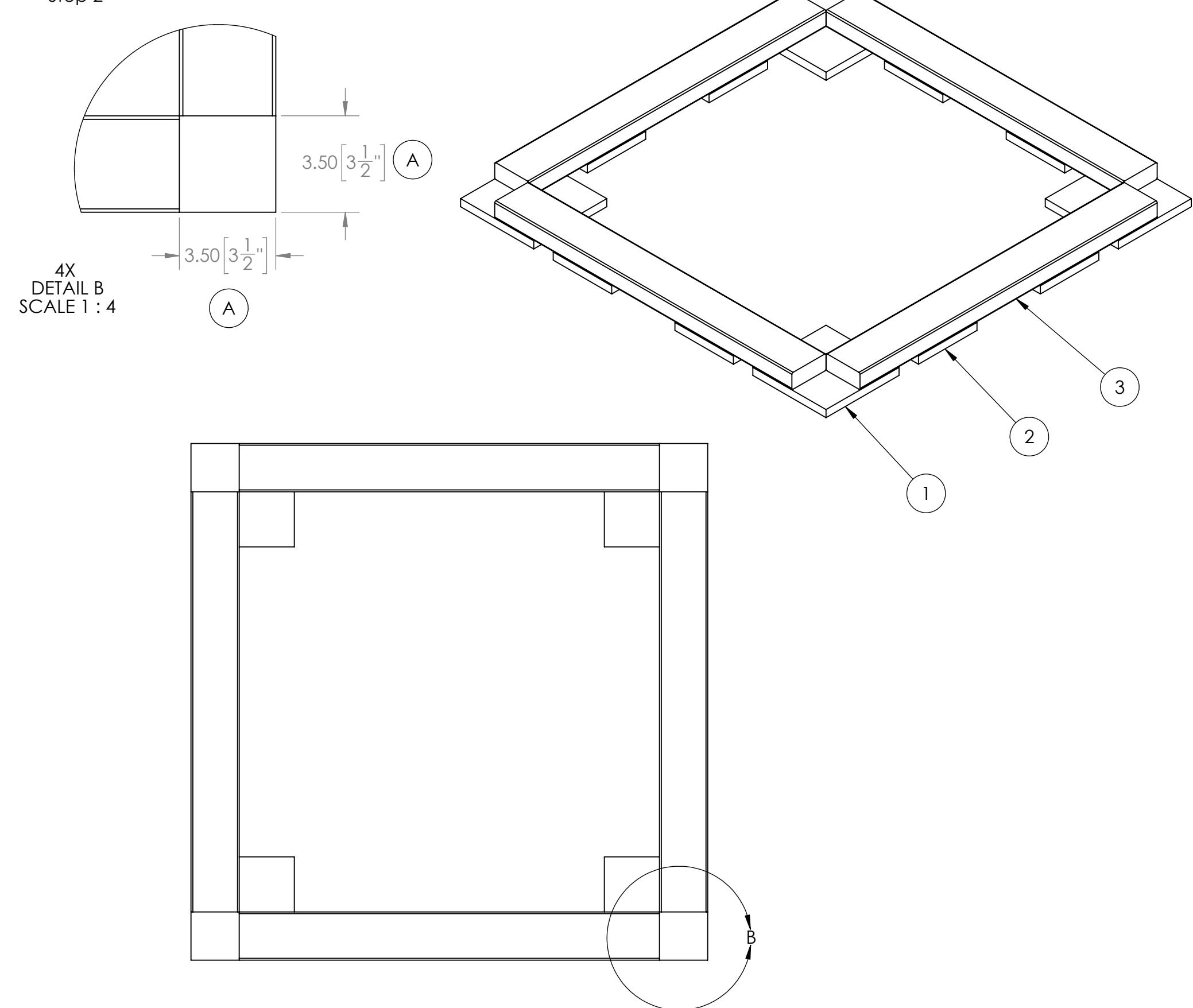
FIRST ROBOTICS COMPETITION	SOLIDWORKS Modeling Solutions Partner
TITLE: Hub - Simple Build - Upper Hub Goal Bottom Assembly	
SIZE	DWG. NO.
C	TE-22038
REV	
SCALE: 1:8	SHEET 2 OF 3

Step 1



1. Align 2x (2) on (3), as shown.
2. Connect using 2" long screws. It is recommended to use 2x screws per (2) and locate them as shown above. Keep center of (2) clear of screws.
3. Repeat until you have a total of 4x sub-assemblies.

Step 2



1. Align 4x (1) to the 4x Step 1 assemblies, as shown.

Dimensions with (A) indicate spacing for 4"x4" lumber from TE-22036 (or TE-22036-AM) if you are connecting to AndyMark's Upper Hub Vision Ring AM-4672. It is recommended to measure the cross section of TE-22036 (or TE-22036-AM) and modify these dimensions as needed.

2. Connect using 2" long screws. It is recommended to use 8x screws per (3), 4x into each end.

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
	DRAWN	KAMC	12/30/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SIZE	DWG. NO.	REV
	C	TE-22038	
	SCALE: 1:8	SHEET 3 OF 3	

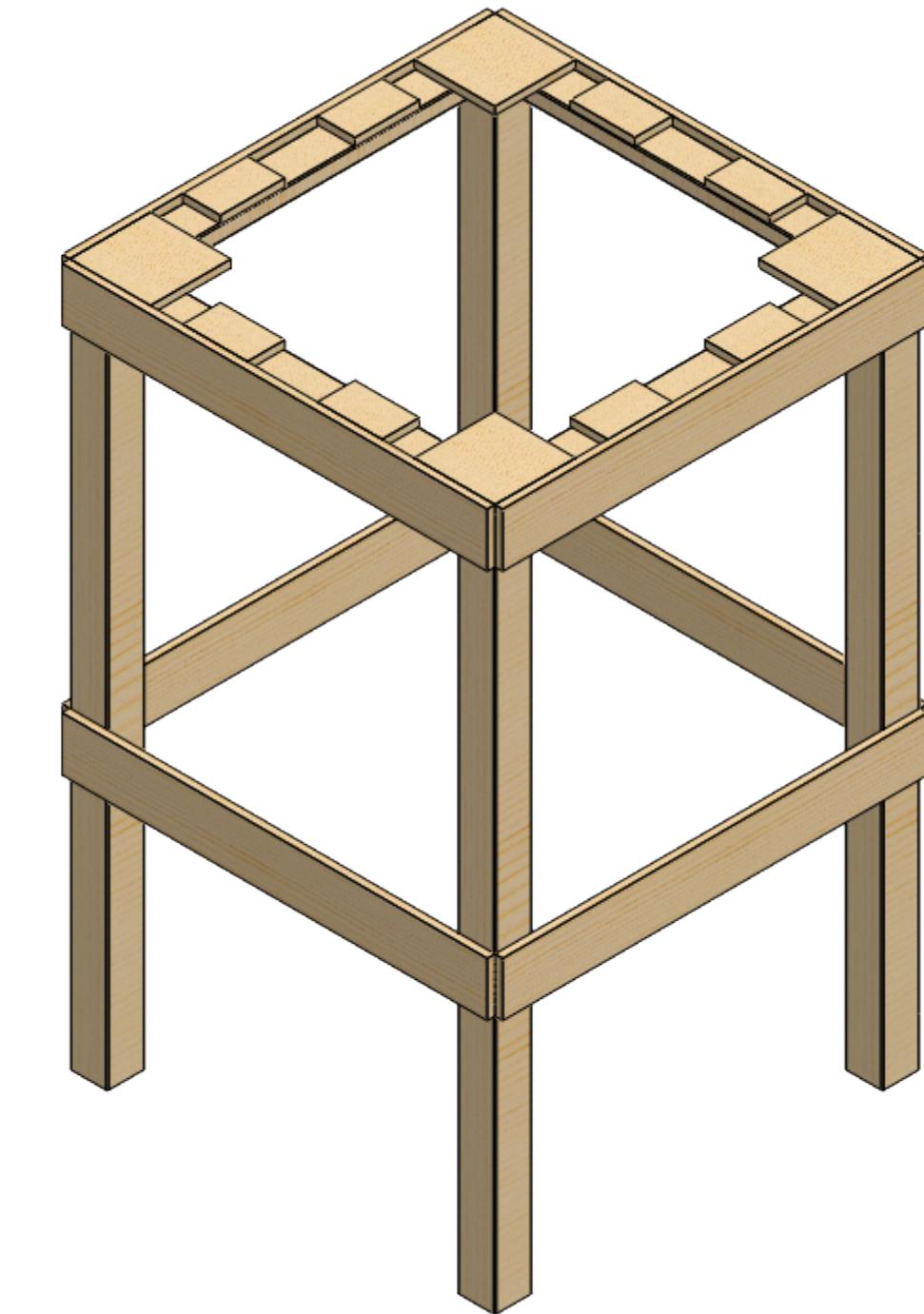
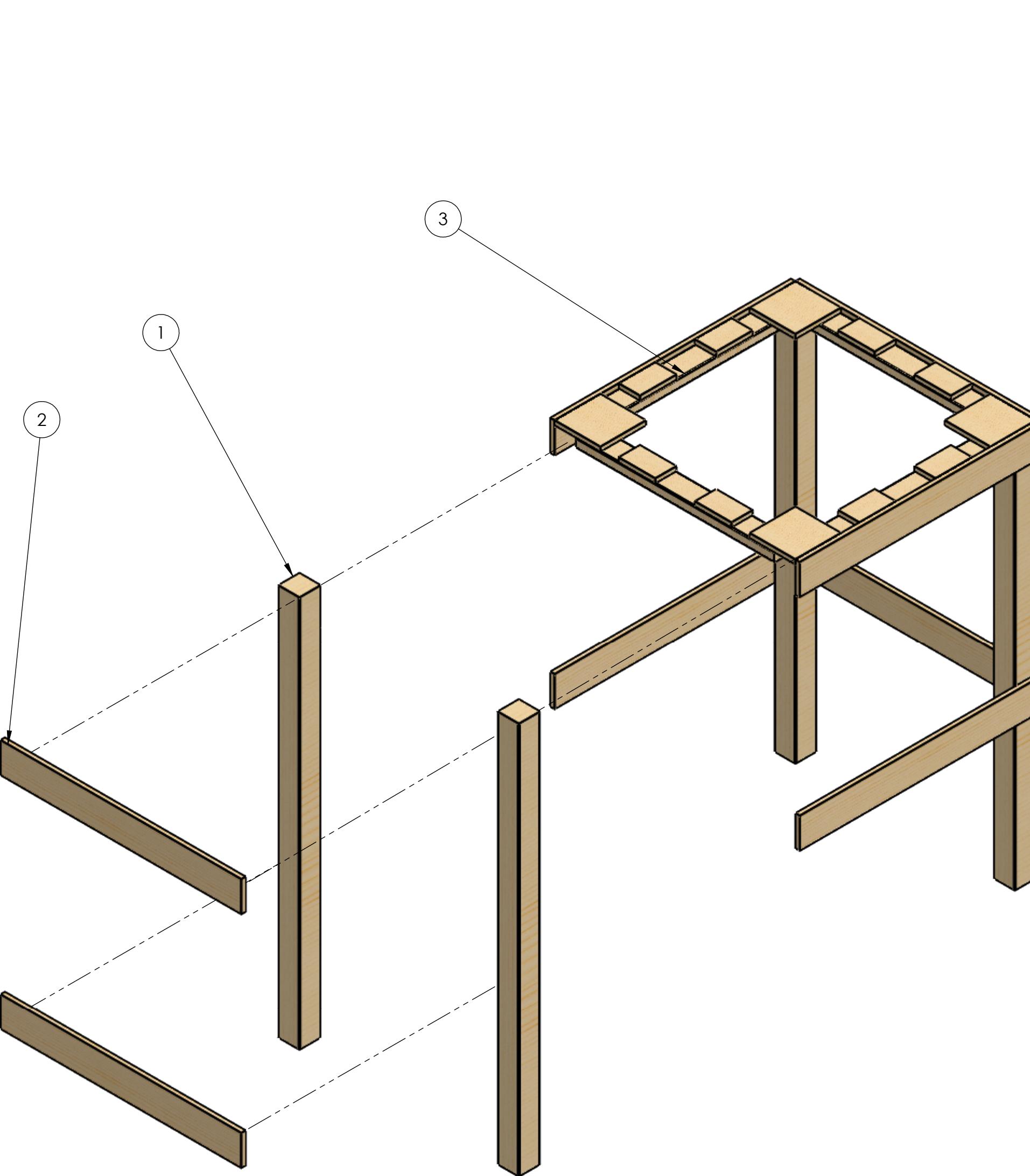
 **FIRST  
ROBOTICS  
COMPETITION**  **SOLIDWORKS**  
Modeling Solutions Partner

