

Hardware Needed:
#8 x 2" Long Screw - Qty 48
#8 x 2.5" Long Screw - Qty 64
Optional, but recommended: Safety Edging such as pool noodles or baby proofing

| ITEM NO. | PART NUMBER | DESCRIPTION | |
|----------|------------------------|--|----|
| 1 | TE-22110 | HUB - Complex Build - Base Assembly | 1 |
| 2 | TE-22120 | HUB - Complex Build - Lower Exit Assembly | 4 |
| 3 | TE-22130 | HUB - Complex Build - Fender Face Assembly | 4 |
| 4 | TE-22140-AM | HUB - Complex Build - Connection Box Assembly for AndyMark Upper Hub (AM-4671) | 1 |
| 5 | TE-22150 | HUB - Complex Build - Lower Hub Ring Assembly | 4 |
| 6 | TE-22160 | HUB - Complex Build - Upper Exit Assembly | 4 |
| 7 | TE-22170 | HUB - Complex Build - Leg Assembly | 4 |
| 8 | TE-22180 | HUB - Complex Build - Lower Hub Ring to Leg Assembly | 4 |
| 9 | AM-4671 | AndyMark Production Upper Hub | 1 |
| 10 | washer_flat_.25 | Flat Washer for 1/4" Screw | 40 |
| 11 | nylock_.25_20 | Steel Nylon-Insert Locknut, 1/4"-20 | 20 |
| 12 | hex_.25_20_2 | Steel Hex Head Bolt 1/4"-20 x 2" long, fully threaded | 4 |
| 13 | hex_.25_20_3.5_partial | Steel Hex Head Bolt, 1/4"-20 x 3.5", partially threaded | 8 |
| 14 | hex.25_20_5.5 | Steel Hex Head Bolt, 1/4"-20 x 5.5", partially threaded | 8 |

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±1/16
ANGULAR: MACH ±1° BEND ±1°
TWO PLACE DECIMAL ±.13
THREE PLACE DECIMAL ±.125

MATERIAL/FINISH:



DO NOT SCALE DRAWING

| | | |
|-------|------|----------|
| TEAM | NAME | DATE |
| DRAWN | KAMC | 1/4/2022 |

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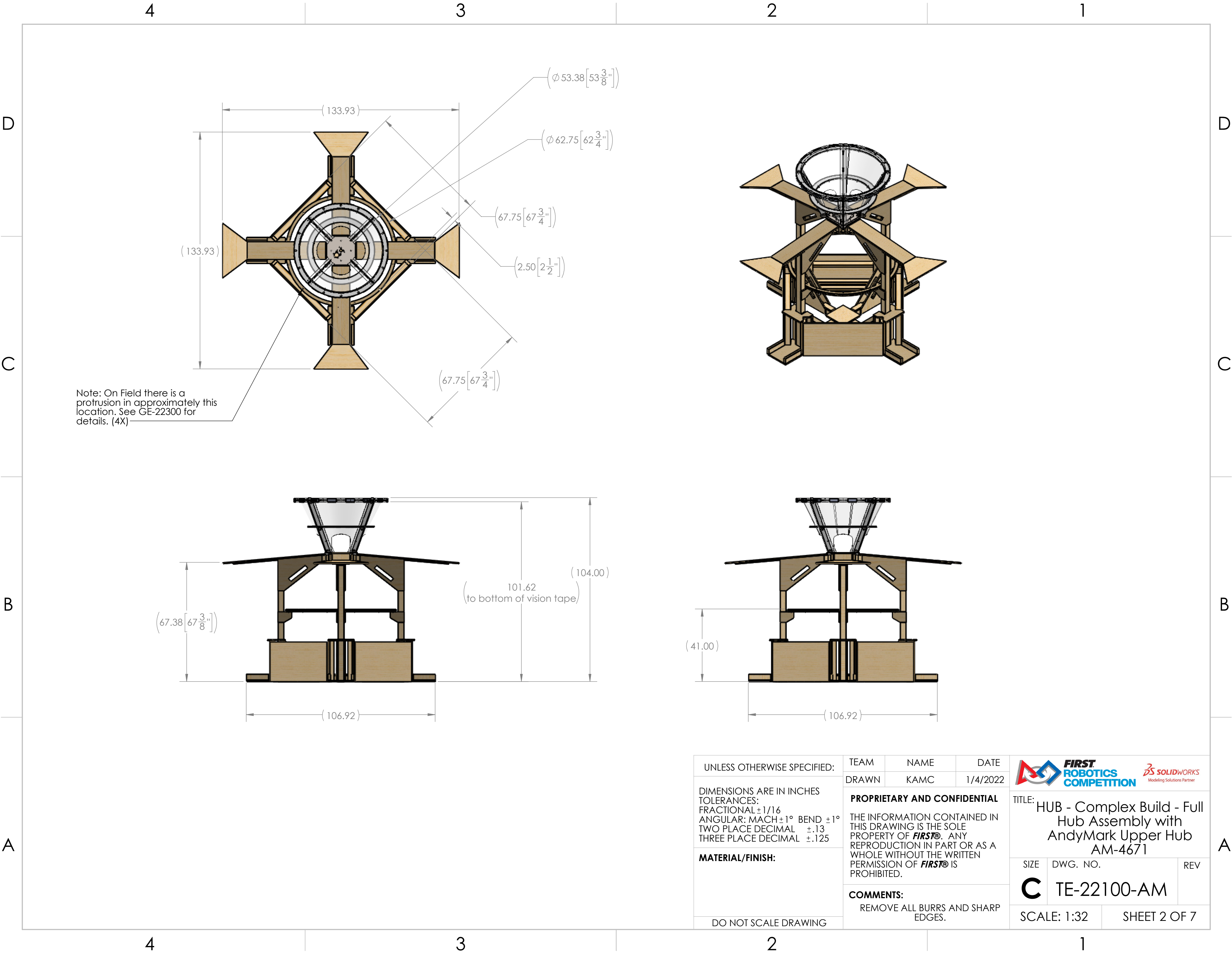




TITLE:
HUB - Complex Build - Full Hub Assembly with AndyMark Upper Hub AM-4671

| | | |
|----------|-------------|-----|
| SIZE | DWG. NO. | REV |
| C | TE-22100-AM | |

| | |
|-------------|--------------|
| SCALE: 1:12 | SHEET 1 OF 7 |
|-------------|--------------|

- 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 and ability to move assembly through doors before fastening sub-assemblies together.
 - Bolts spec'd as partially threaded can be replaced with fully threaded bolt of the same length.
 - TE-22190 can be replaced with TE-22190-AMActive (if pairing with AndyMark's Motorized Agitator AM-4674) or TE-22190-AMPassive (if pairing with AndyMark's Passive Agitator AM-4673).



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|---|--|------|----------|--|--|--|
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| | DRAWN | KAMC | 1/4/2022 | | | |
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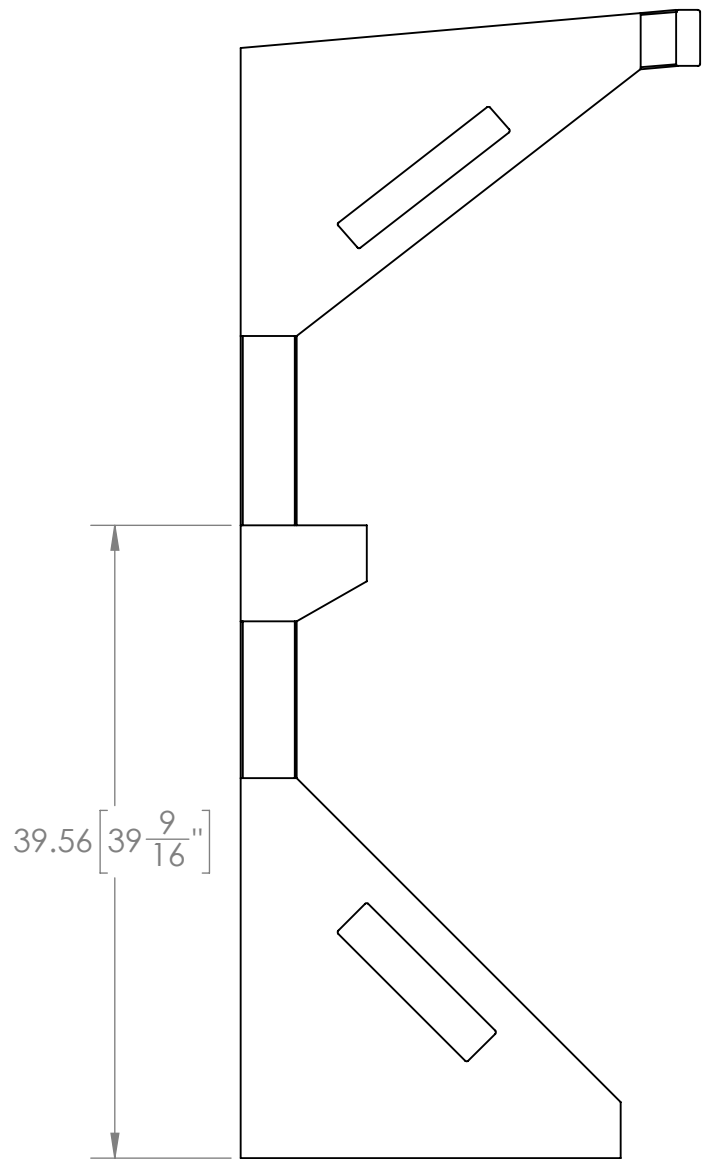
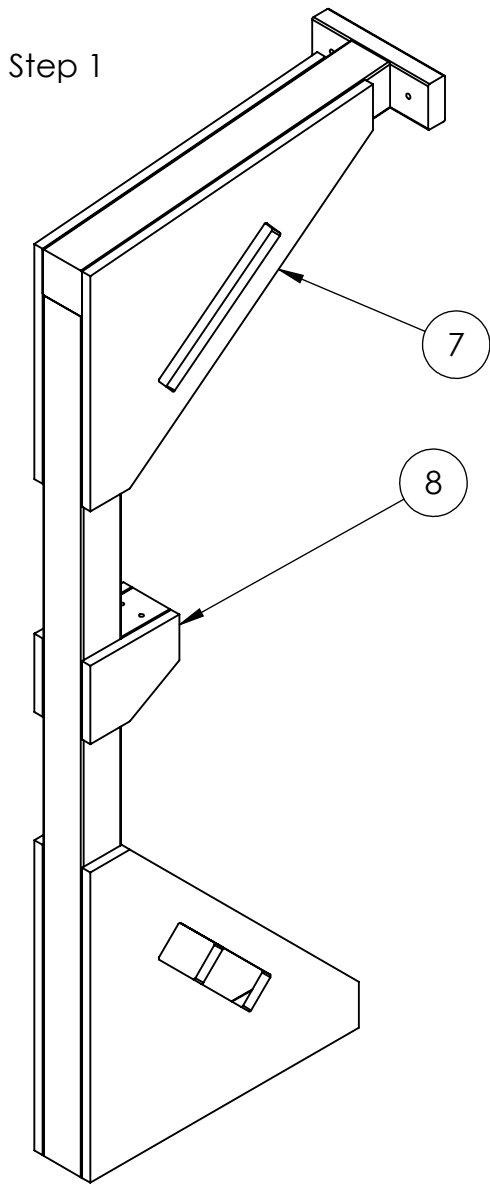
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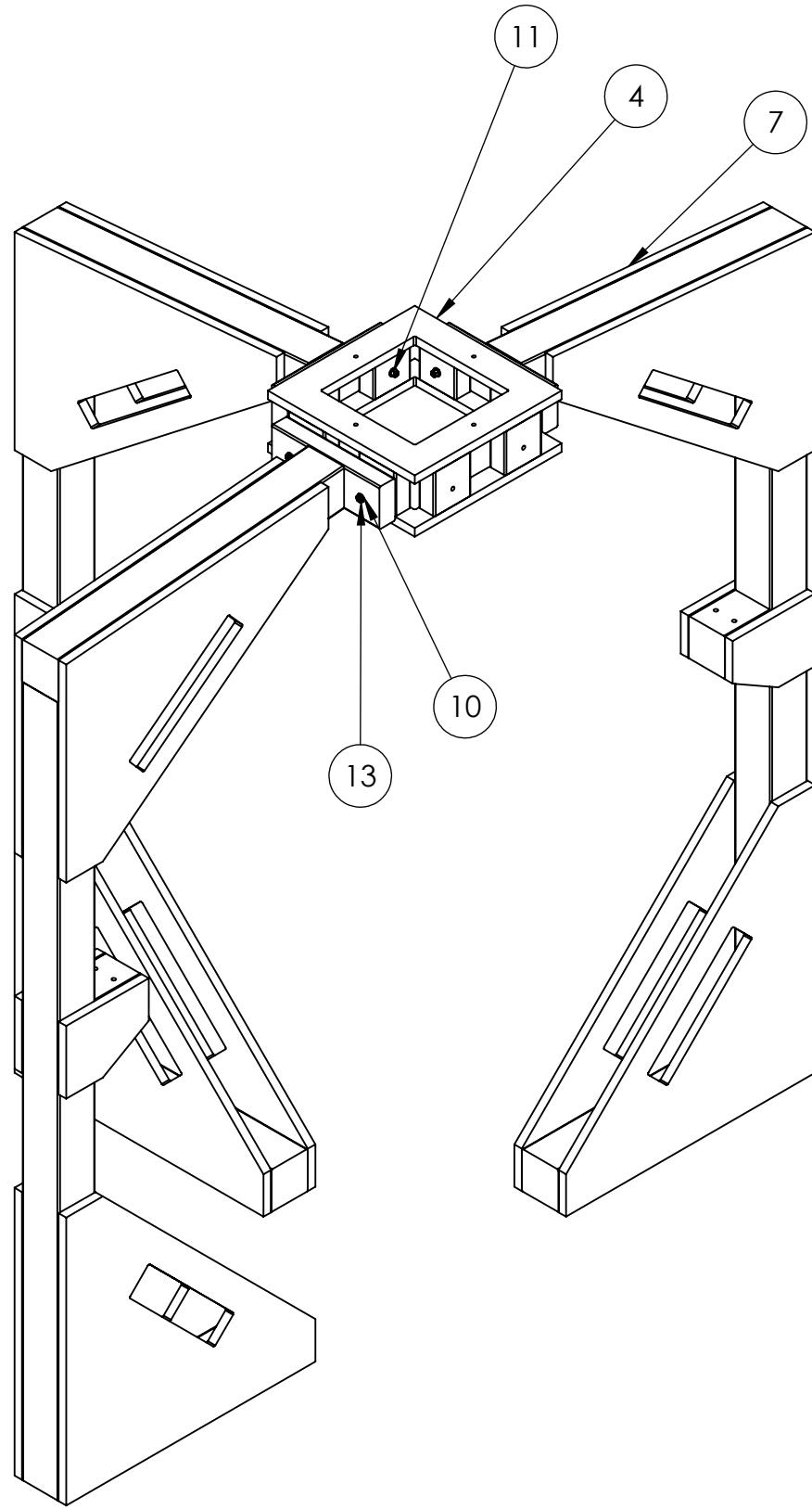
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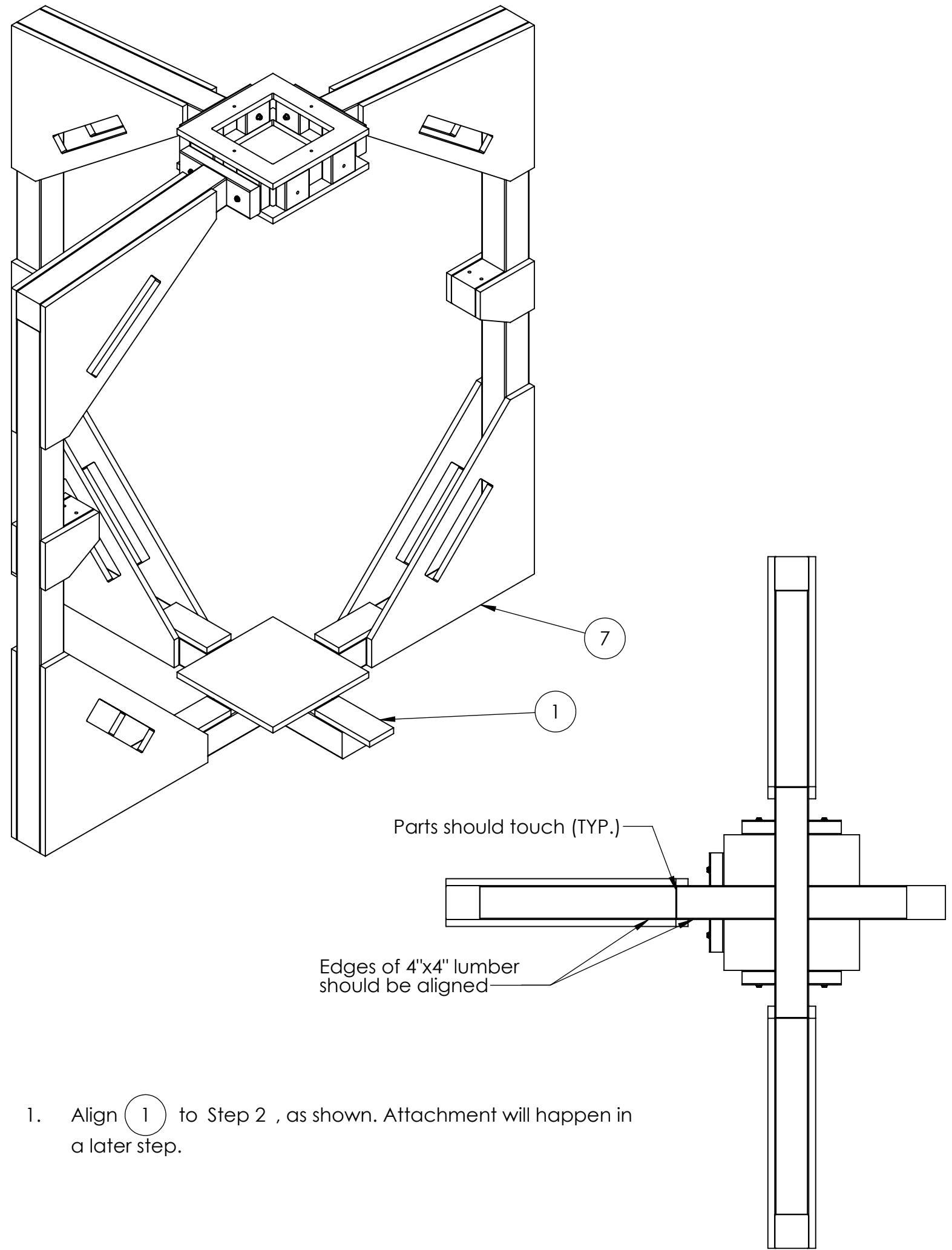
1. Align (8) to (7), as shown.
2. Connect using 2.5" long screws. It is recommended to use 8x screws, 4x into each side.
3. Repeat 3x, for a total of 4x sub-assemblies.