TITLE:  
**Hub - Simple Build -  
Upper Hub Goal  
Bottom Assembly**

SIZE DWG. NO. REV

**C** TE-22038

SCALE: 1:8 SHEET 3 OF 3



Hardware Needed:  
 #8 x 1.25" Long Screw - Qty 12  
 #8 x 2" Long Screw - Qty 80

ITEM NO.	PART NUMBER	DESCRIPTION	
1	TE-22042	Hub - Simple Build - Upper Hub Base 4x4	4
2	TE-22043	Hub - Simple Build - Upper Hub Base Rectangle Connection Plate	8
3	TE-22044	Hub - Simple Build - Upper Hub Base Top Assembly	1

UNLESS OTHERWISE SPECIFIED:			TEAM	NAME	DATE	 FIRST ROBOTICS COMPETITION		
			DRAWN	KAMC	12/30/2021	 SOLIDWORKS Modeling Solutions Partner		
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$								
PROPRIETARY AND CONFIDENTIAL THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST IS PROHIBITED.								
MATERIAL/FINISH:								
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.								
DO NOT SCALE DRAWING								
SIZE	DWG. NO.	REV	TITLE: Hub - Simple Build - Upper Hub Base Assembly					
C	TE-22040							
SCALE: 1:12				SHEET 1 OF 4				

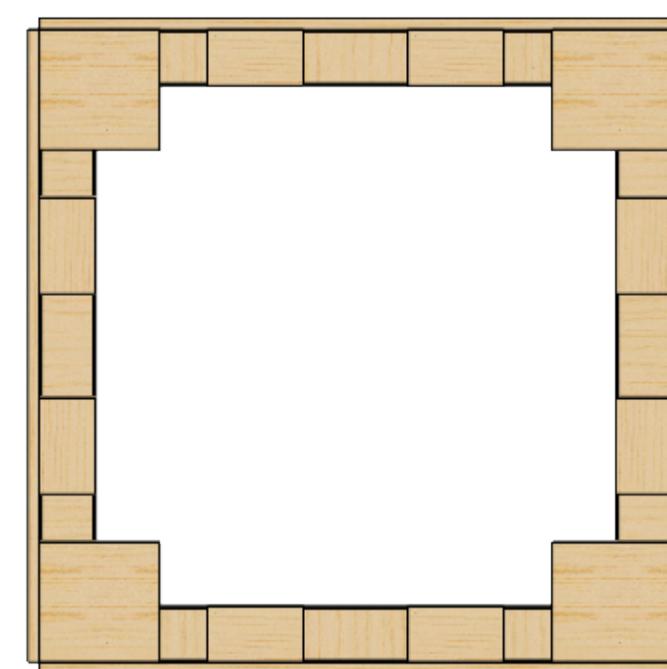
4

3

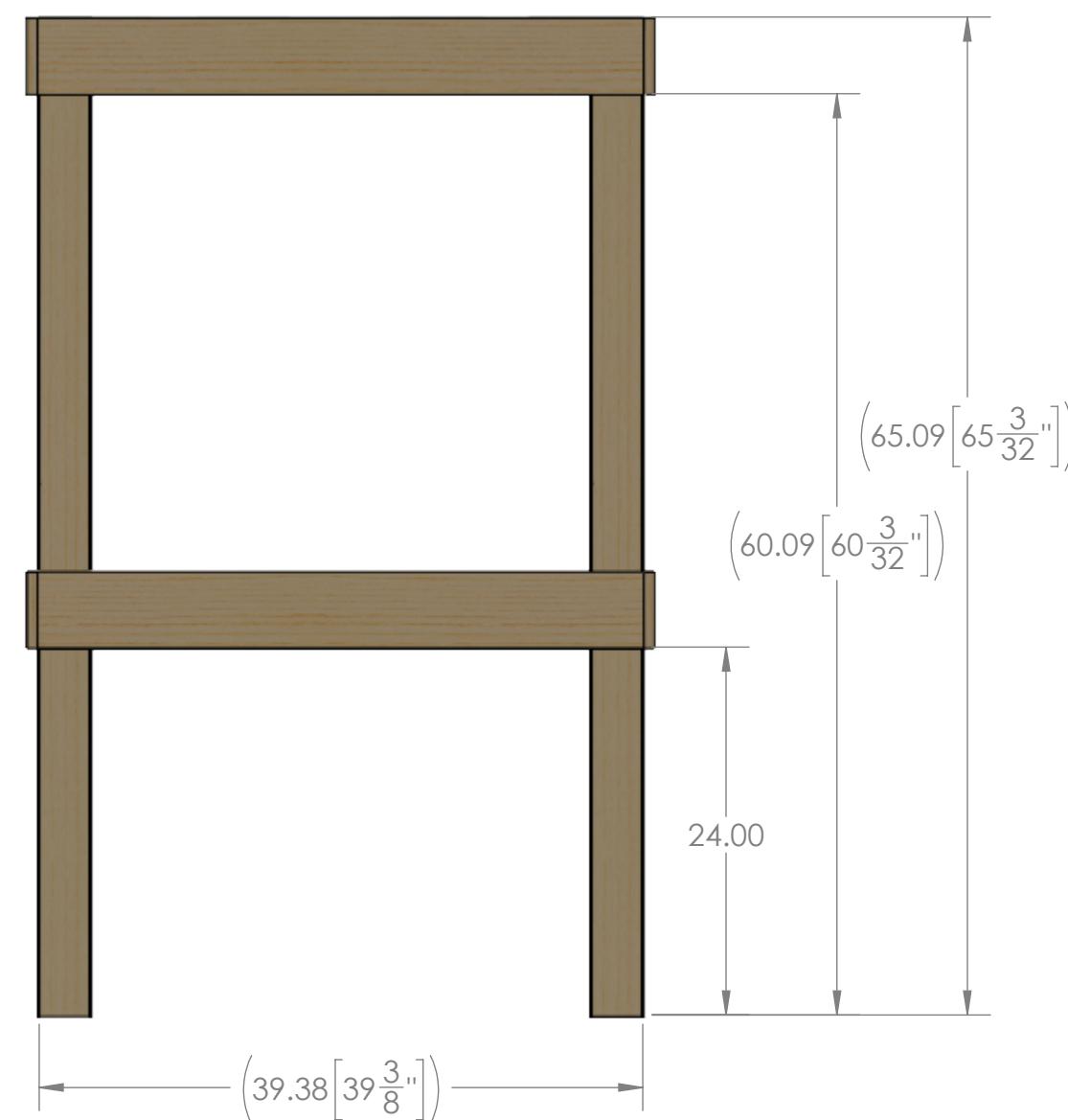
2

1

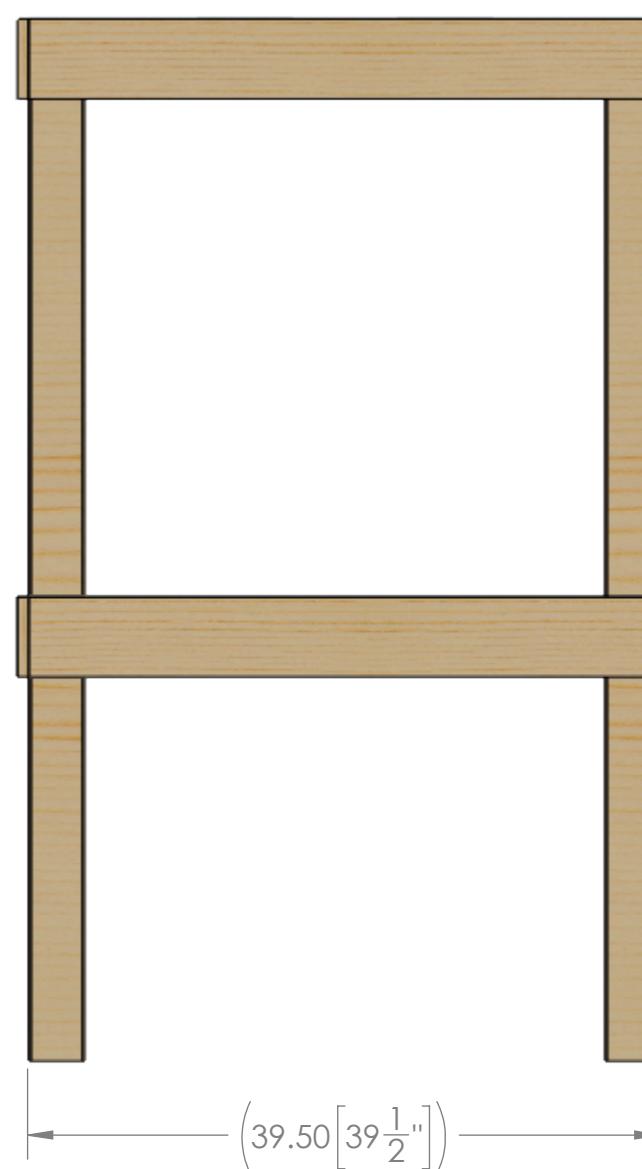
D



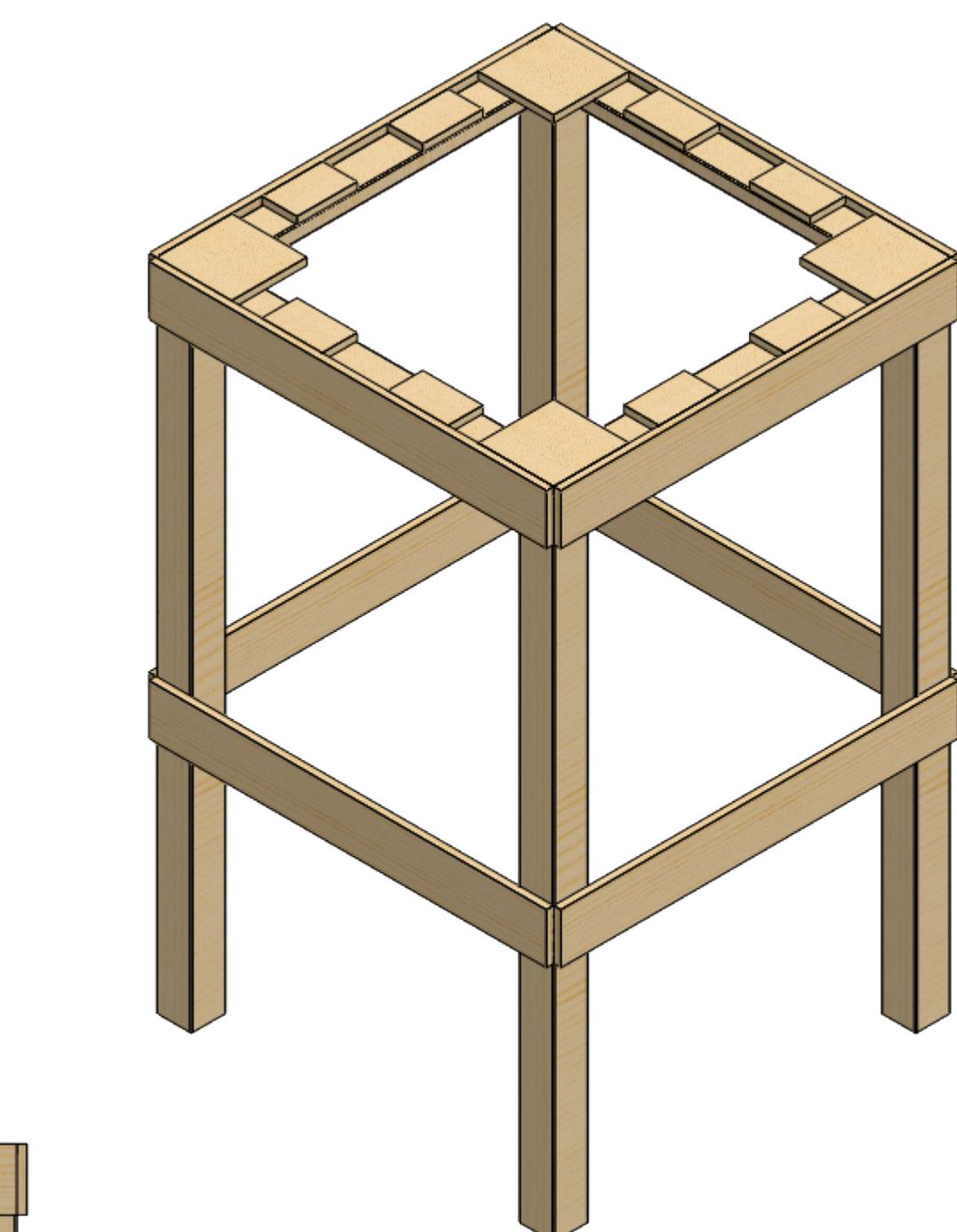
C



B



A



4

3

2

1

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/30/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
<b>MATERIAL/FINISH:</b>			
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

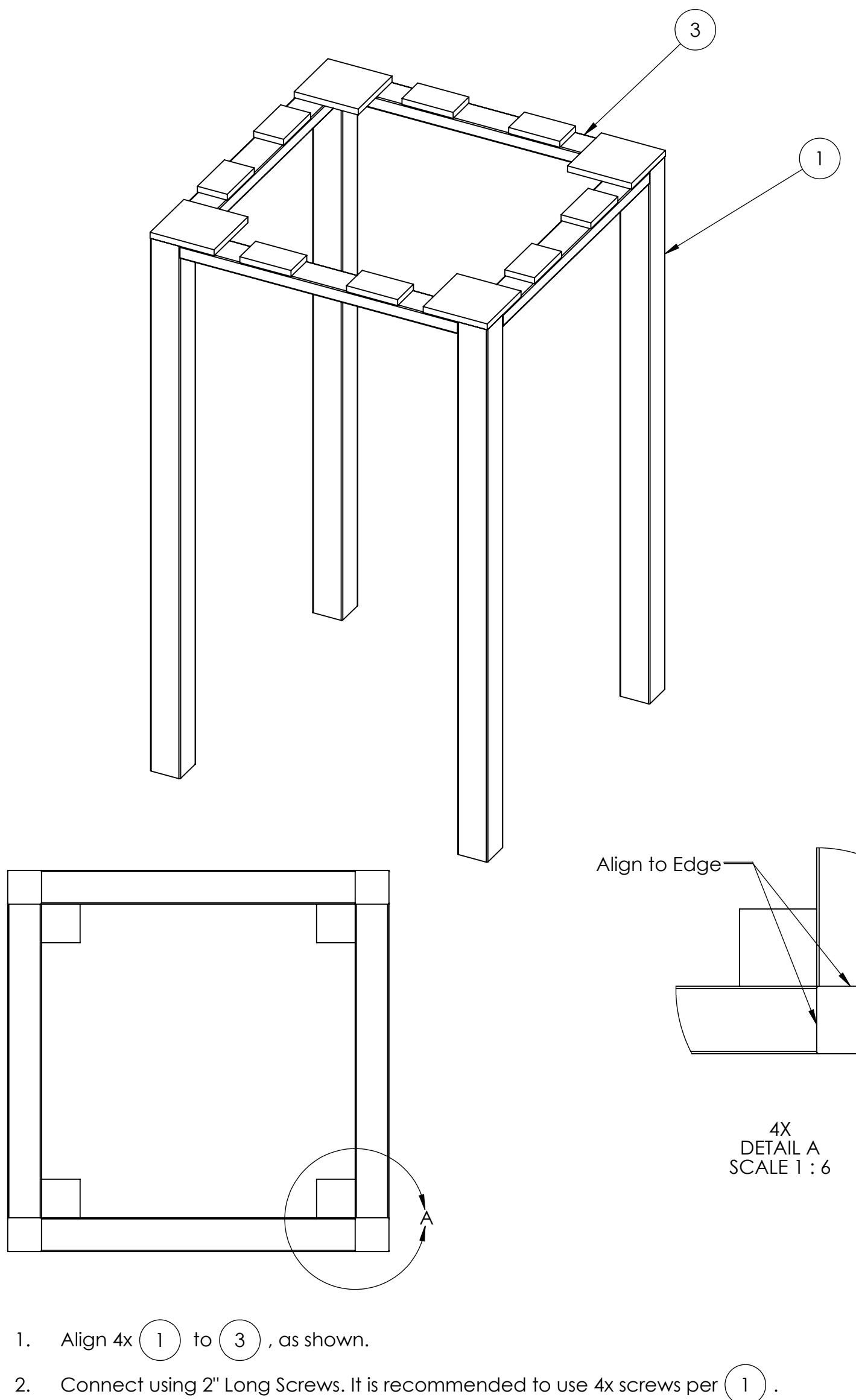
TITLE:  
Hub - Simple Build -  
Upper Hub Base  
Assembly