Step 2





1. Align 3x assemblies from Step 1 to (4), as shown.
2. Loosely connect using 2x (13), 4x (10), and 2x (11) per (7). Hardware will be tightened in a later step.

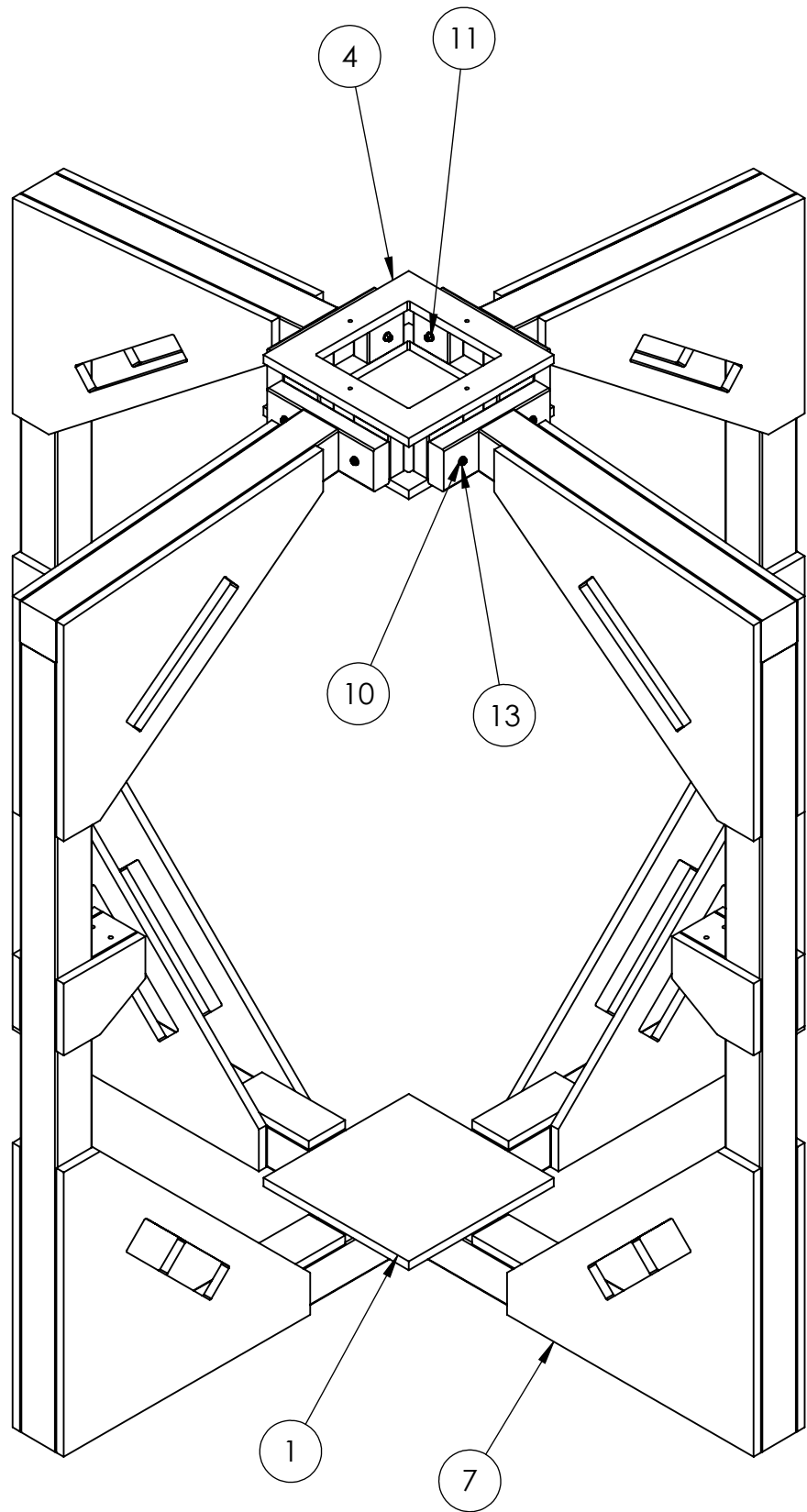
Step 3





1. Align (1) to Step 2, as shown. Attachment will happen in a later step.

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|---|---|------|----------|--|-------------|--------------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div><div>FIRST ROBOTICS COMPETITION</div></div> <div><div>SOLIDWORKS Modeling Solutions Partner</div></div> | | |
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| TITLE: HUB - Complex Build - Full Hub Assembly with AndyMark Upper Hub AM-4671 | | | | SIZE | DWG. NO. | REV |
| | | | | C | TE-22100-AM | |
| | | | | SCALE: 1:12 | | SHEET 3 OF 7 |

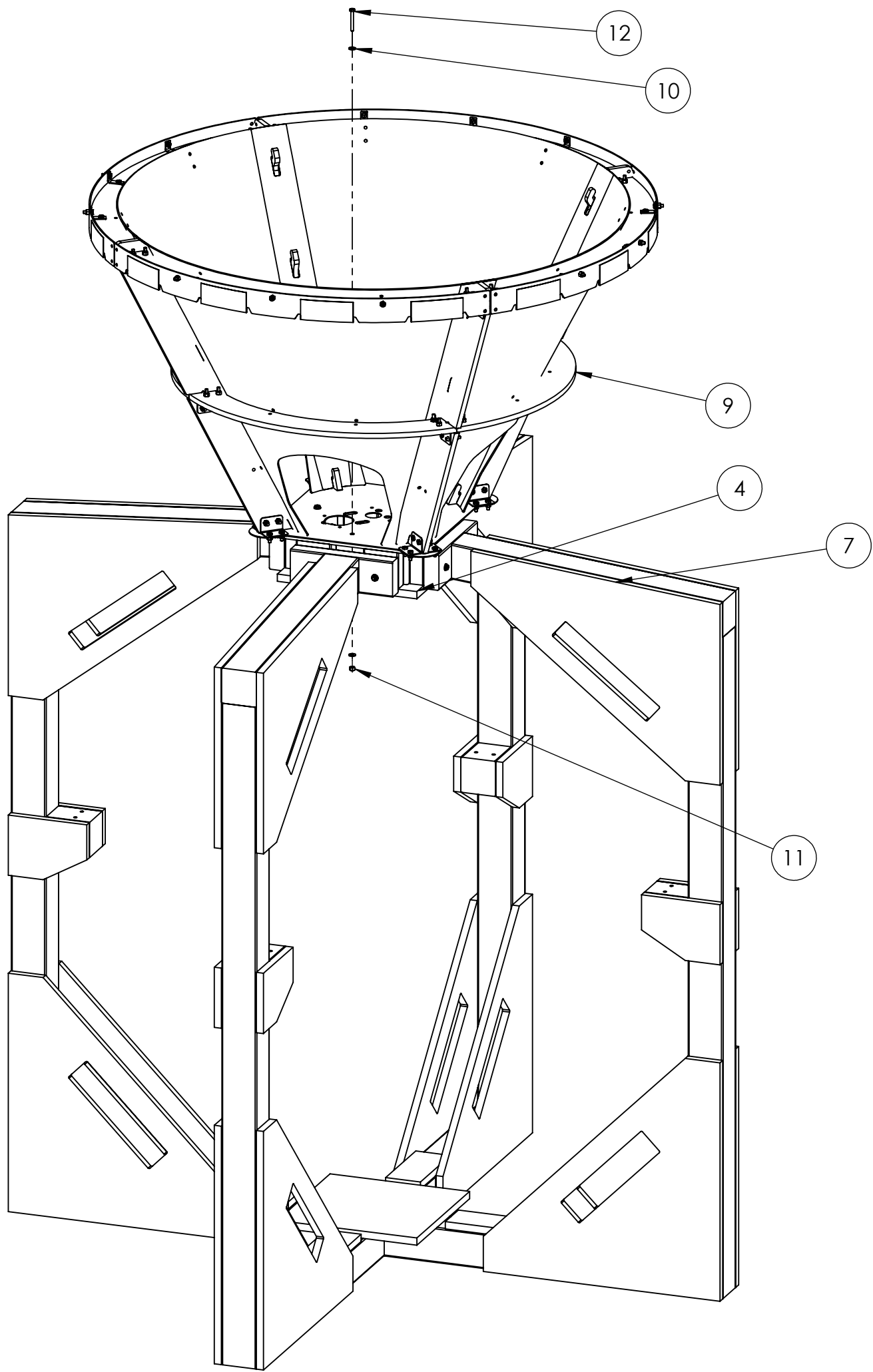
Step 4



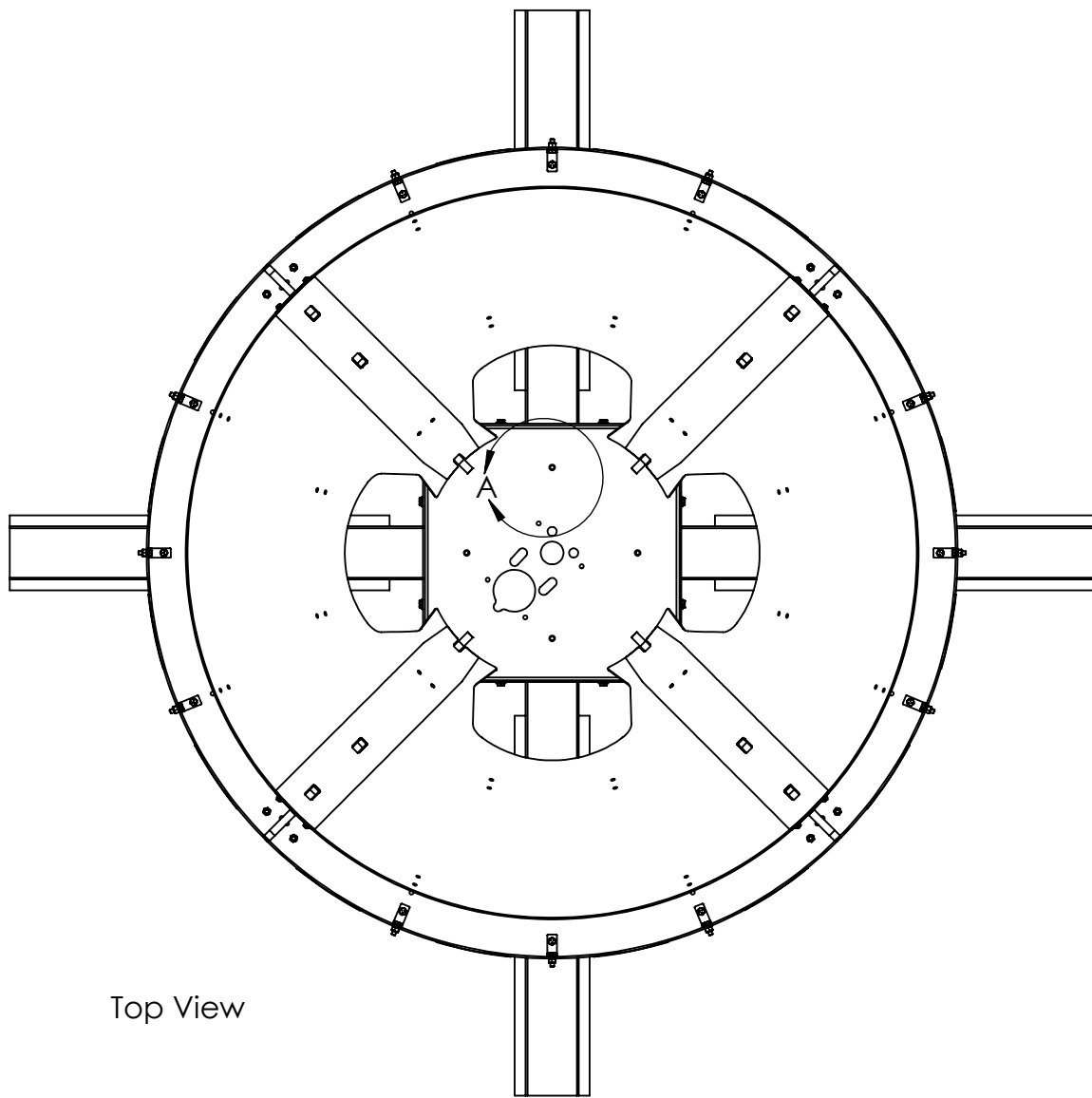
1. Add remaining Step 1 assembly to Step 3, as shown. Ensure the plywood from (1) sits on top of the 4"x4" lumber of (7) .
Note: Attachment between (7) and (1) will occur in a later step.
2. Connect (7) to (4) using 2x (13) , 4x (10) , and 2x (11) . Ensure connection is tight.
3. Tighten hardware installed in Step 2.

| | | | | | |
|--|---|------|-----------------------------------|---|--------------|
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| | DRAWN | KAMC | 1/4/2022 | | |
| | PROPRIETARY AND CONFIDENTIAL | | | TITLE: HUB - Complex Build - Full Hub Assembly with AndyMark Upper Hub AM-4671 | |
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| COMMENTS: | | | REMOVE ALL BURRS AND SHARP EDGES. | | REV |
| | | | C TE-22100-AM | | |
| | | | SCALE: 1:12 | | SHEET 4 OF 7 |

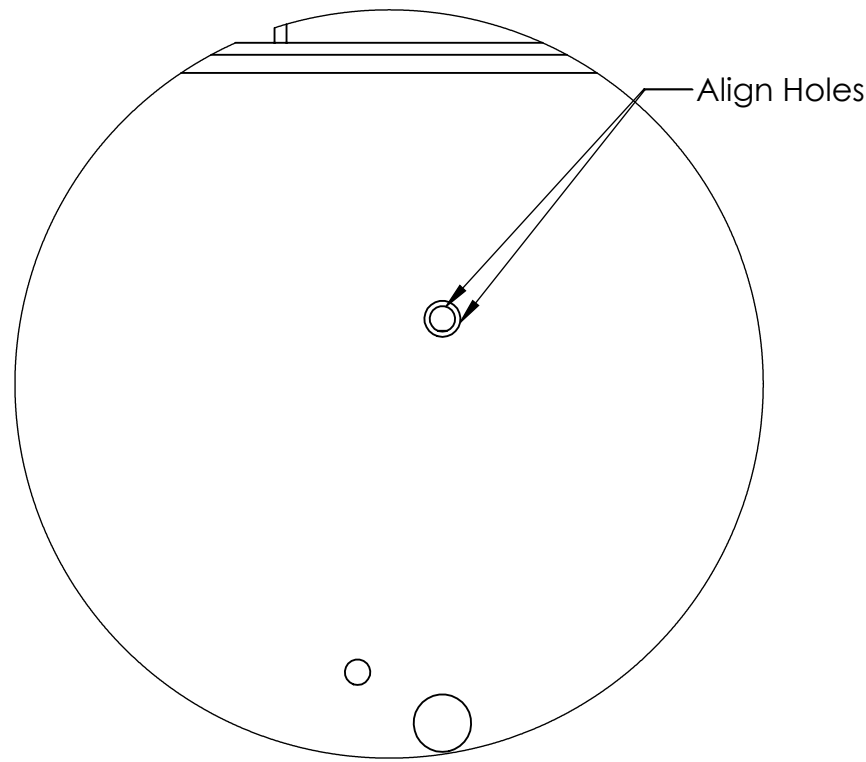
Step 5



1. Align (9) atop Step 4, as shown.
- Note: Ensure there are multiple people to lift (9) into place. Consider resting (9) atop (7), if needed. If an agitator such as AM-4673 or AM-4674 has been installed prior to this step, be mindful of any parts extending beyond the baseplate of (9). Installation of AM-4673 or AM-4674 can be done after (9) is connected to (4).
2. Connect (9) to (4) using 4x (12), 8x (10), and 4x (11).