SIZE DWG. NO. REV

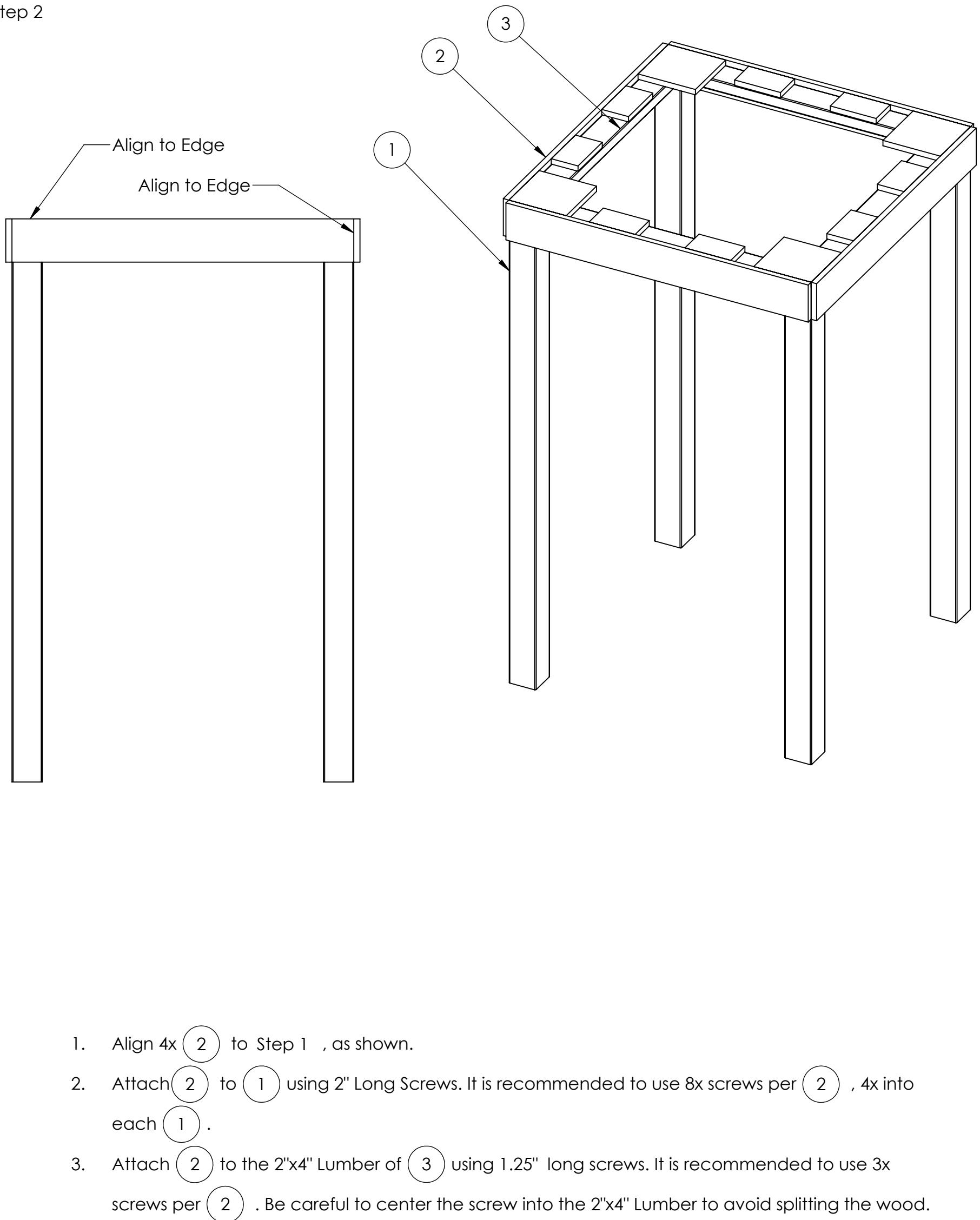
C TE-22040

SCALE: 1:12 SHEET 2 OF 4

Step 1



Step 2



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/30/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

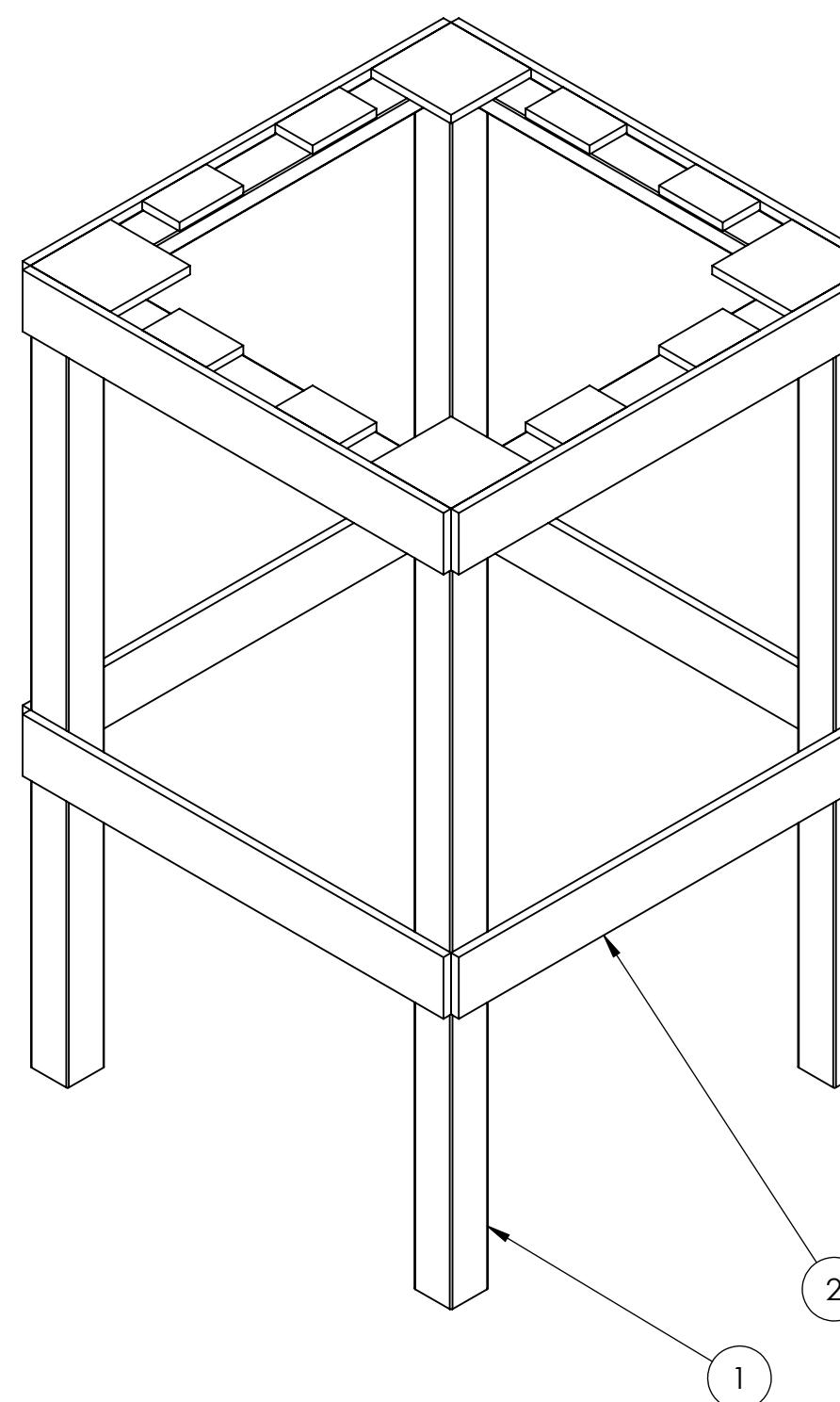
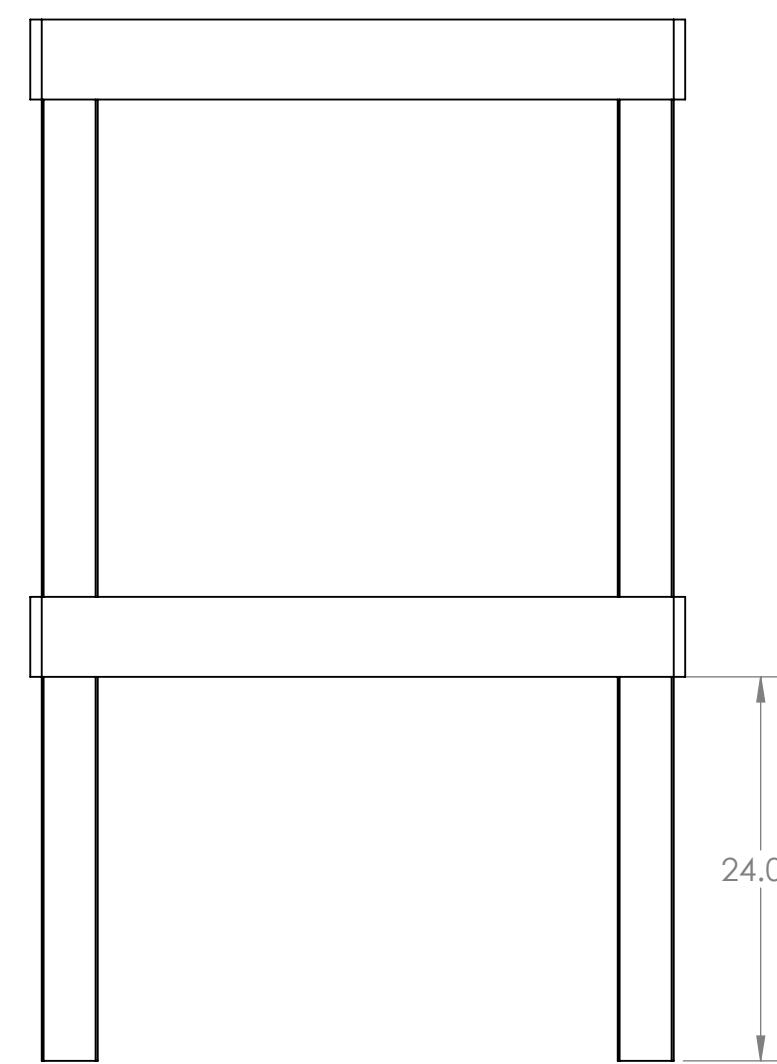
 **FIRST  
ROBOTICS  
COMPETITION**  **SOLIDWORKS**  
Modeling Solutions Partner

TITLE:  
**Hub - Simple Build -  
Upper Hub Base  
Assembly**

SIZE DWG. NO. REV

**C** TE-22040

SCALE: 1:12 SHEET 3 OF 4

D  
Step 3

1. Align 4x (2) to Step 2 , as shown.
2. Attach (2) to (1) using 2" Long Screws. It is recommended to use 8x screws per (2) , 4x into each (1) .