Top View



DETAIL A
SCALE 1:2

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:

DO NOT SCALE DRAWING

TEAM

NAME

DATE

DRAWN

KAMC

1/4/2022

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COMMENTS:

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**FIRST
ROBOTICS
COMPETITION**



Modeling Solutions Partner

TITLE: HUB - Complex Build -
Full Hub Assembly with
AndyMark Upper Hub
AM-4671

SIZE

DWG. NO.

REV

C

TE-22100-AM

SCALE: 1:12

SHEET 5 OF 7

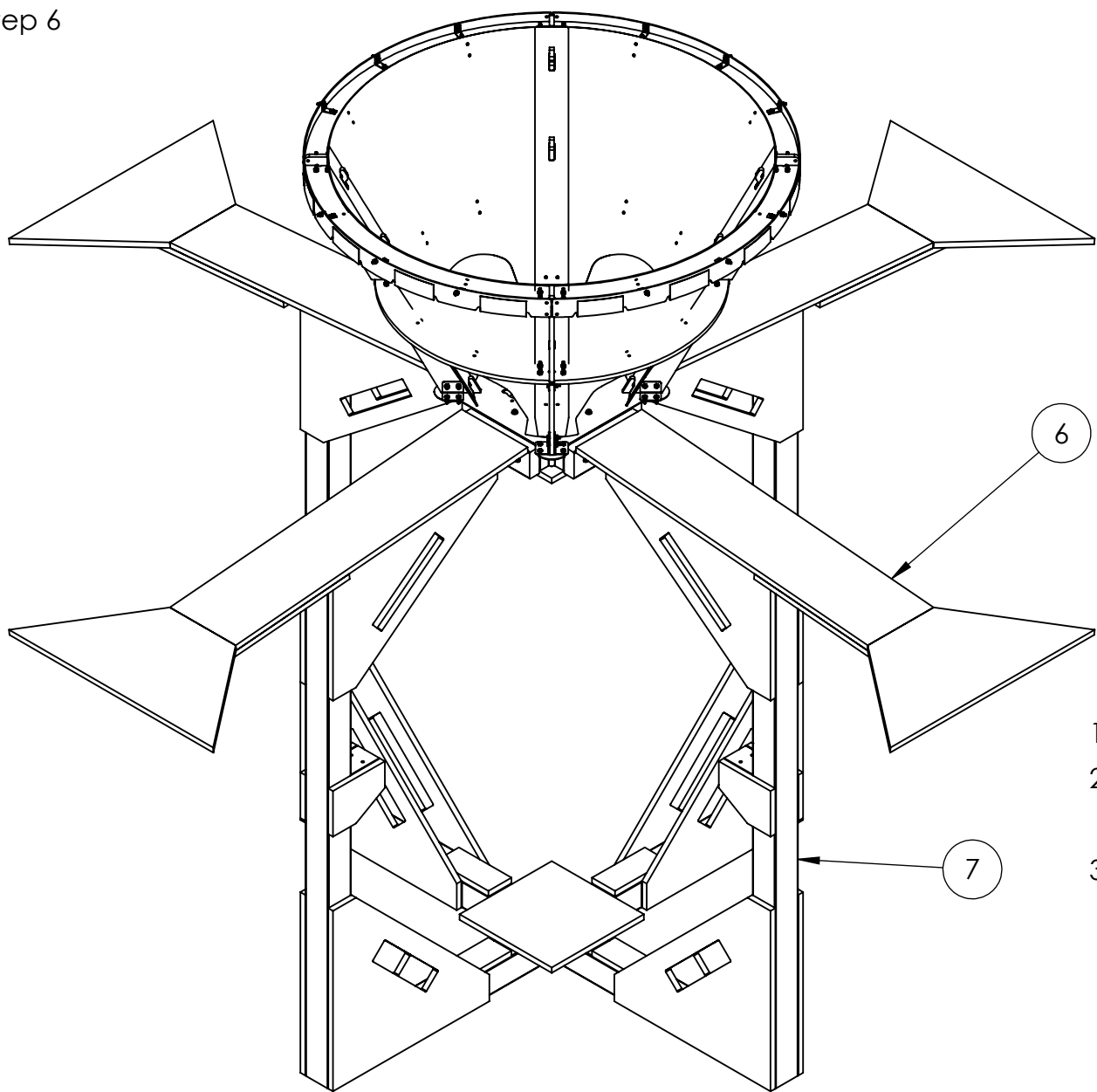
D

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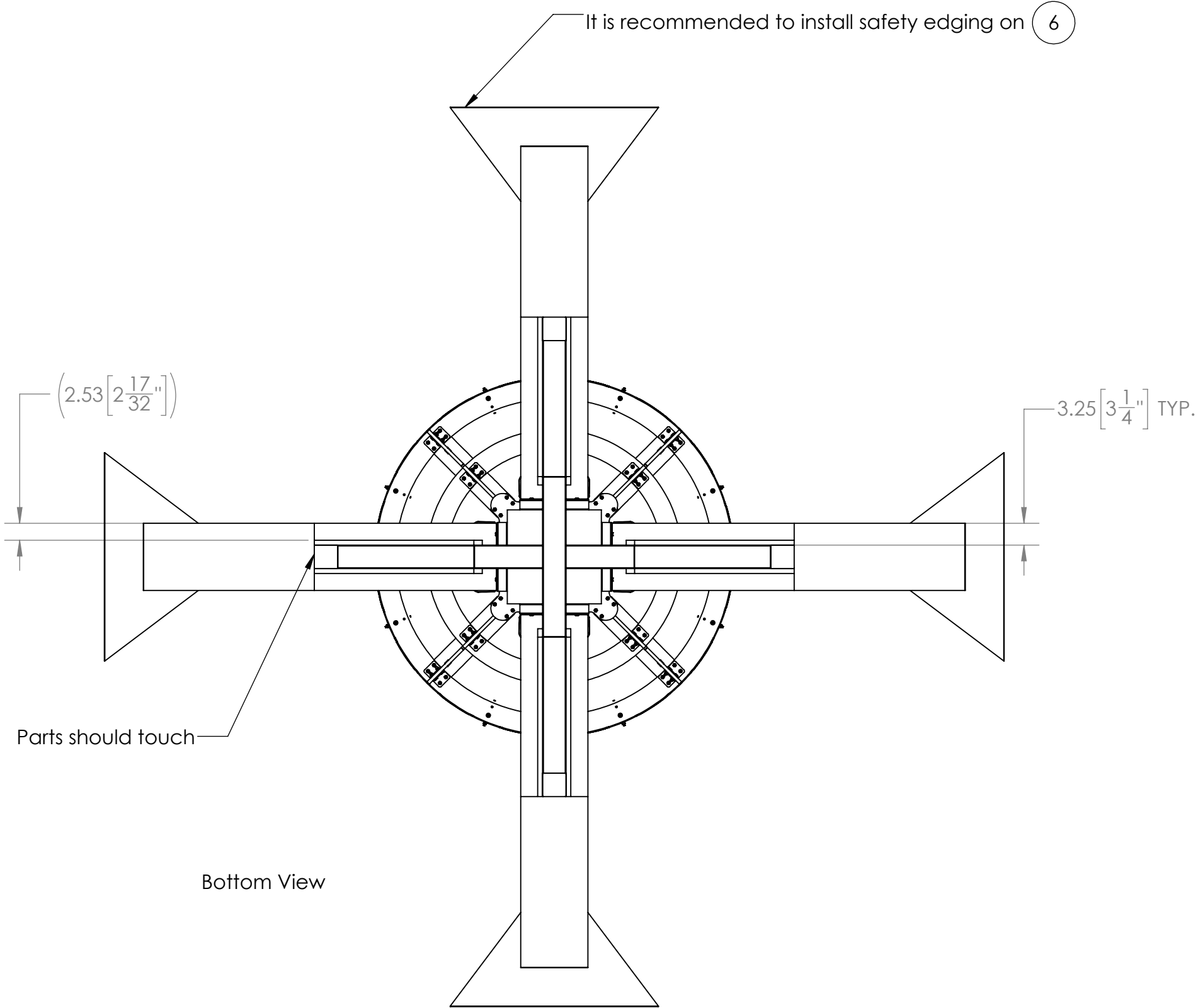
A

Step 6

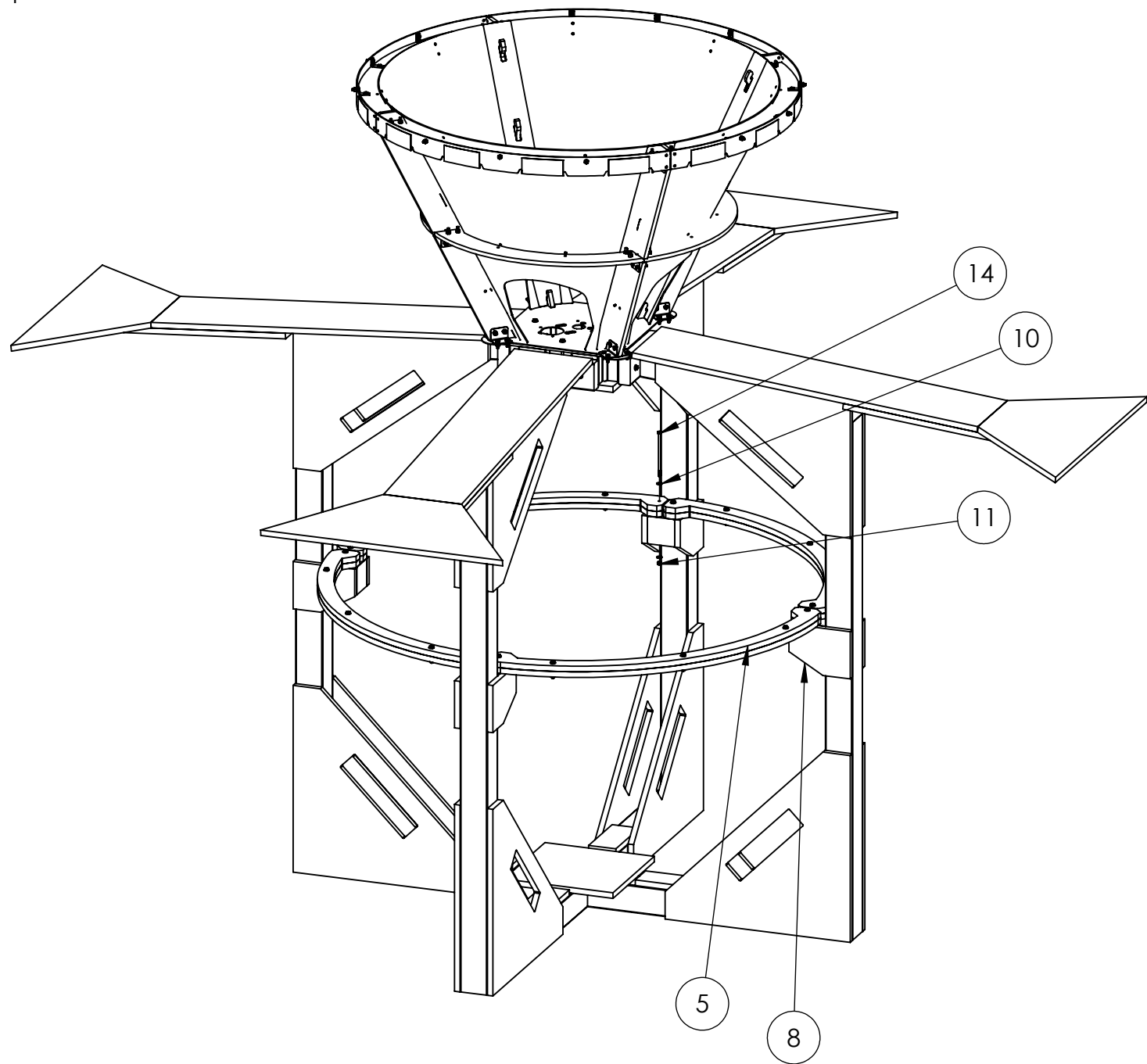


1. Align 4x 6 to Step 5, as shown.
2. Connect using 2" long screws. It is recommended to use 8x screws per 6.
3. Optional: It is recommended to install safety edging on 6 at this time. Safety edging could be pool noodles, baby proofing material, etc.