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/30/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
	C	TE-22040	
COMMENTS:		SCALE: 1:12	
REMOVE ALL BURRS AND SHARP EDGES.		SHEET 4 OF 4	
DO NOT SCALE DRAWING			

4

3

2

1

D

D

C

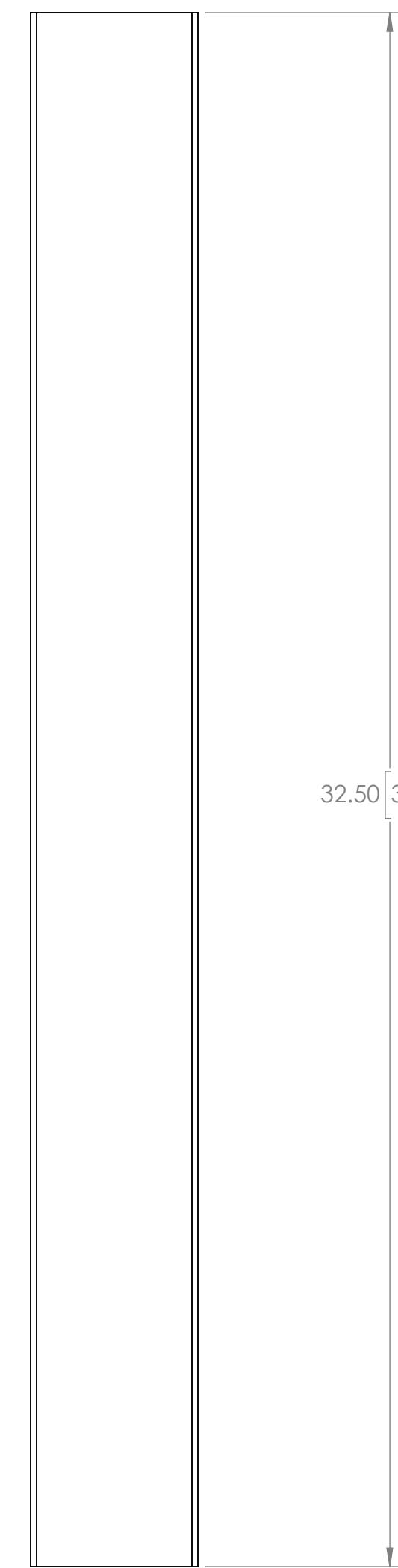
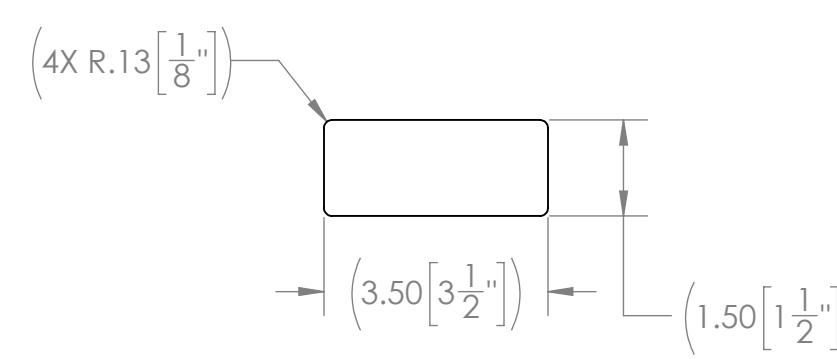
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DIMENSIONS ARE IN INCHES	DRAWN	KAMC	12/29/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
2"x4" Lumber	C	TE-22041	
COMMENTS:		REMOVE ALL BURRS AND SHARP EDGES.	
DO NOT SCALE DRAWING		SCALE: 1:3	SHEET 1 OF 1

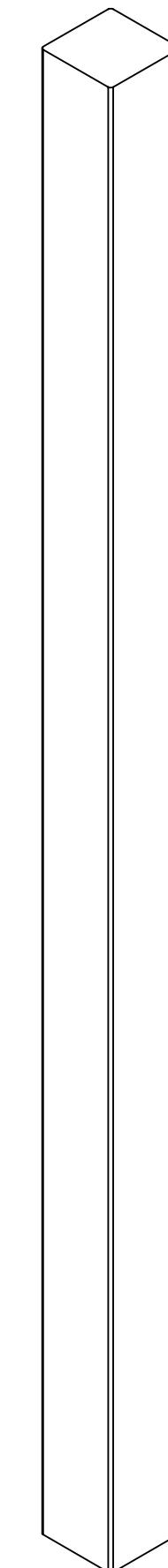
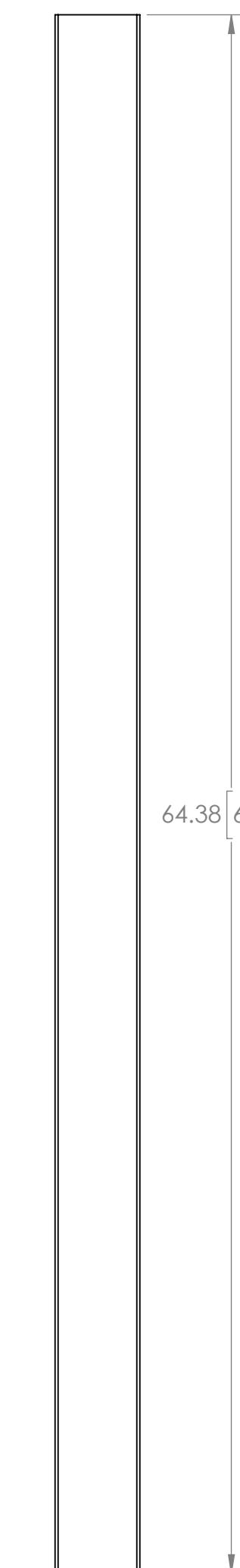
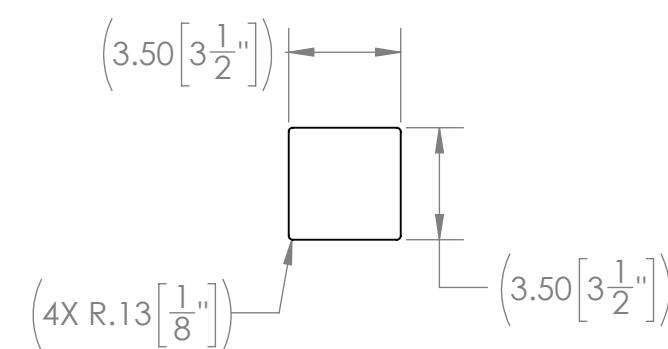
4

3

2

1

D



C

D

B

C

A

B

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$	DRAWN	KAMC	12/29/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH: 4"x4" Lumber	SIZE	DWG. NO.	REV
COMMENTS: REMOVE ALL BURRS AND SHARP EDGES.	C	TE-22042	
DO NOT SCALE DRAWING	SCALE: 1:6	SHEET 1 OF 1	

 **FIRST ROBOTICS COMPETITION**  Modeling Solutions Partner

TITLE: Hub - Simple Build -  
Upper Hub Base 4x4

SIZE DWG. NO. REV  
**C** TE-22042

SCALE: 1:6 SHEET 1 OF 1

4

3

2

1

D

D

C

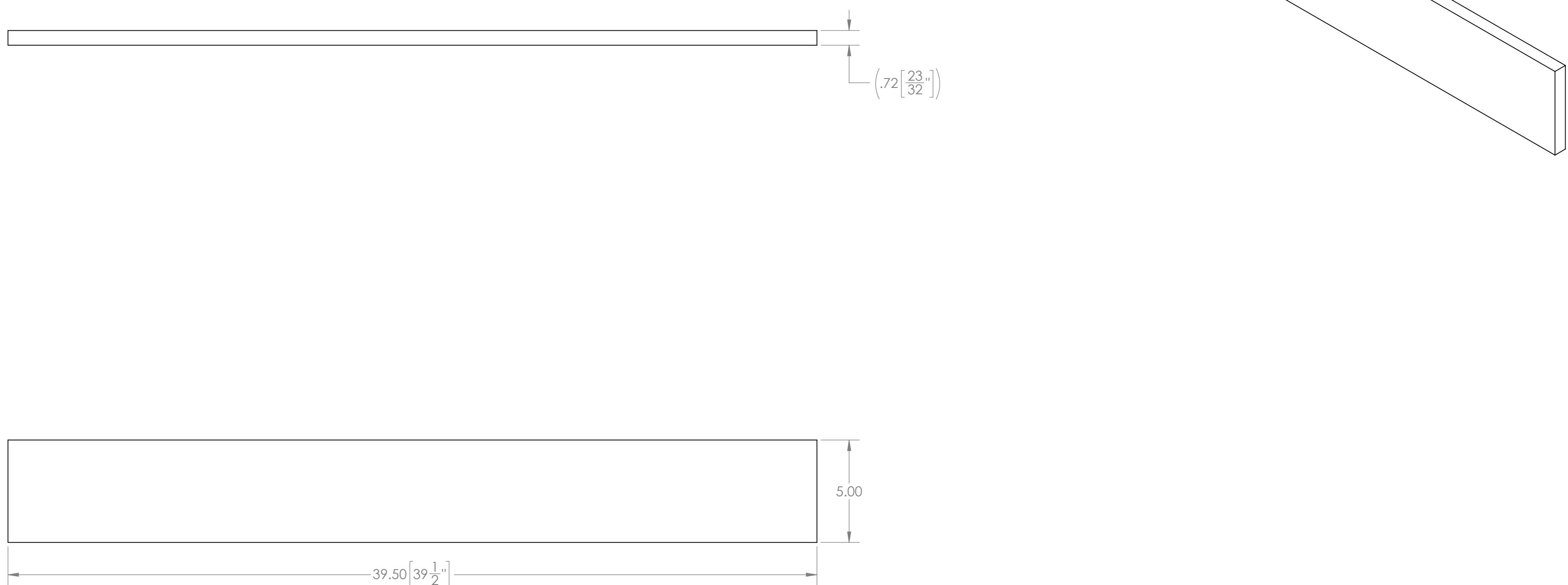
C

B

B

A

A



UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN			12/29/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:	SIZE	DWG. NO.	REV
3/4" Plywood	C	TE-22043	
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING	SCALE: 1:4	SHEET 1 OF 1	

4

3

2

1

4

3

2

1

D

D

C

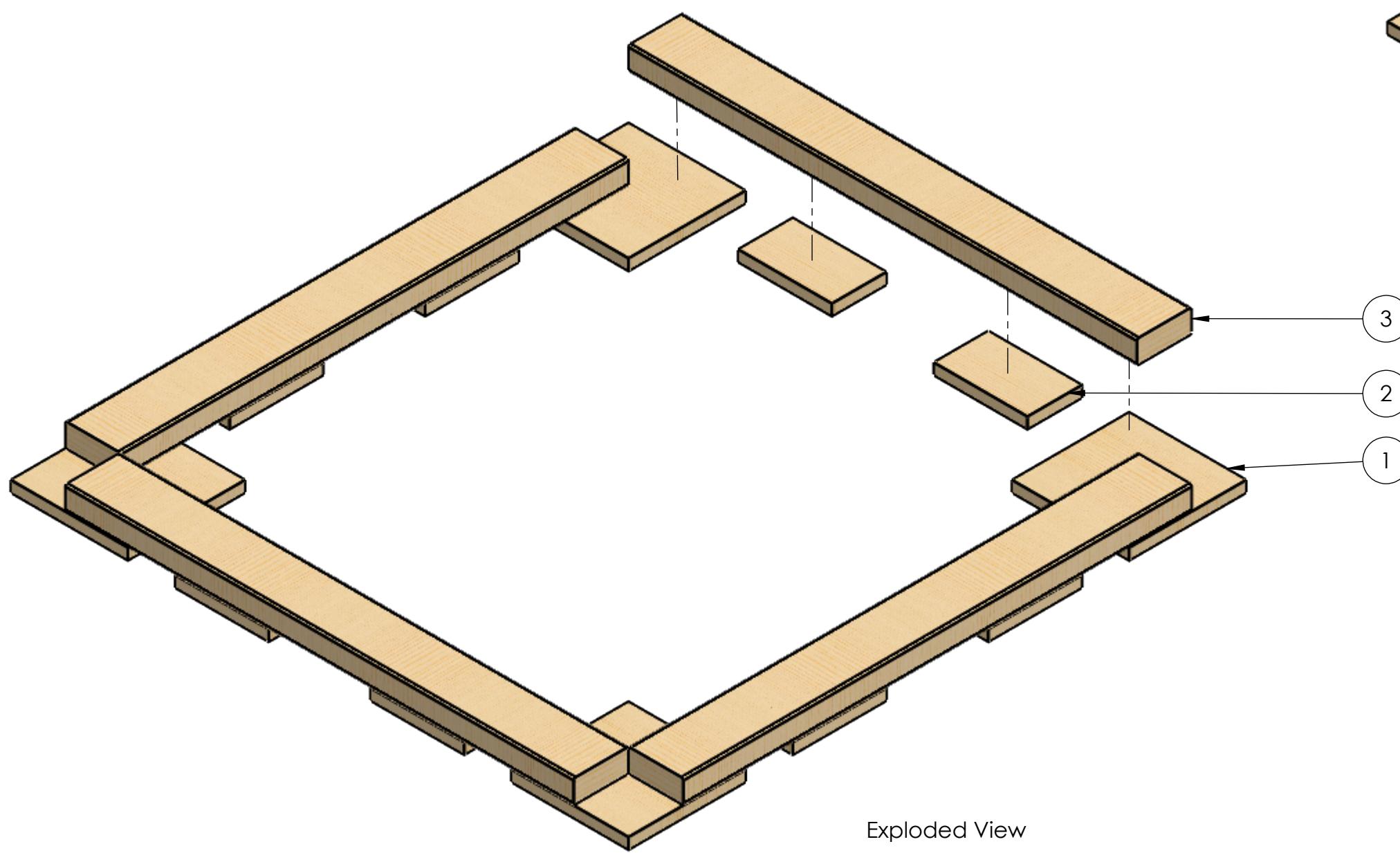
C

B

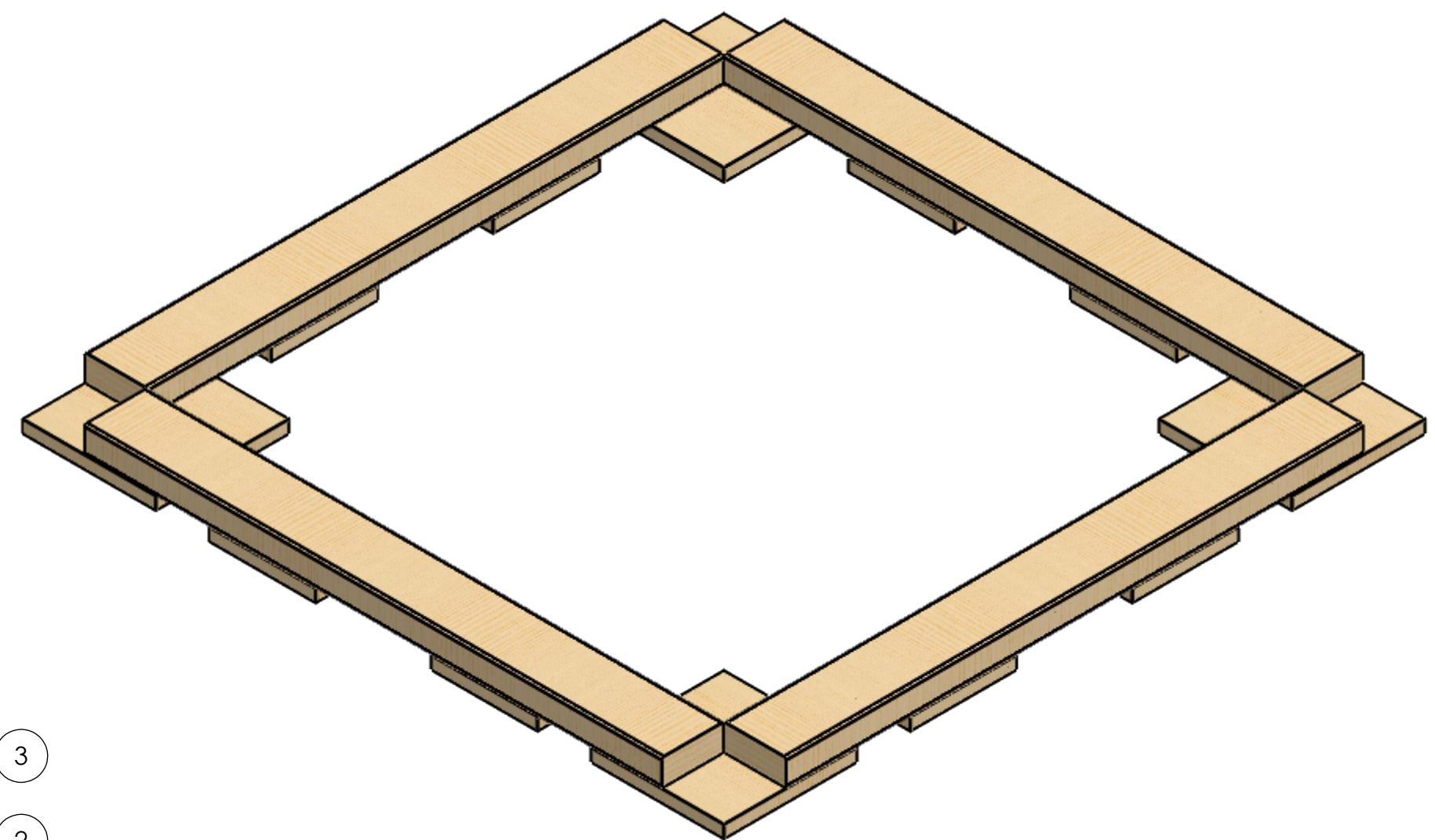
B

A

A



Exploded View



Hardware Needed:  
#8 x 2" Long Screw - Qty 58

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	TE-22005	Hub - Simple Build - Upper Hub Square Connection Plate	4
2	TE-22006	Hub - Simple Build - Upper Hub 2x4 Connection Plate	8
3	TE-22041	Hub - Simple Build - Upper Hub Base 2x4	4

UNLESS OTHERWISE SPECIFIED:			TEAM	NAME	DATE
			DRAWN	KAMC	12/30/2021
<b>PROPRIETARY AND CONFIDENTIAL</b>					
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.					
<b>COMMENTS:</b>					
REMOVE ALL BURRS AND SHARP EDGES.					
DO NOT SCALE DRAWING			SIZE	DWG. NO.	REV
			C	TE-22044	
			SCALE: 1:6	SHEET 1 OF 3	