It is recommended to install safety edging on 6



Step 7



1. Align 4x 5 atop 8 (installed in Step 1 assemblies), as shown.
2. Loosely connect 5 to 8 using 2x 14, 4x 10, and 2x 11 per 8.

| | | | | |
|--|---|--|----------|---|
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| DO NOT SCALE DRAWING | | | | C TE-22100-AM |
| | | | | SCALE: 1:18 SHEET 6 OF 7 |

D

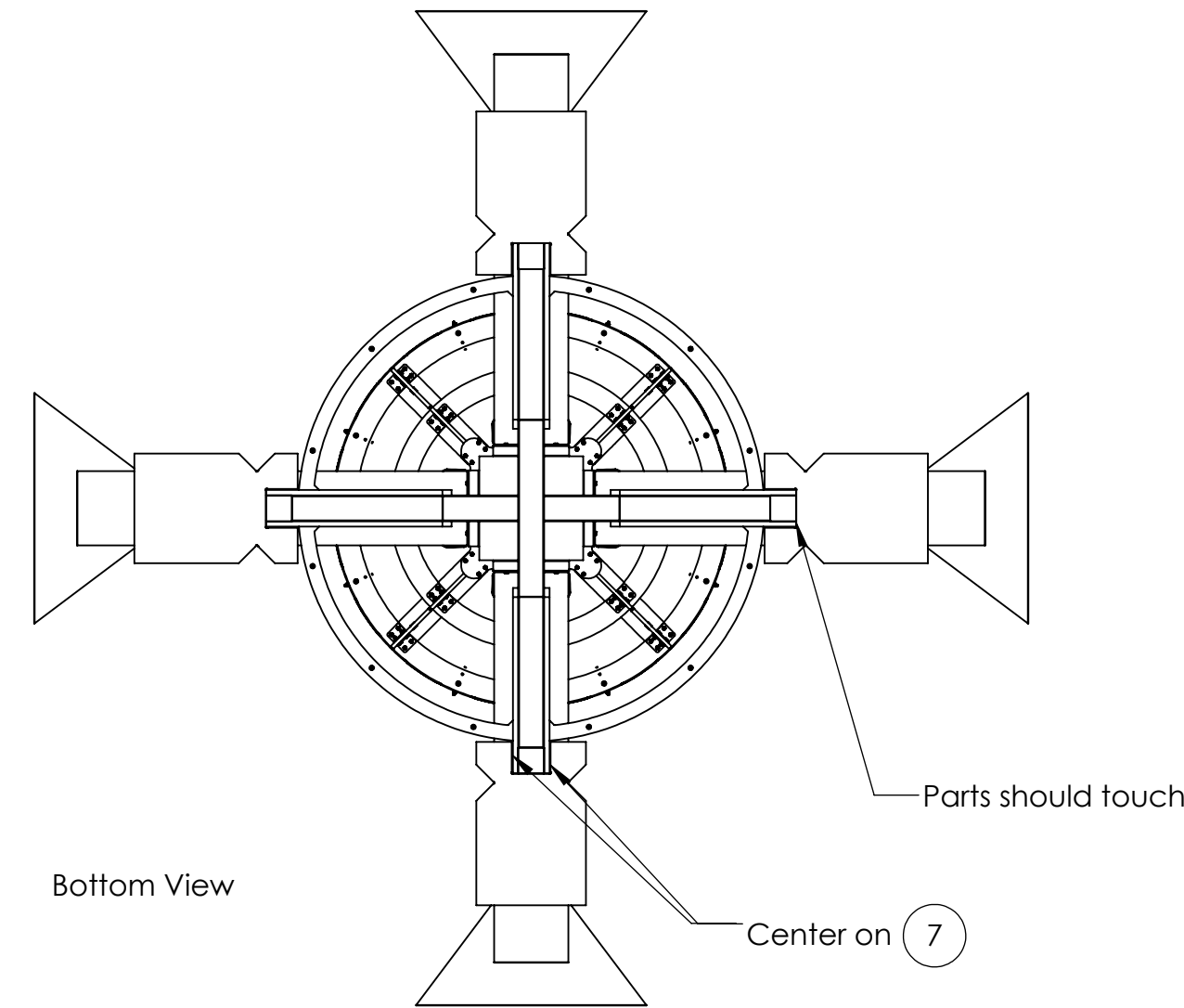
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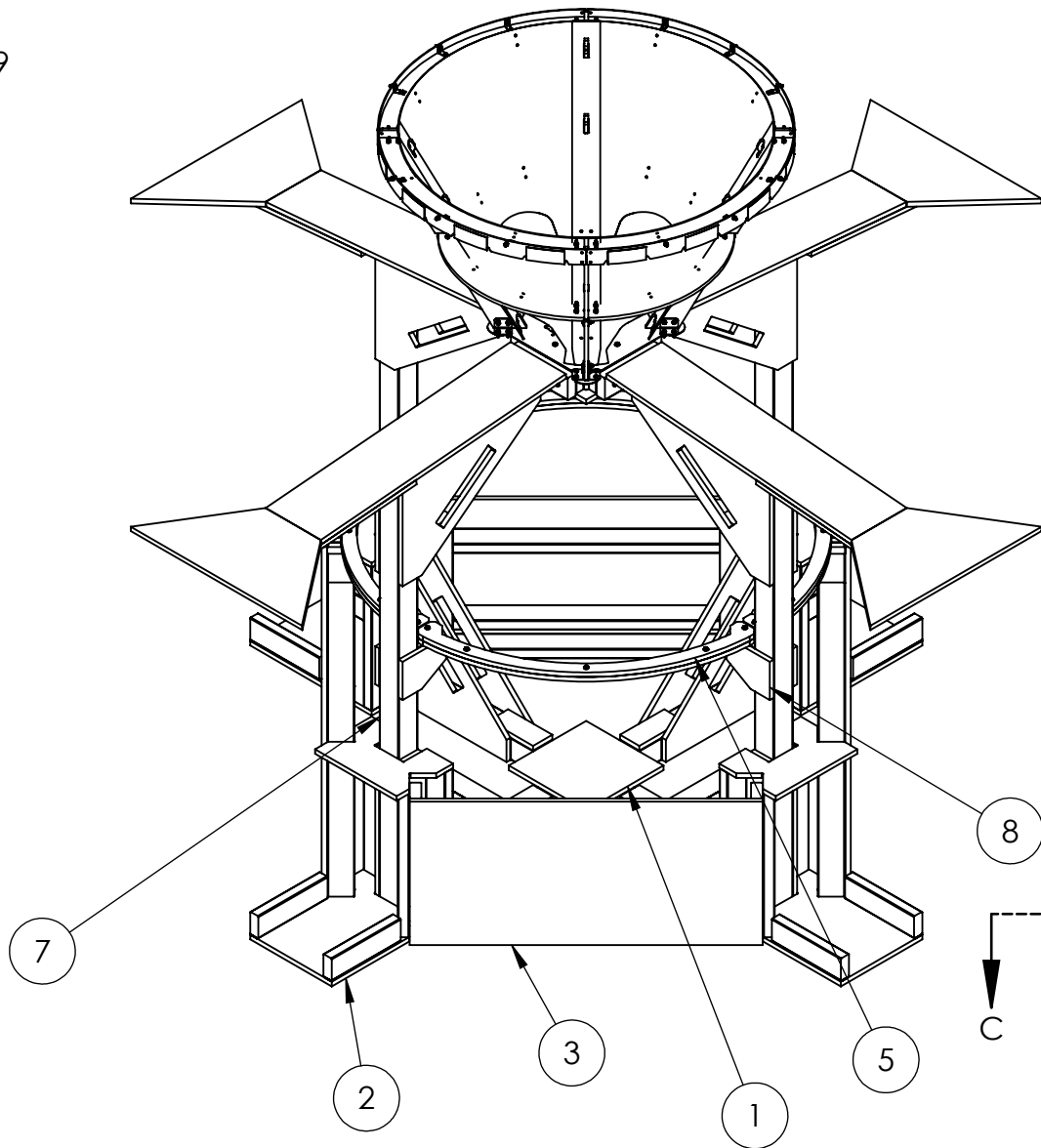
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Step 8

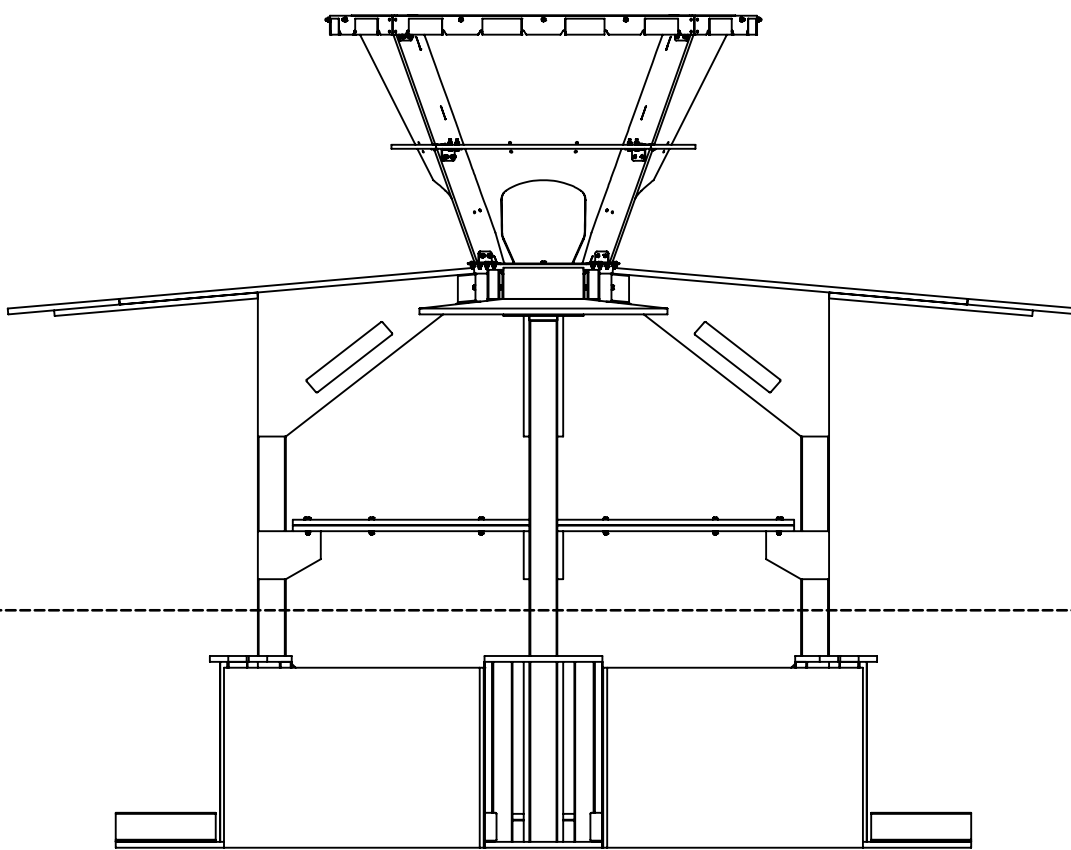
Step 9



1. Align 4x 2 to Step 7, as shown.
Connection will happen in a later step.

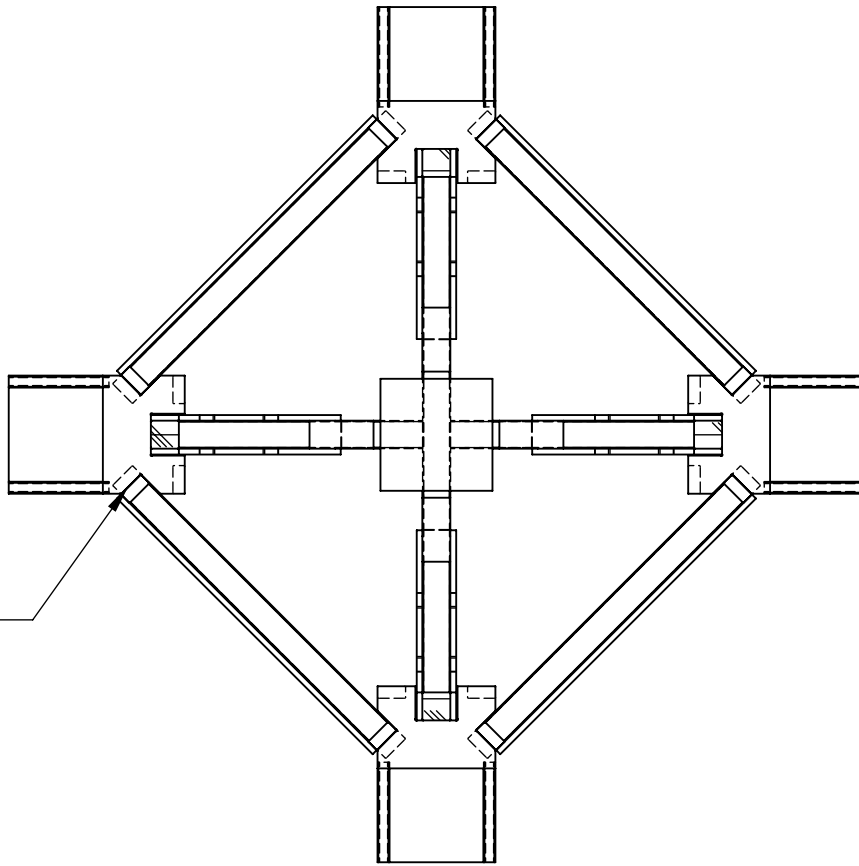


1. Add 4x 3 to Step 8, as shown.
2. Connect 3 to 2 using 2.5" long screws. It is recommended to use 8x screws per 3, 4x per side.
3. Tighten hardware between 4x 5 and 4x 8.
4. Optional: Add 2" long screws to connect 1 to 4x 7. It is recommended to 4x screws per 7.
- Note: It is a best practice to avoid placing screws within 1" of the cut edge of 4"x4" lumber.



Parts should touch

SECTION C-C
Hidden Lines Shown



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:

DO NOT SCALE DRAWING

| TEAM | NAME | DATE |
|-------|------|----------|
| DRAWN | KAMC | 1/4/2022 |

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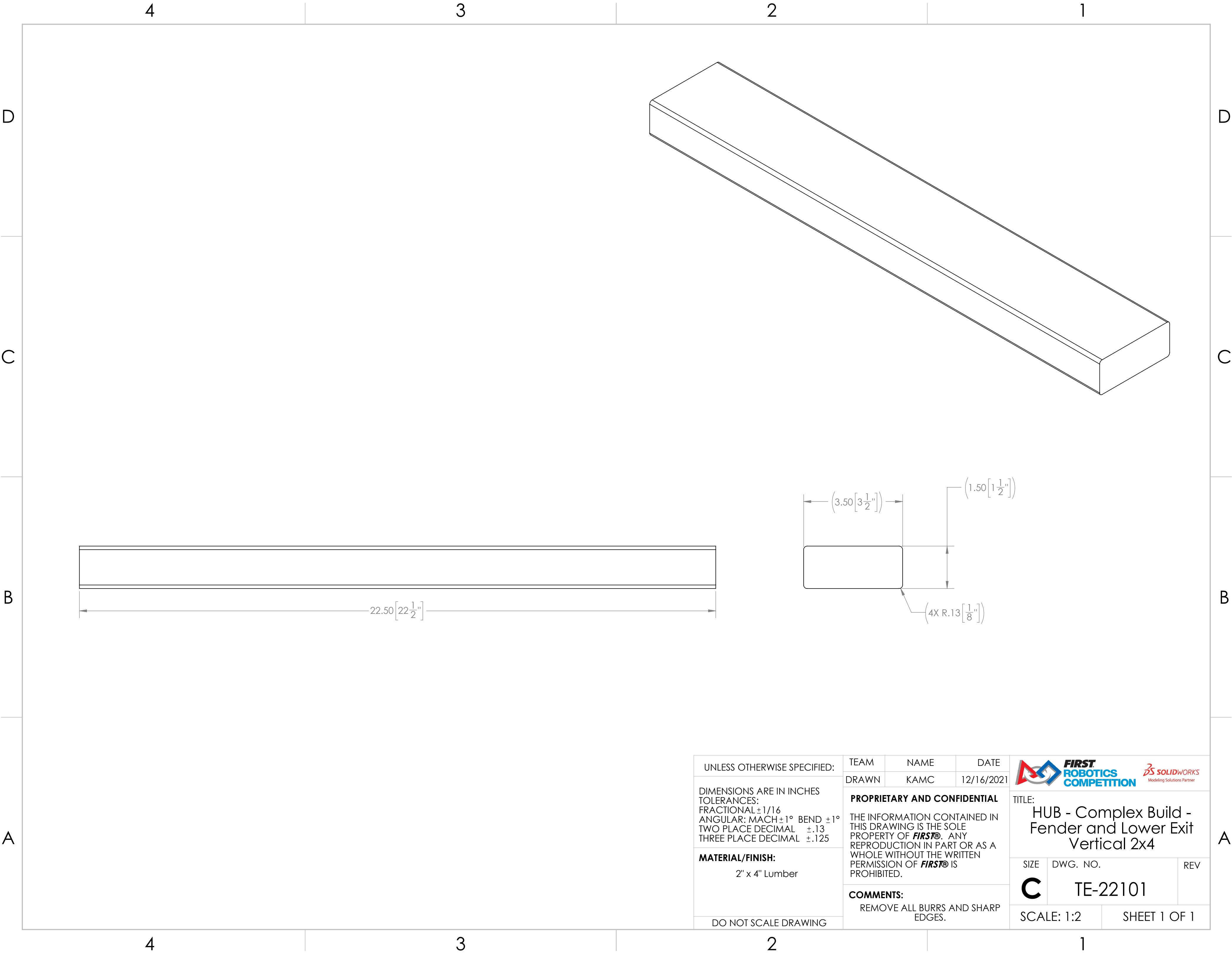




TITLE: HUB - Complex Build - Full Hub Assembly with AndyMark Upper Hub AM-4671

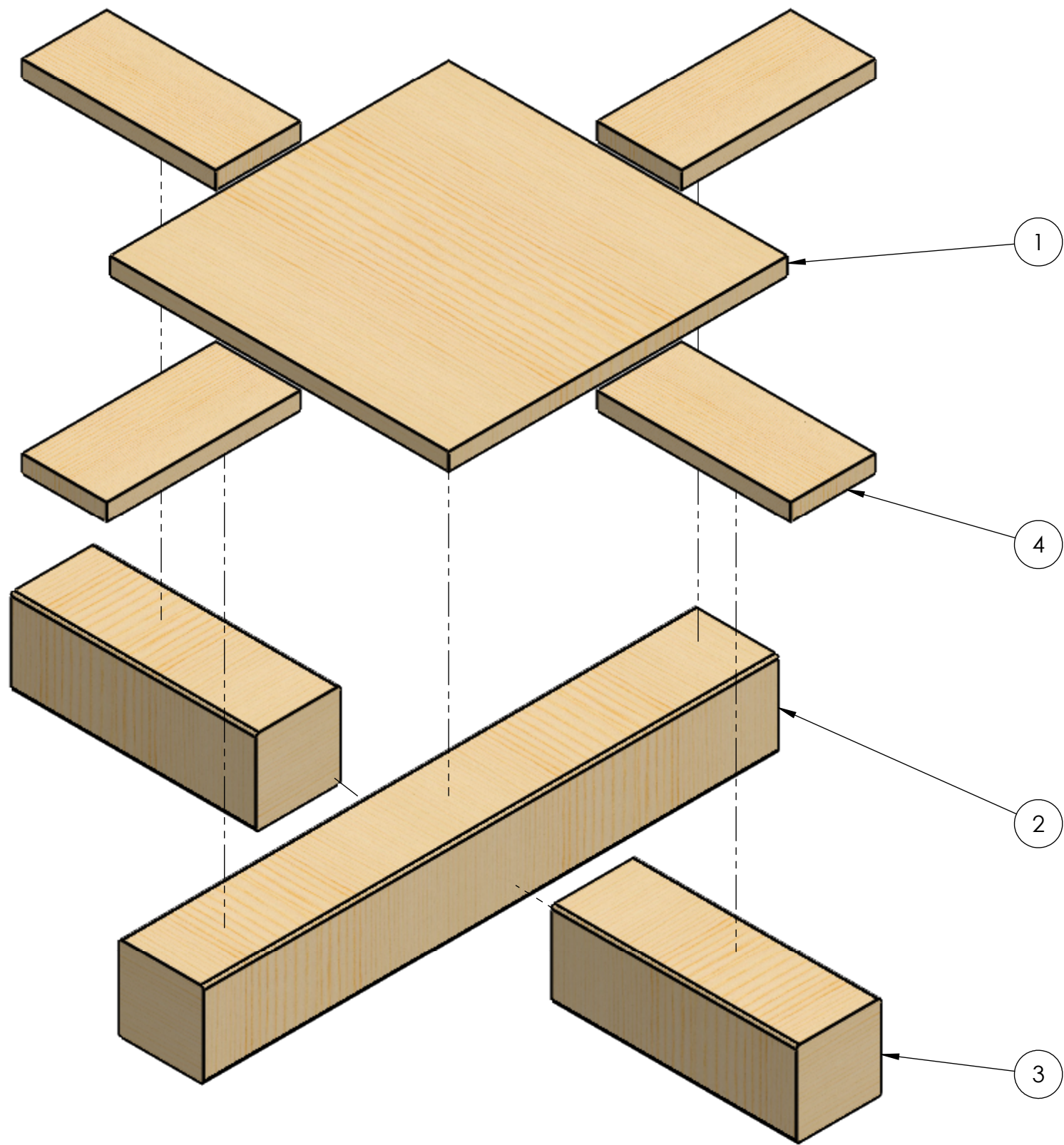
SIZE DWG. NO. REV

C TE-22100-AM

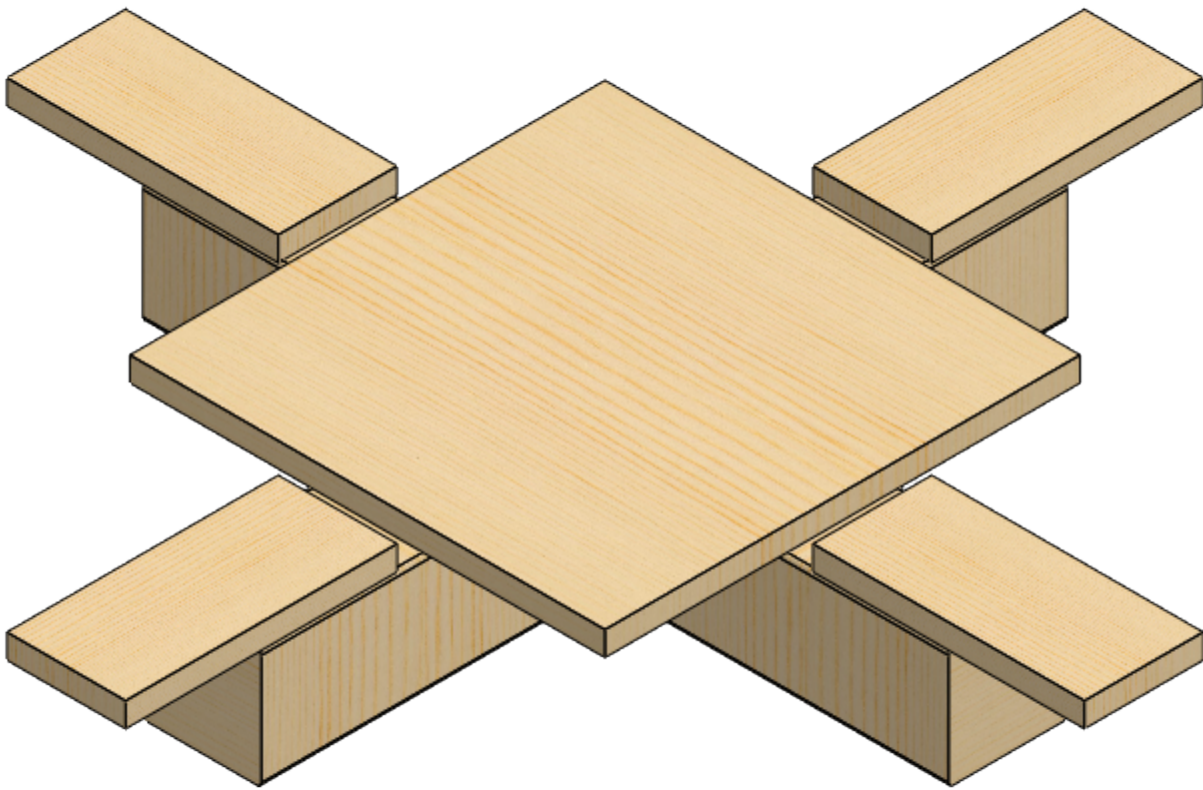
SCALE: 1:24 SHEET 7 OF 7



| | | | | | | |
|---|--|--------------|------------|---|----------------------|-----|
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| | DRAWN | KAMC | 12/16/2021 | | | |
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| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE C | DWG. NO. TE-22101 | REV |
| SCALE: 1:2 | | SHEET 1 OF 1 | | | | |





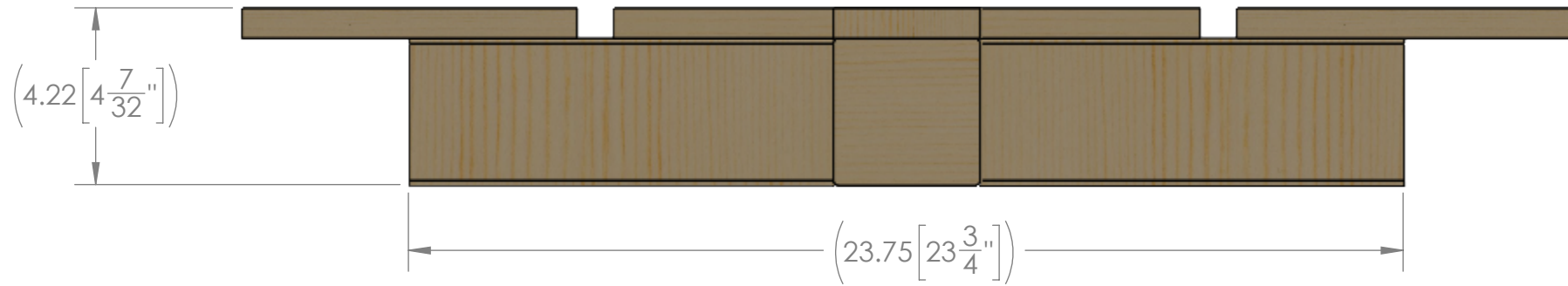
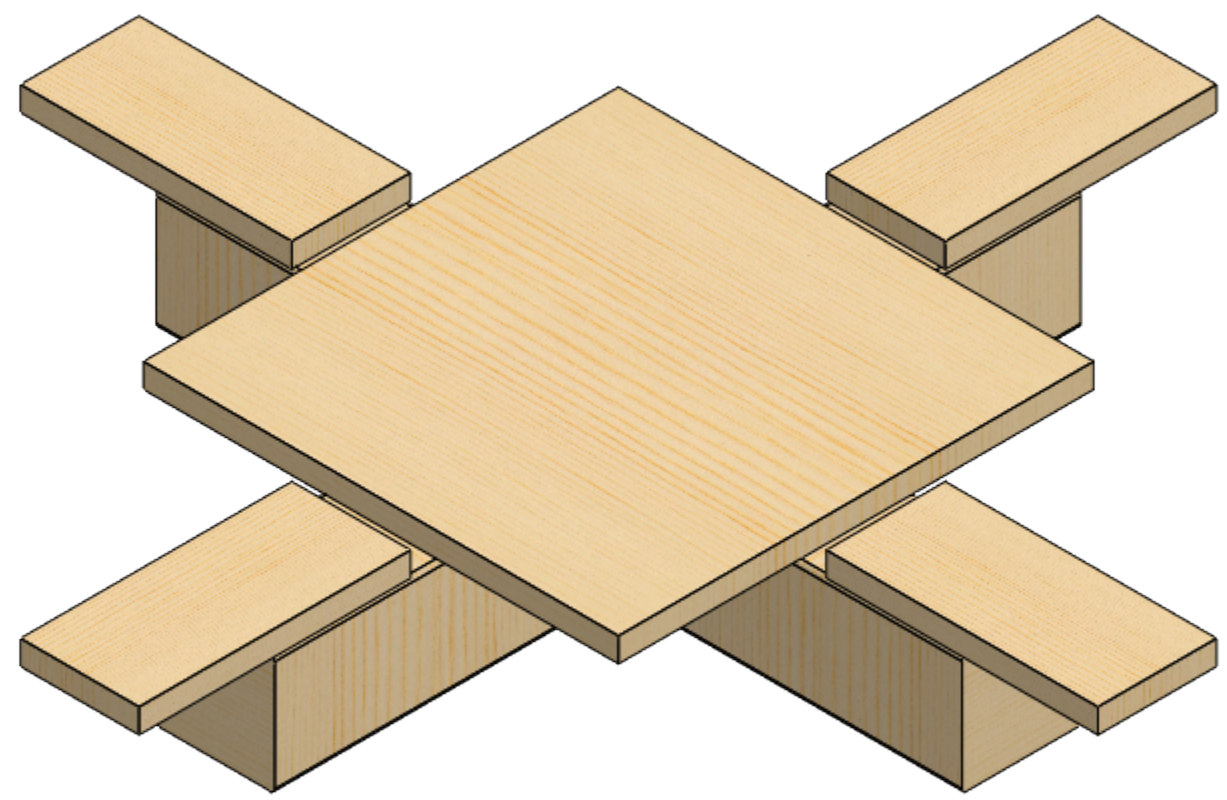
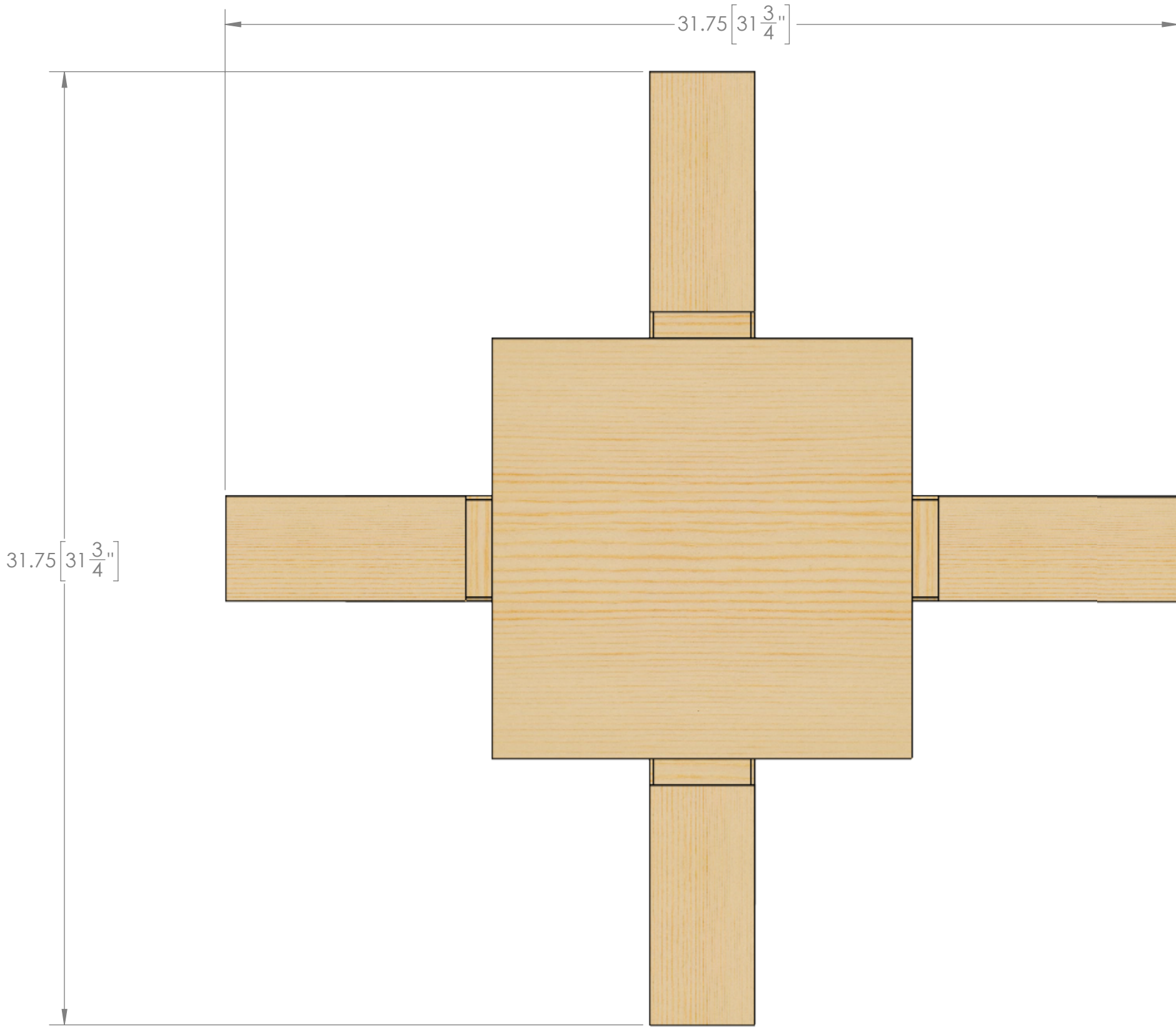
Exploded View