4

3

2

1

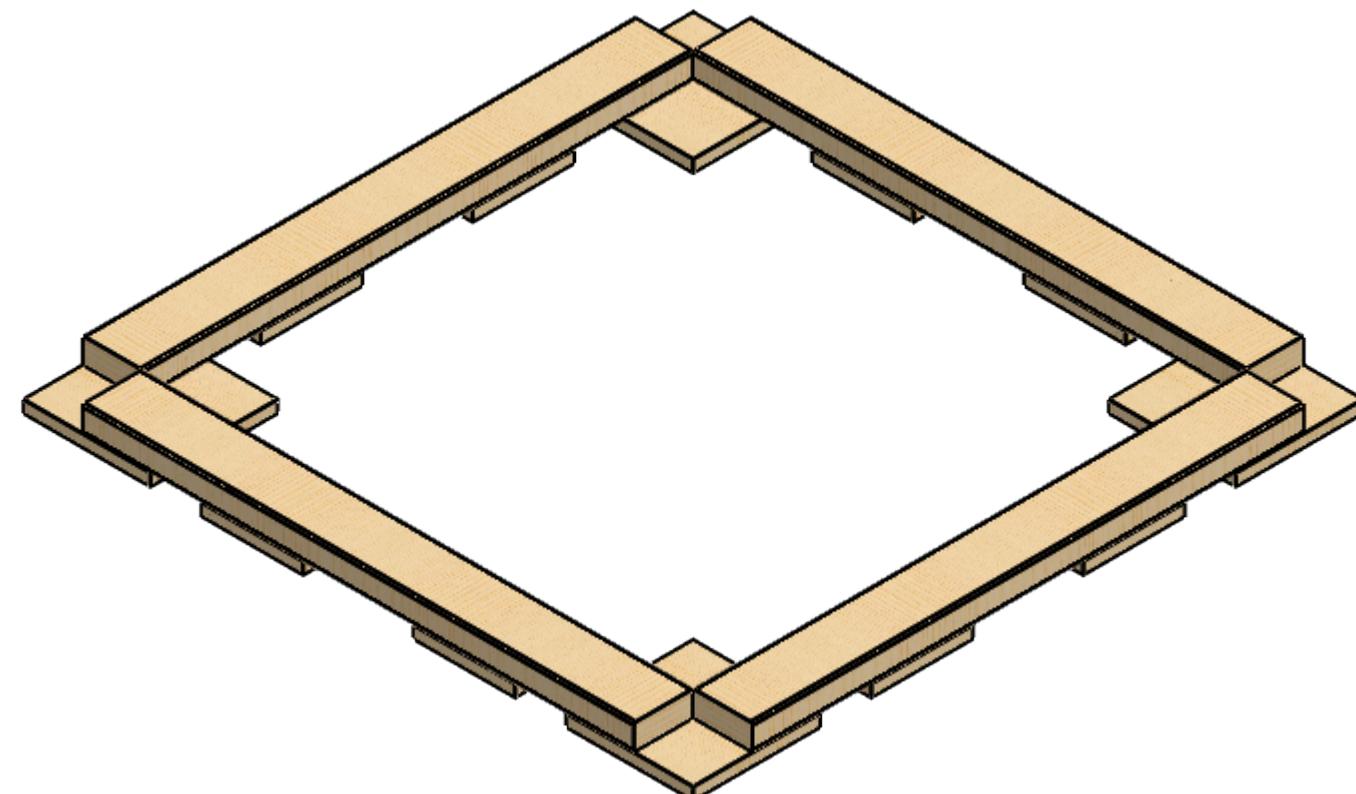
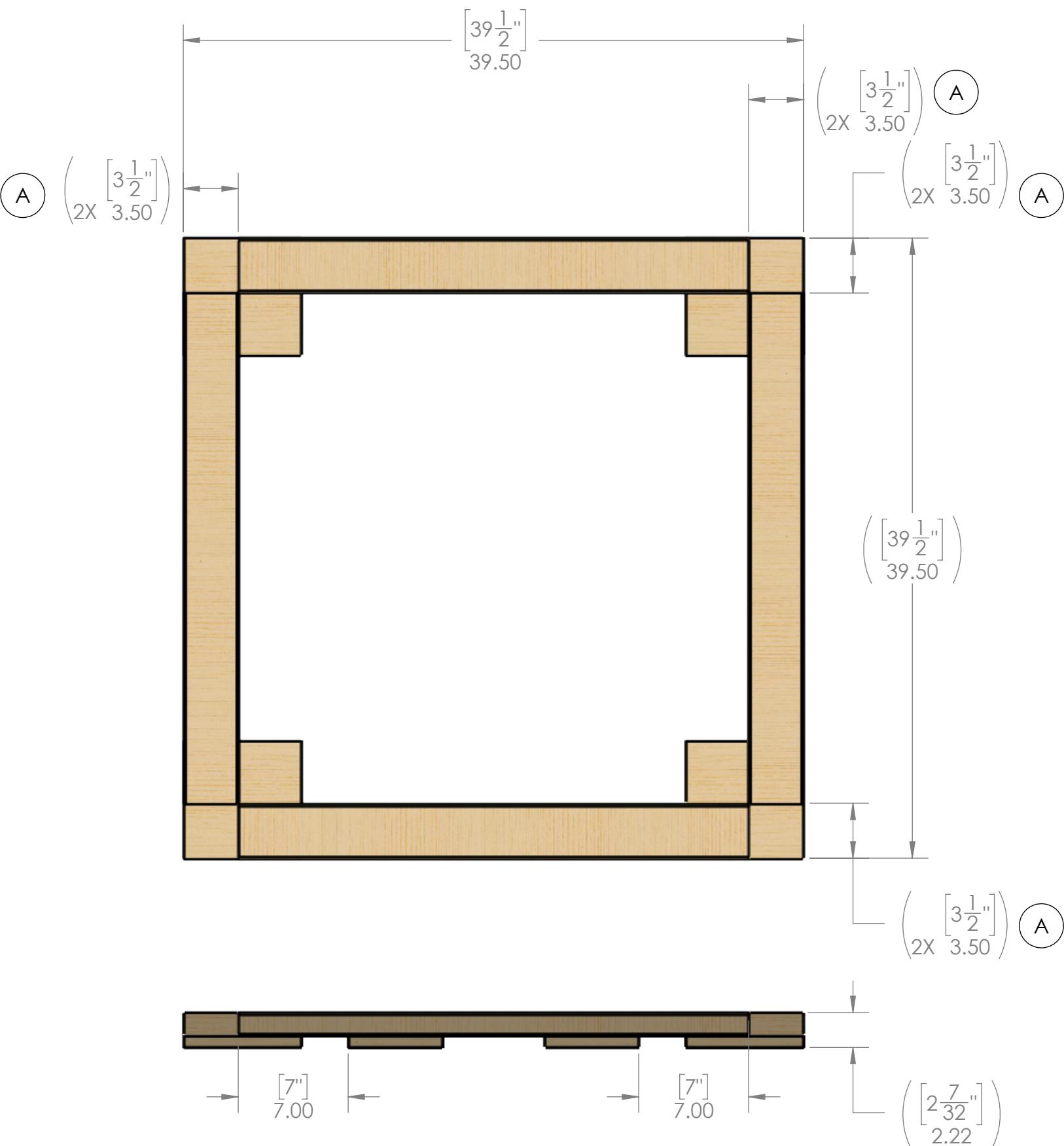
4

3

2

1

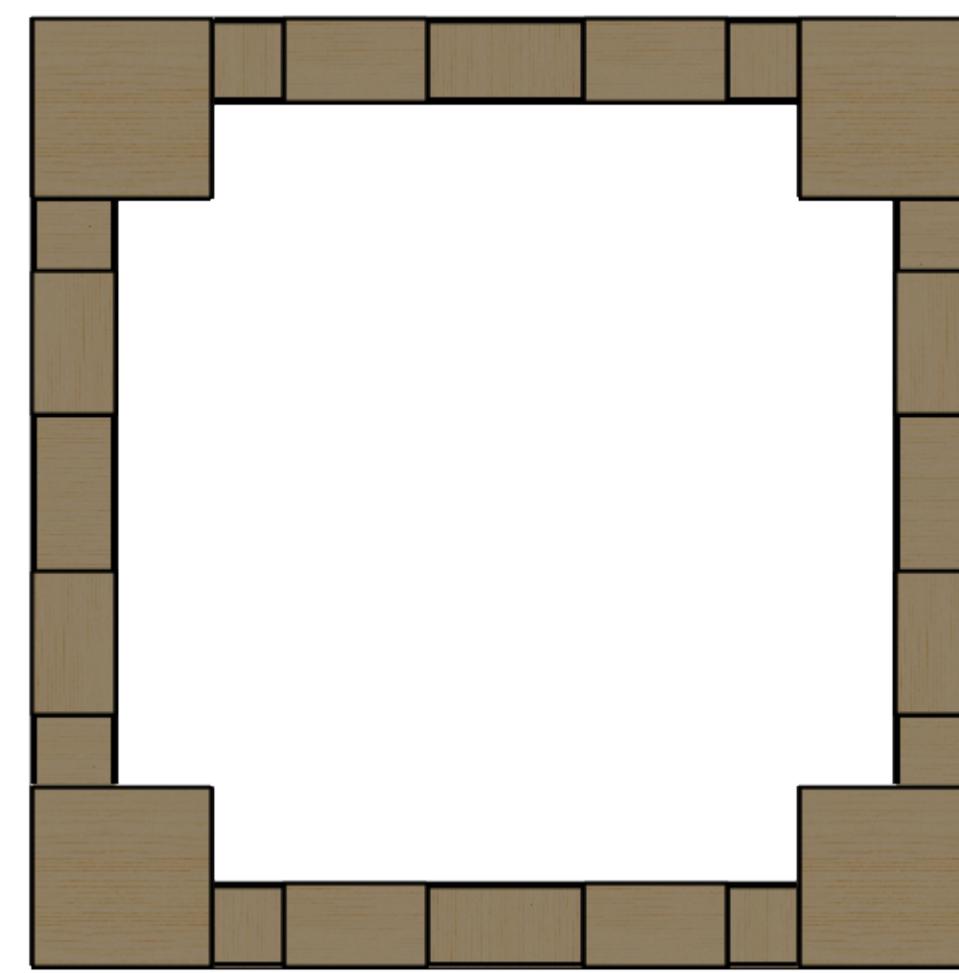
D



C

B

A

**Note:**

Dimensions with (A) indicate spacing for 4"x4" lumber from TE-22042. It is recommended to measure the cross section of TE-22042 and modify these dimensions as needed.