Hardware Needed:
#8 x 2.5" Long Screw - Qty 32

| ITEM NO. | PART NUMBER | DESCRIPTION | |
|----------|-------------|--|---|
| 1 | TE-22111 | Hub - Complex Build - Center Base Plate | 1 |
| 2 | TE-22112 | HUB - Complex Build - Base Long 4x4 | 1 |
| 3 | TE-22113 | HUB - Complex Build - Base Short 4x4 | 2 |
| 4 | TE-22114 | HUB - Complex Build - Base to Leg Connection Plate | 4 |

| | | | | | | | | | | | | | | | |
|--|--|--------------|----------|------------|---|--|------|----------|-----|---|----------|--|------------|--|--------------|
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| <p>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 $\pm .125$</p> <p>MATERIAL/FINISH:</p> <p>DO NOT SCALE DRAWING</p> | | DRAWN | KAMC | 12/16/2021 | <p>TITLE:</p> <p>HUB - Complex Build - Base Assembly</p> <table><tr><td>SIZE</td><td>DWG. NO.</td><td>REV</td></tr><tr><td>C</td><td>TE-22110</td><td></td></tr><tr><td colspan="2">SCALE: 1:4</td><td>SHEET 1 OF 3</td></tr></table> | | SIZE | DWG. NO. | REV | C | TE-22110 | | SCALE: 1:4 | | SHEET 1 OF 3 |
| | | SIZE | DWG. NO. | REV | | | | | | | | | | | |
| | | C | TE-22110 | | | | | | | | | | | | |
| SCALE: 1:4 | | SHEET 1 OF 3 | | | | | | | | | | | | | |
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| MATERIAL/FINISH: | COMMENTS: | | | SIZE | DWG. NO. | REV |
| | REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22110 | |
| DO NOT SCALE DRAWING | | | | SCALE: 1:4 | | SHEET 2 OF 3 |

D

C

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A

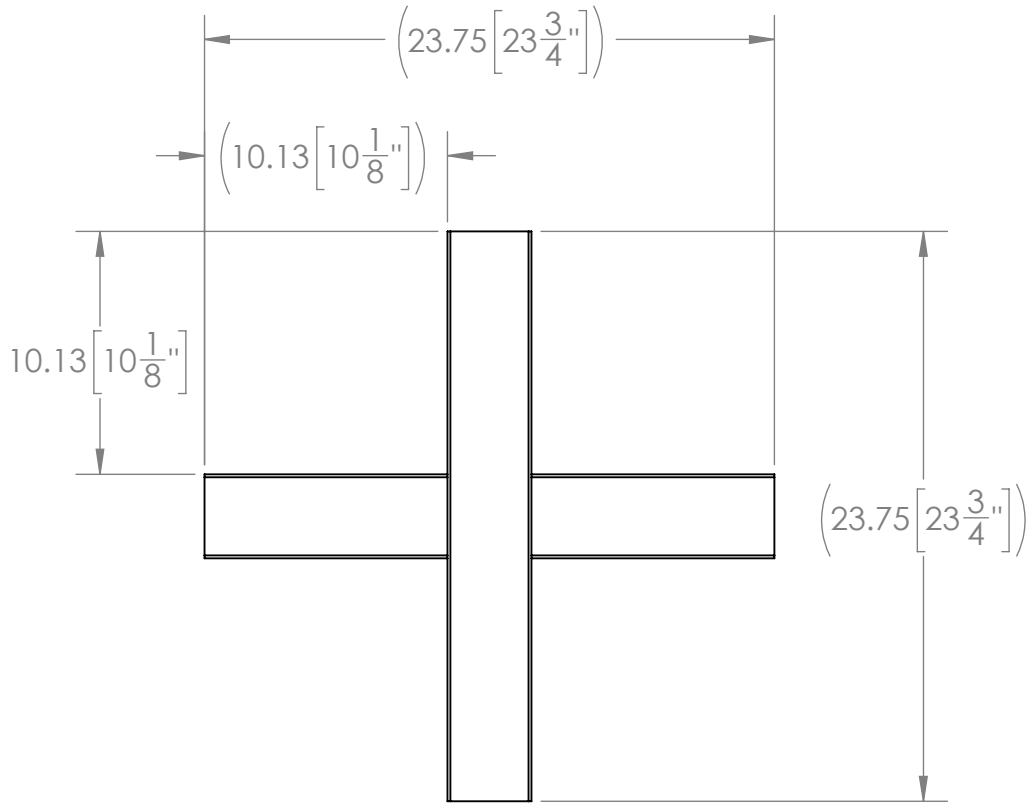
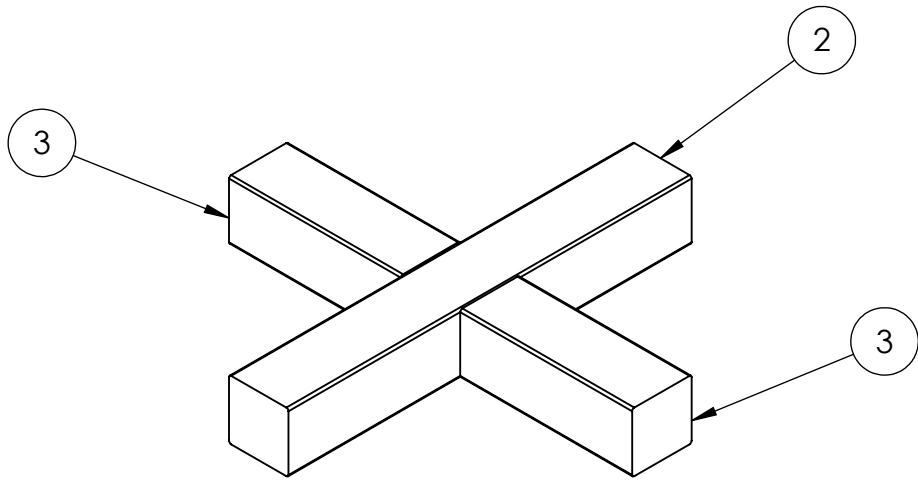
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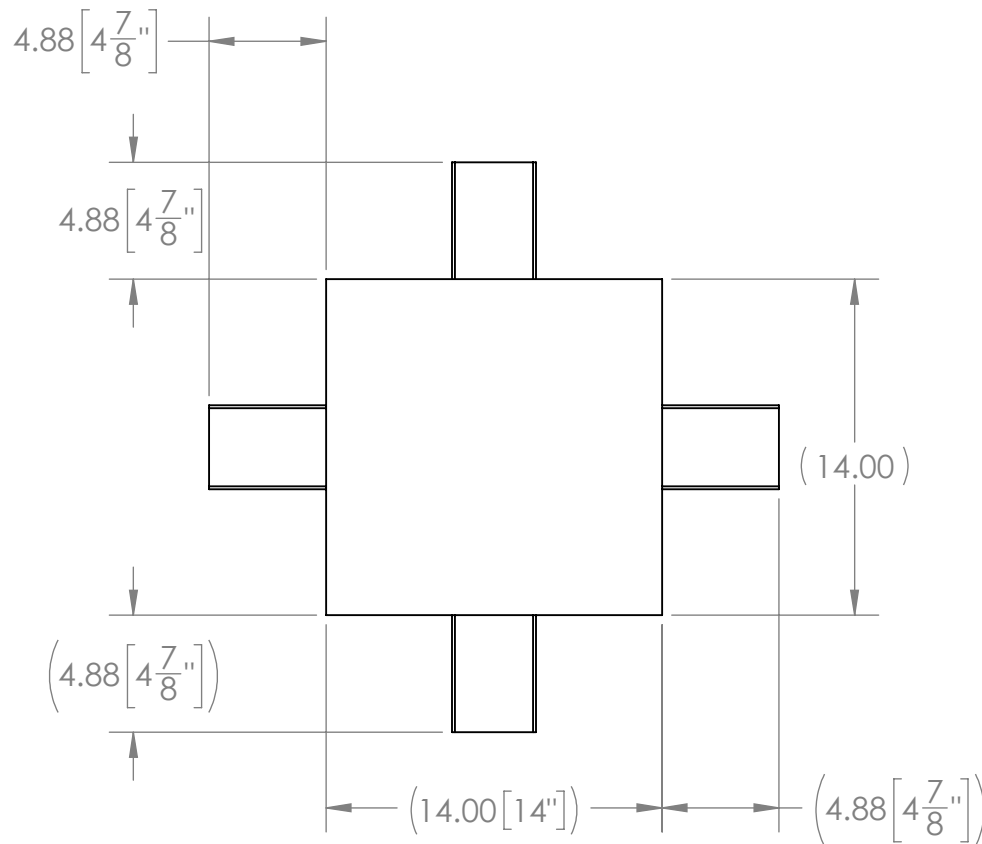
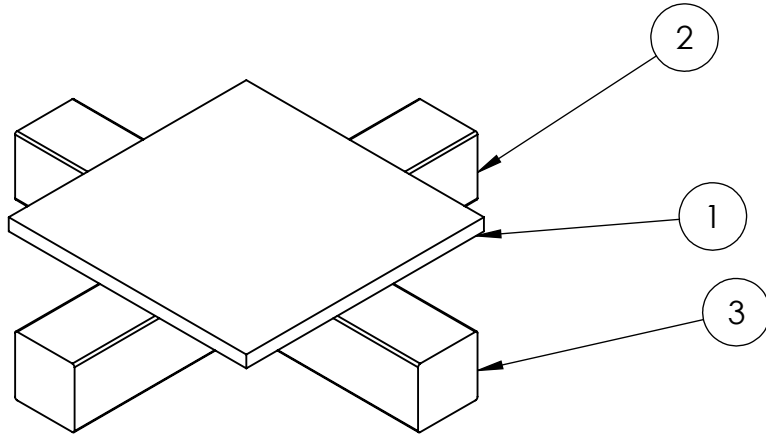
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Step 1



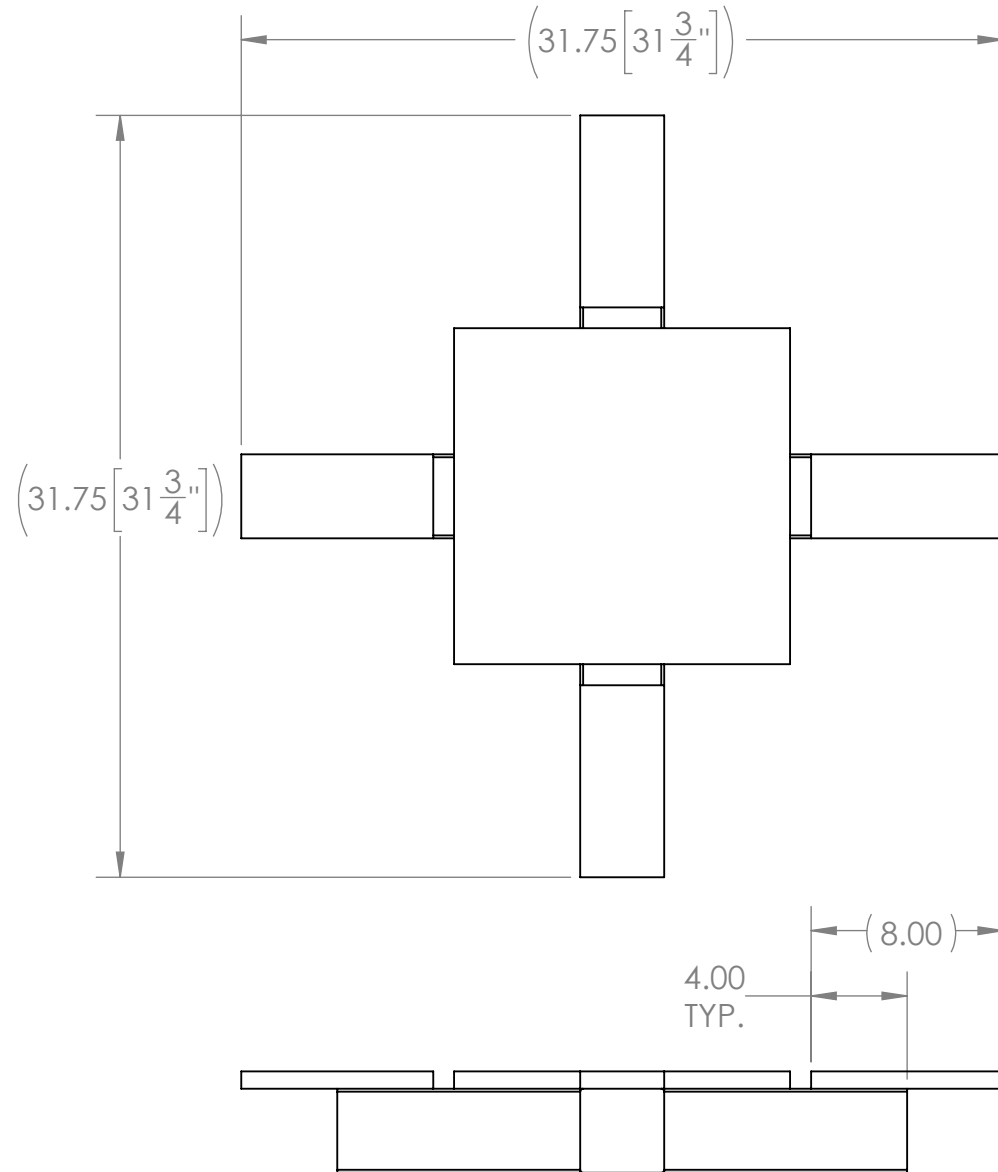
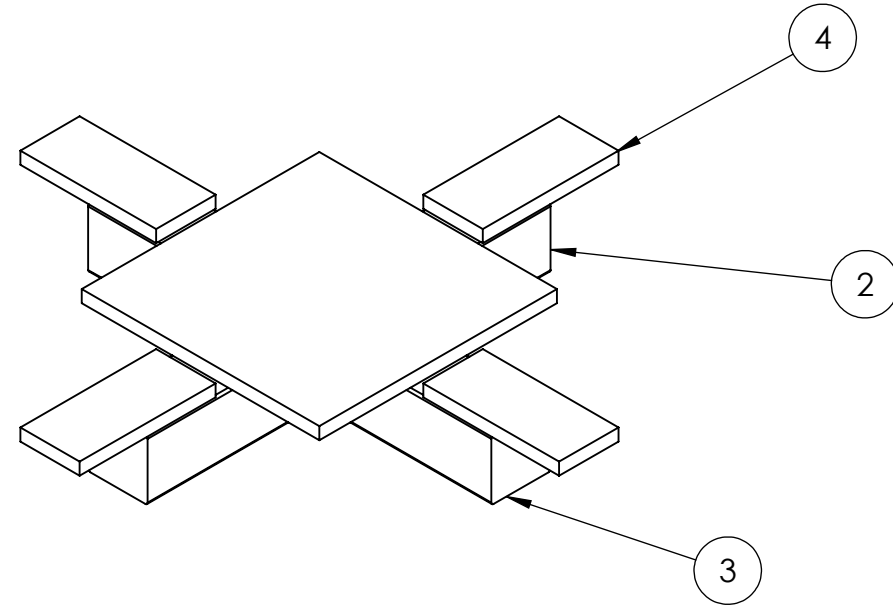
1. Align 2x (3) to (1) as shown. Attachment will happen in next step.

Step 2





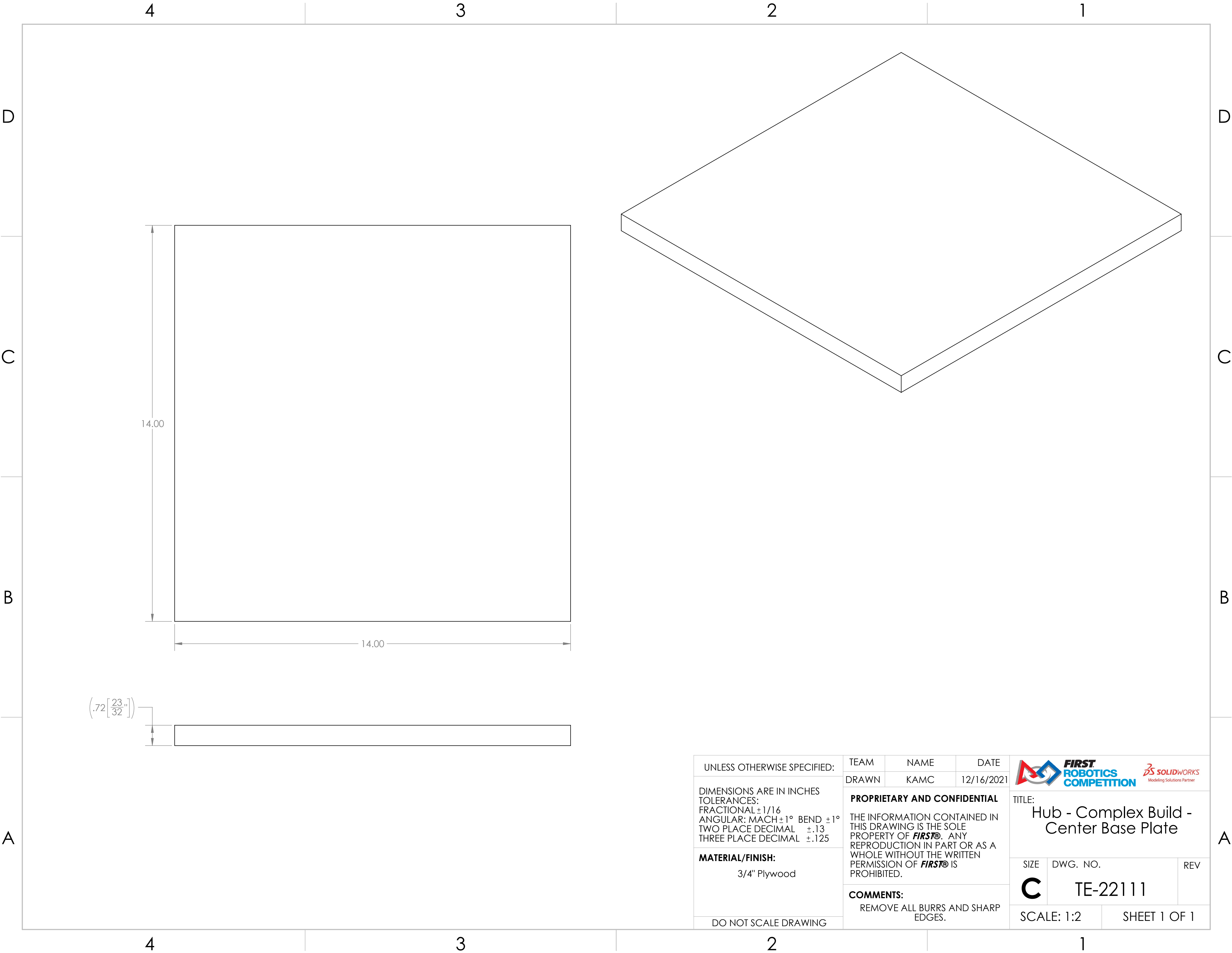
1. Align (1) to Step 1, as shown.
2. Connect using 2.5" long screws. It is recommended to use 4x screws into each (3) and 8x (2).
Note: A best practice when screwing into a 4"x4" is to avoid placing a screw within 1" from the cut edge.



Step 3

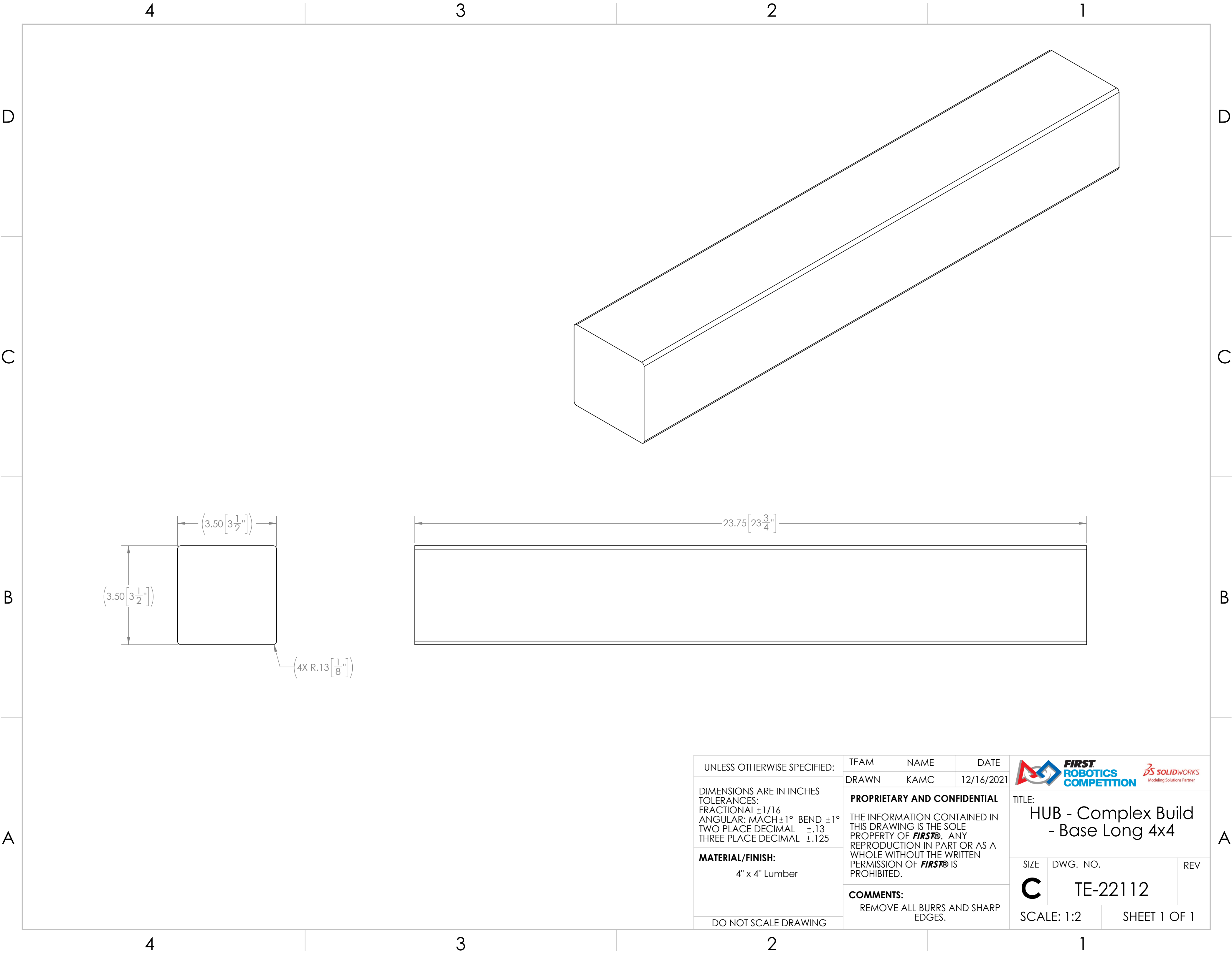


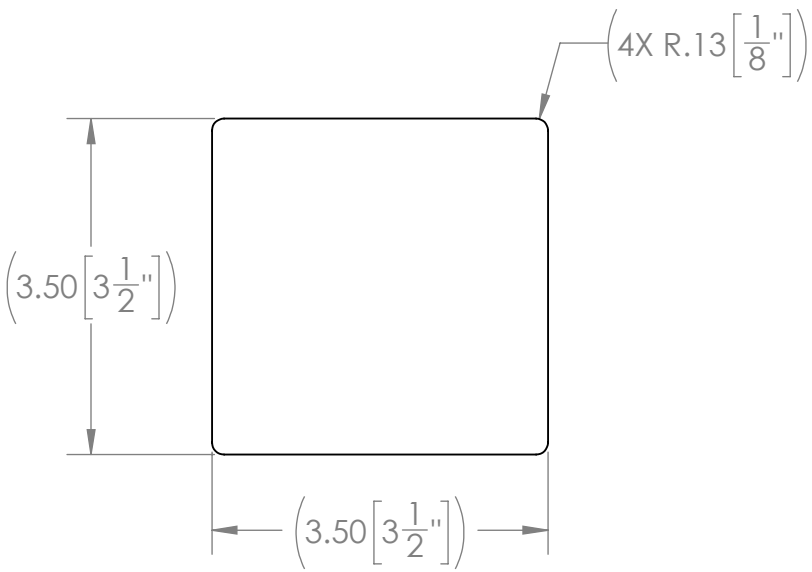
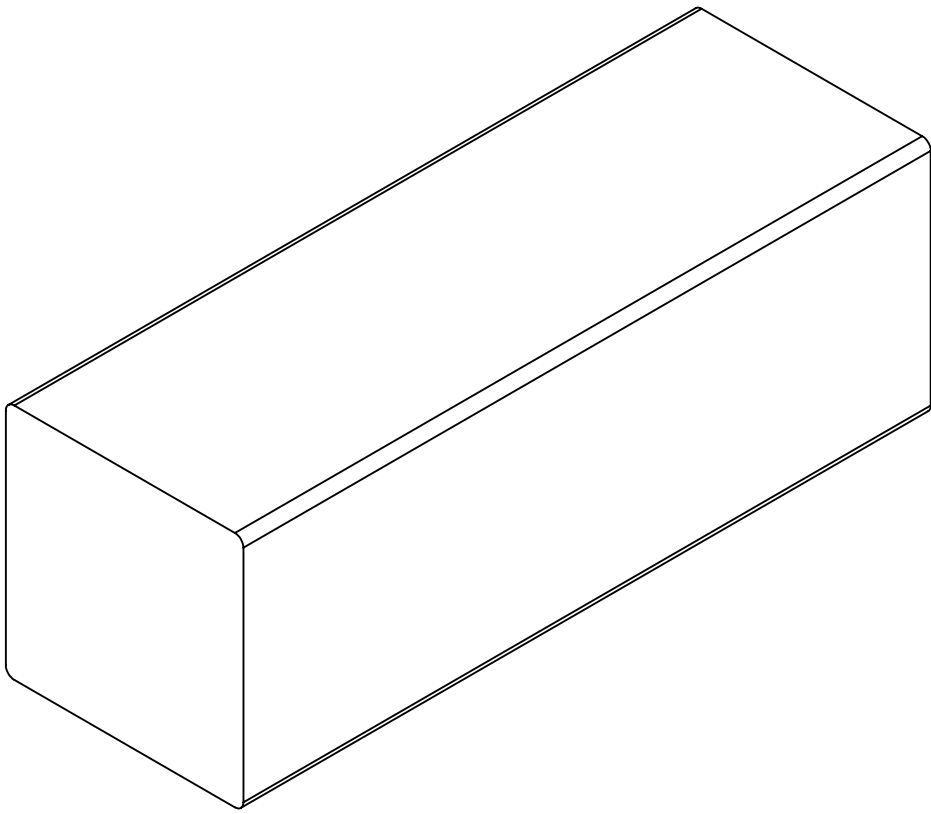
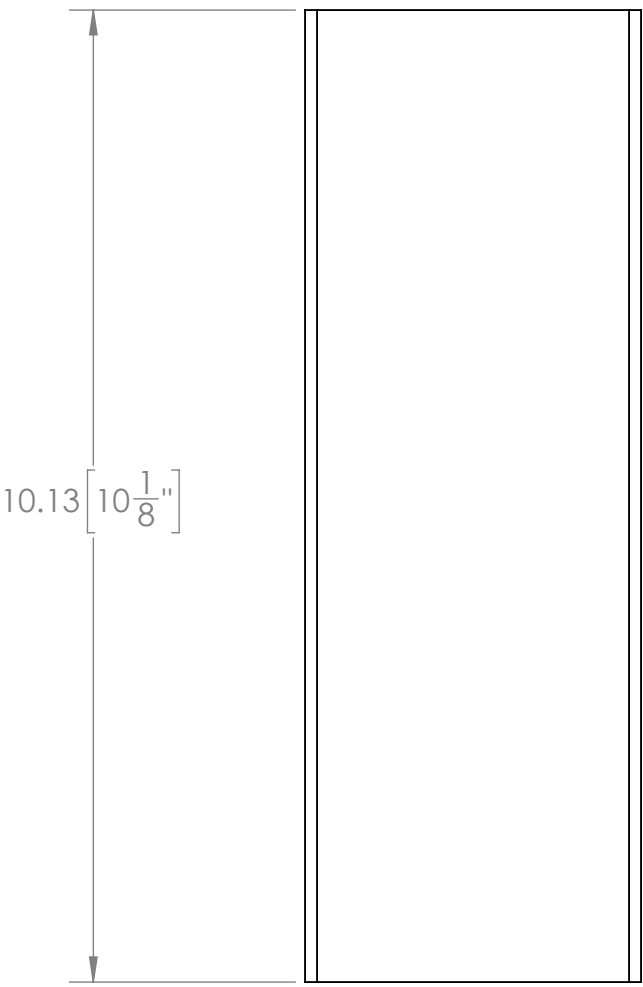
1. Align a total of 4x (4) such that x2 are on (2) and x1 is on each (3), as shown.
2. Connect using 2.5" long screws. It is recommended to use 4x screws per (4).



| | | | | | |
|--|--|------|------------|---|--------------|
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| | DRAWN | KAMC | 12/16/2021 | | |
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| COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SCALE: 1:8 | | SHEET 3 OF 3 |

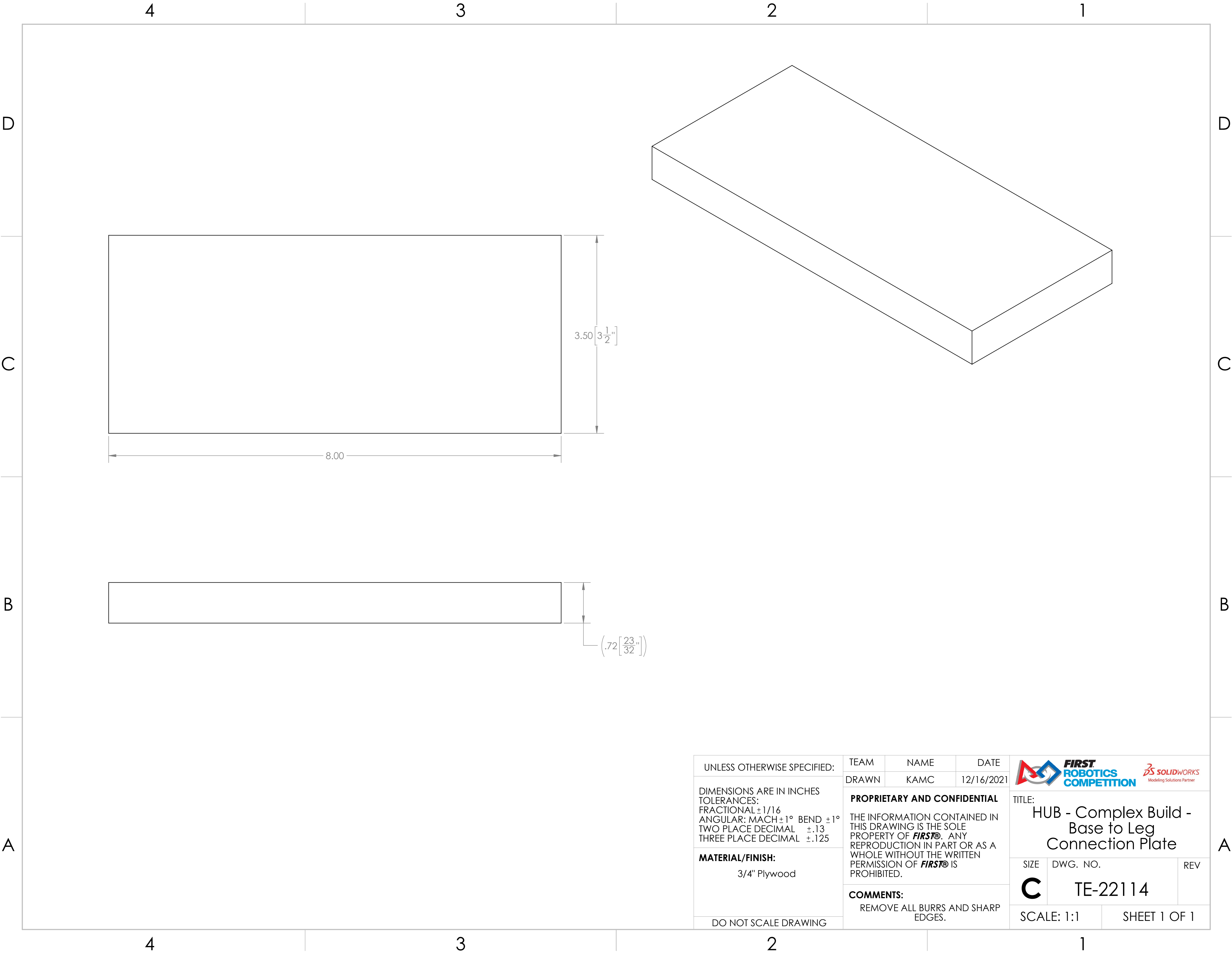




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|--|---|------|------------|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE | <div></div> | | |
| | DRAWN | KAMC | 12/16/2021 | | | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 | PROPRIETARY AND CONFIDENTIAL | | | TITLE: | | |
| | 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. | | | Hub - Complex Build - Center Base Plate | | |
| | | | | | | |
| MATERIAL/FINISH: 3/4" Plywood | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE | DWG. NO. | REV |
| | | | | C | TE-22111 | |
| DO NOT SCALE DRAWING | | | | SCALE: 1:2 | | SHEET 1 OF 1 |