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/30/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
<b>MATERIAL/FINISH:</b>			
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION**  
SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
**Hub - Simple Build -  
Upper Hub Base Top  
Assembly**

SIZE DWG. NO. REV  
**C TE-22044**

SCALE: 1:8 SHEET 2 OF 3

4

3

2

1

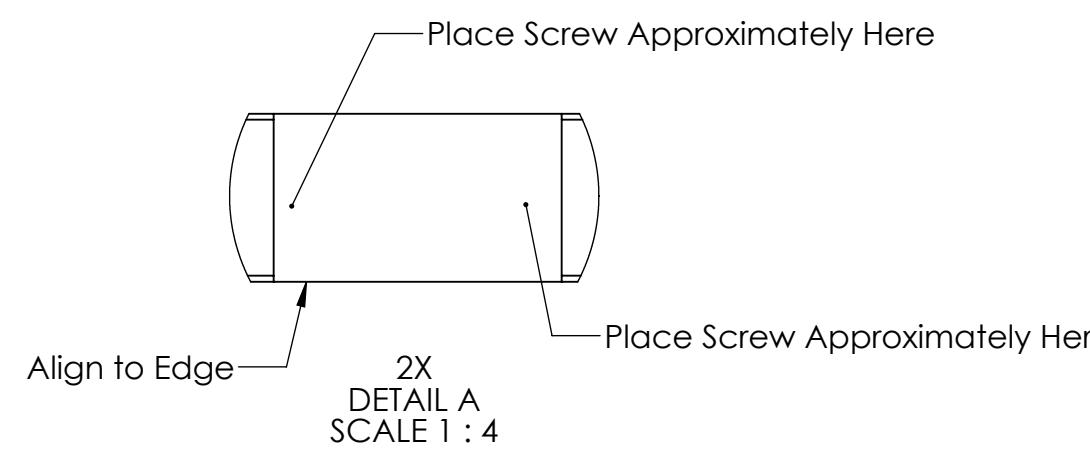
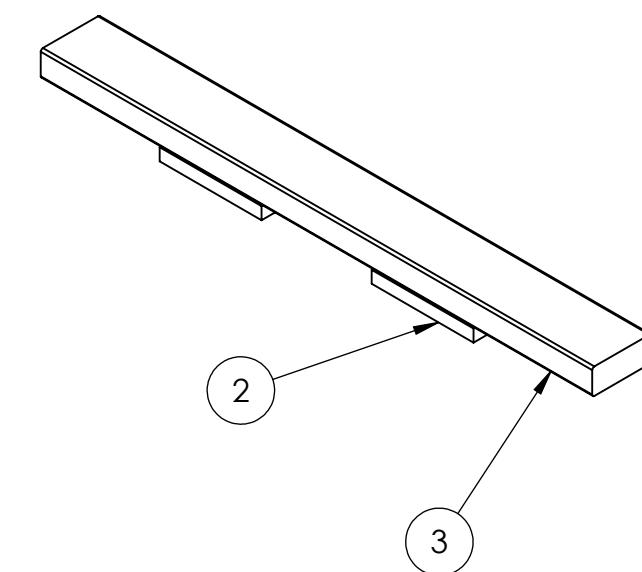
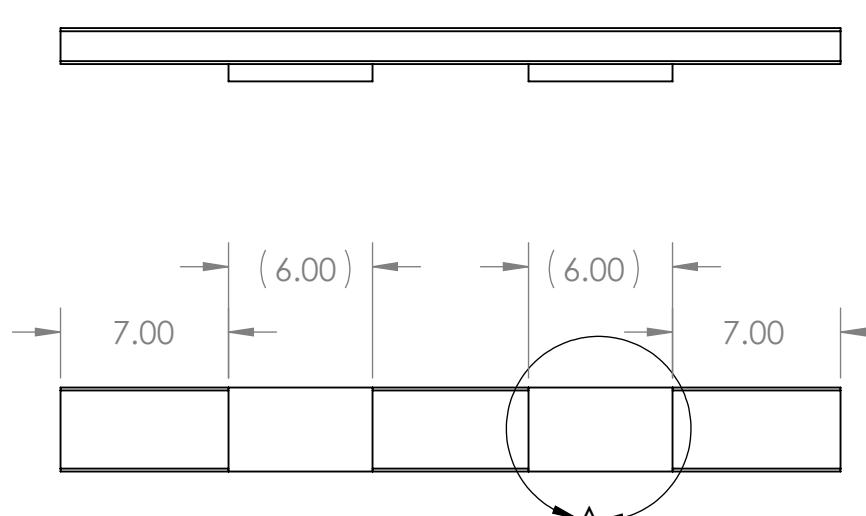
4

3

2

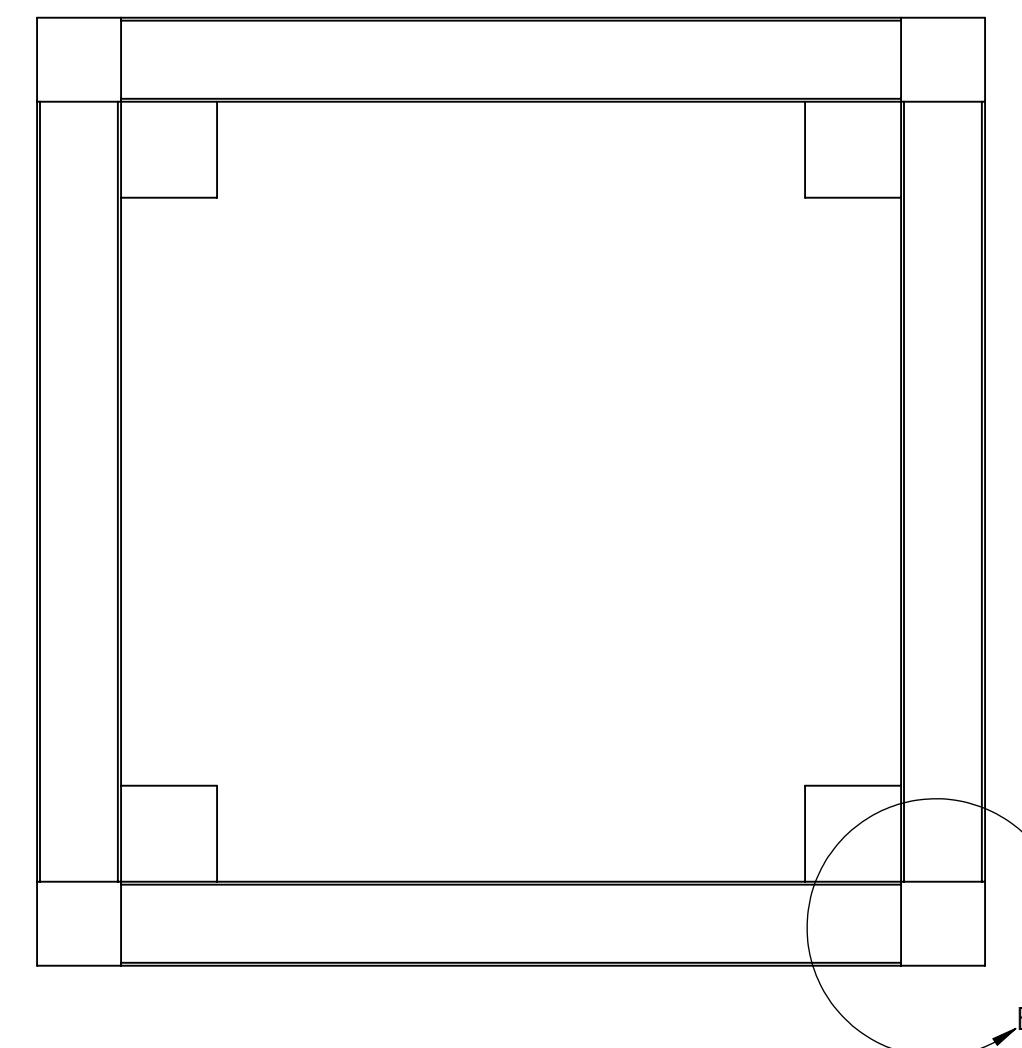
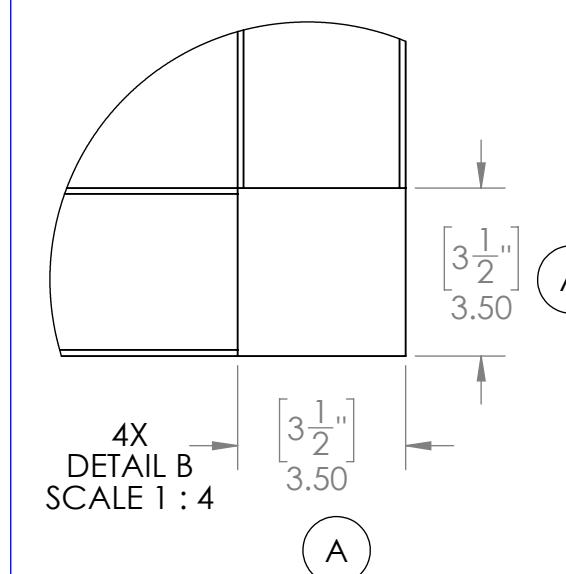
1

Step 1



1. Align 2x (2) on (3), as shown.
2. Connect using 2" long screws. It is recommended to use x2 screws per (2) and locate them as shown above. Keep center of (2) clear of screws.
3. Repeat until you have a total of 4 assemblies.

Step 2



1. Align 4x (1) to the x4 Step 1 assemblies, as shown.

Dimensions with (A) indicate spacing for 4"x4" lumber from TE-22042. It is recommended to measure the cross section of TE-22042 and modify these dimensions as needed.

2. Connect using 2" long screws. It is recommended to use x8 screws per (2), x4 into each end.

UNLESS OTHERWISE SPECIFIED:	TEAM	NAME	DATE
DRAWN	KAMC	12/30/2021	
<b>PROPRIETARY AND CONFIDENTIAL</b>			
THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.			
MATERIAL/FINISH:			
<b>COMMENTS:</b> REMOVE ALL BURRS AND SHARP EDGES.			
DO NOT SCALE DRAWING			
FIRST ROBOTICS COMPETITION			
SOLIDWORKS Modeling Solutions Partner			
TITLE: <b>Hub - Simple Build - Upper Hub Base Top Assembly</b>			
SIZE	DWG. NO.	REV	
<b>C</b>	TE-22044		
SCALE: 1:8		SHEET 3 OF 3	

4

3

2

1