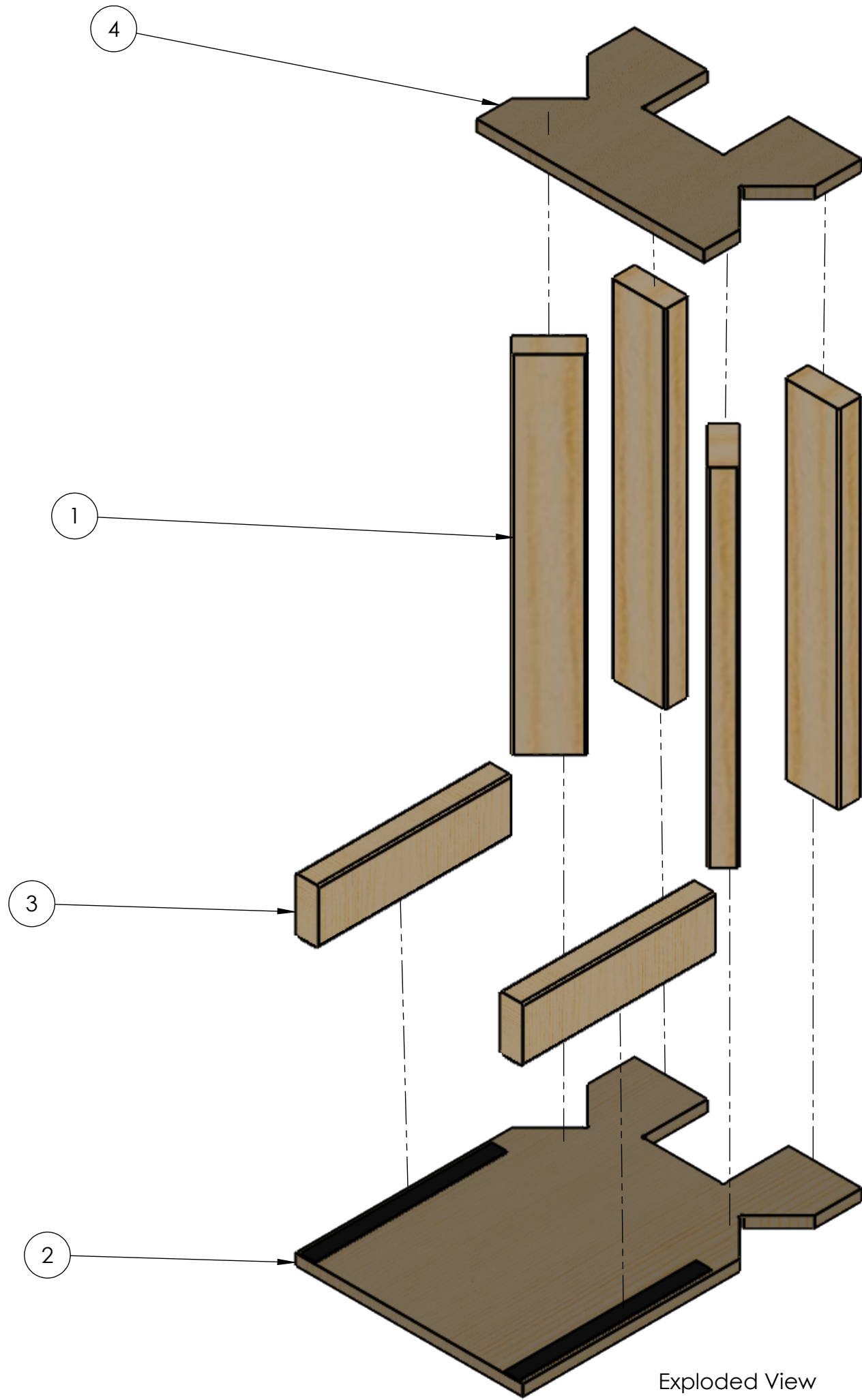




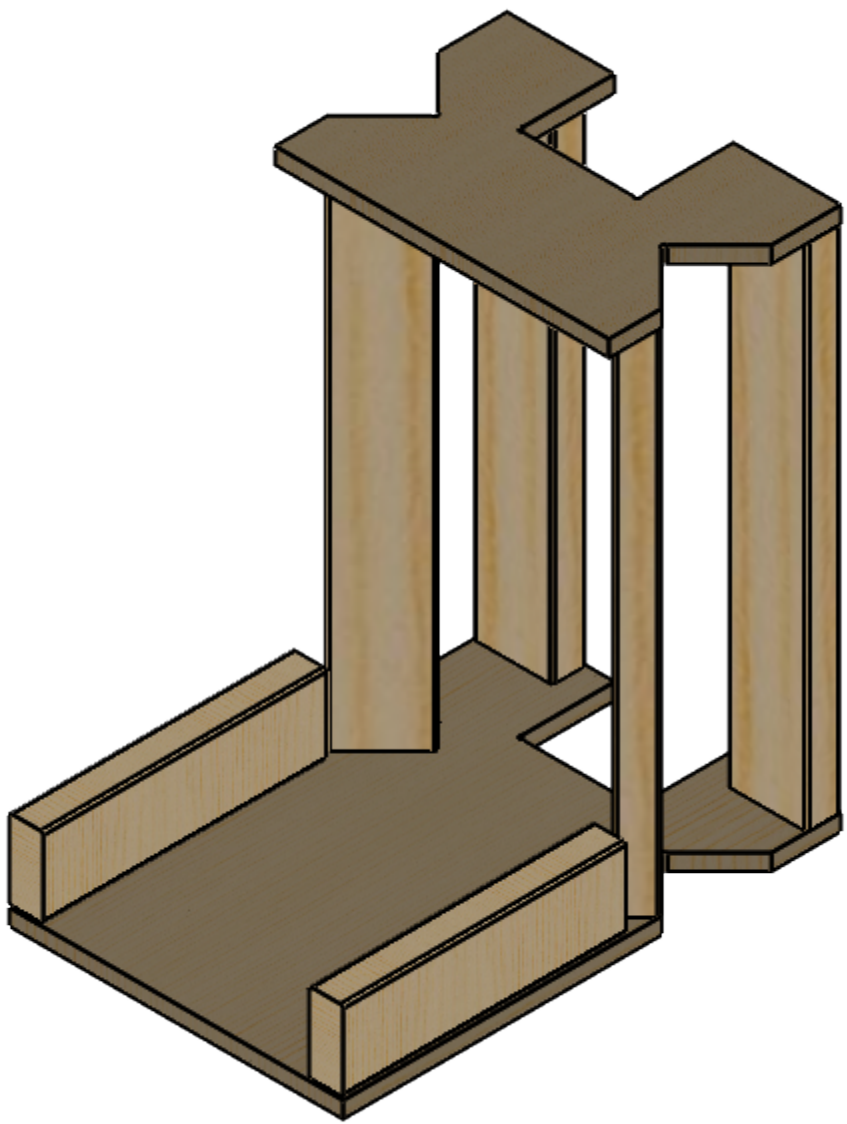
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|--|---|------|------------|--|----------|-----|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: 4" x 4" Lumber DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div><div></div><div>TITLE: HUB - Complex Build - Base Short 4x4</div></div> | | |
| | DRAWN | KAMC | 12/16/2021 | | | |
| | 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. COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE | DWG. NO. | REV |
| C | | | | TE-22113 | | |
| SCALE: 1:2 | | | | SHEET 1 OF 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: 3/4" Plywood DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> | | |
| | DRAWN | KAMC | 12/16/2021 | | | |
| | 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. | | | TITLE: HUB - Complex Build - Base to Leg Connection Plate | | |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE C | DWG. NO. TE-22114 | REV |
| SCALE: 1:1 | | SHEET 1 OF 1 | | | | |





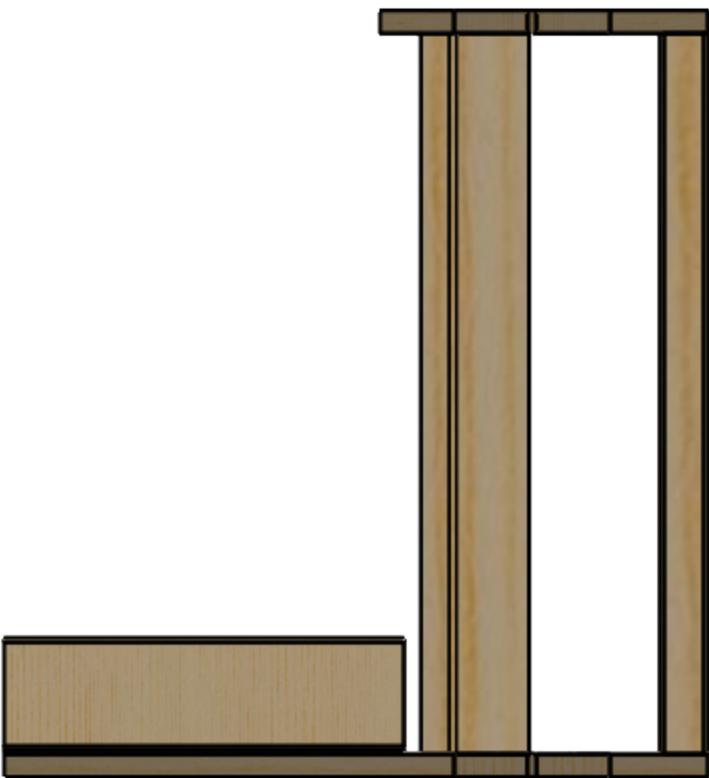
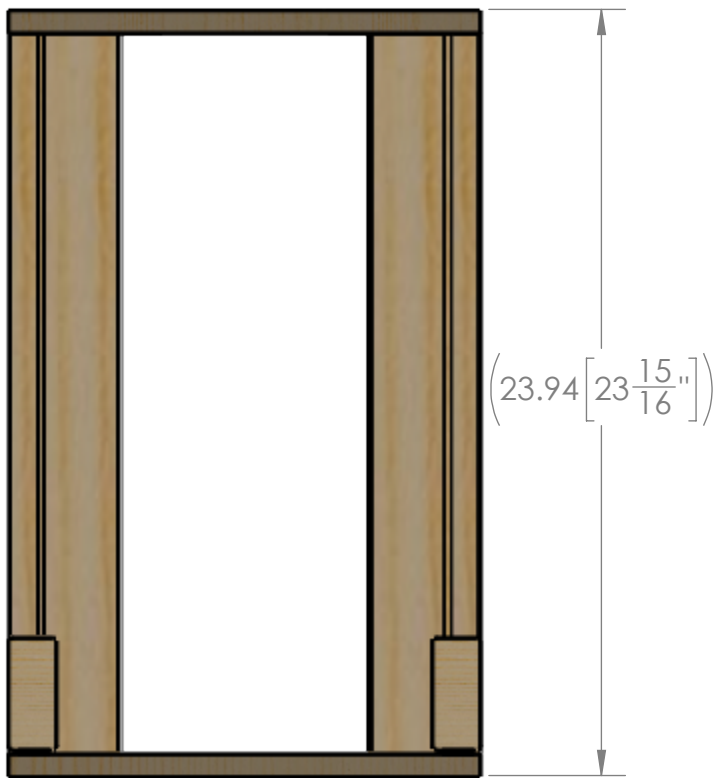
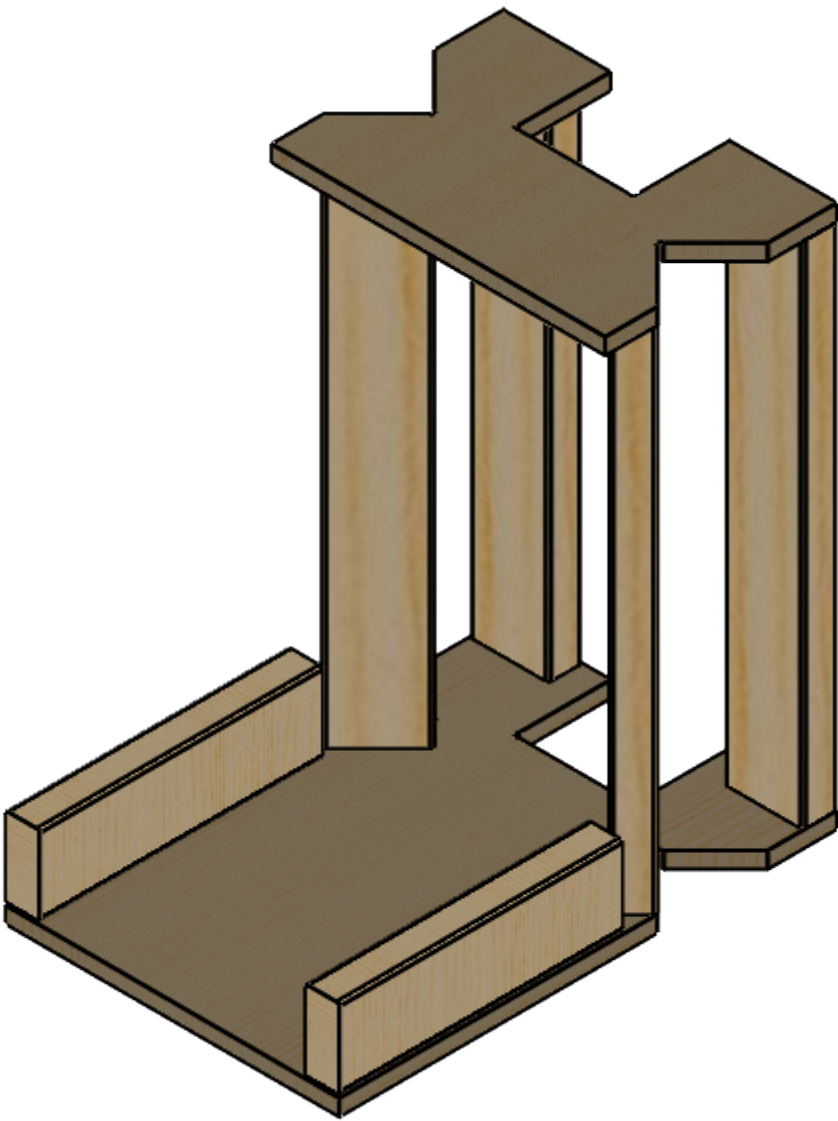
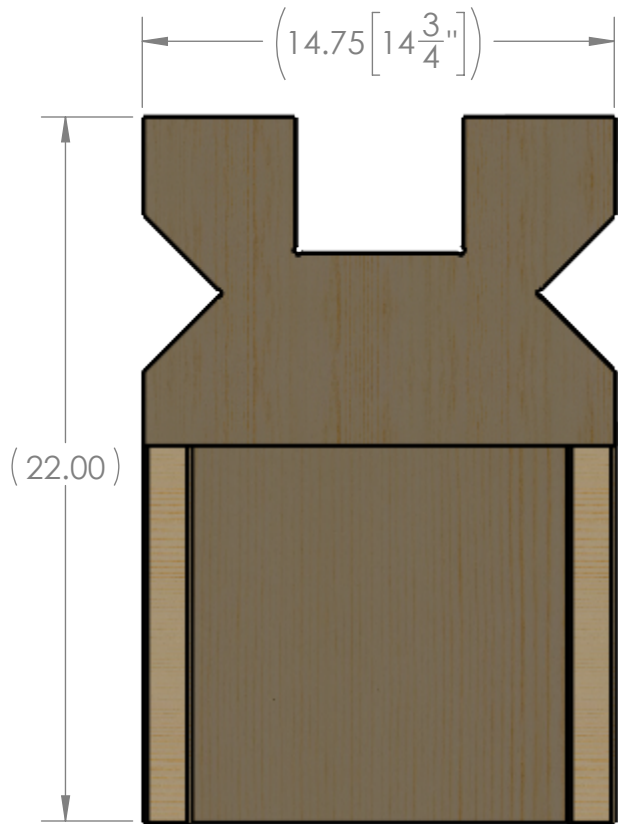
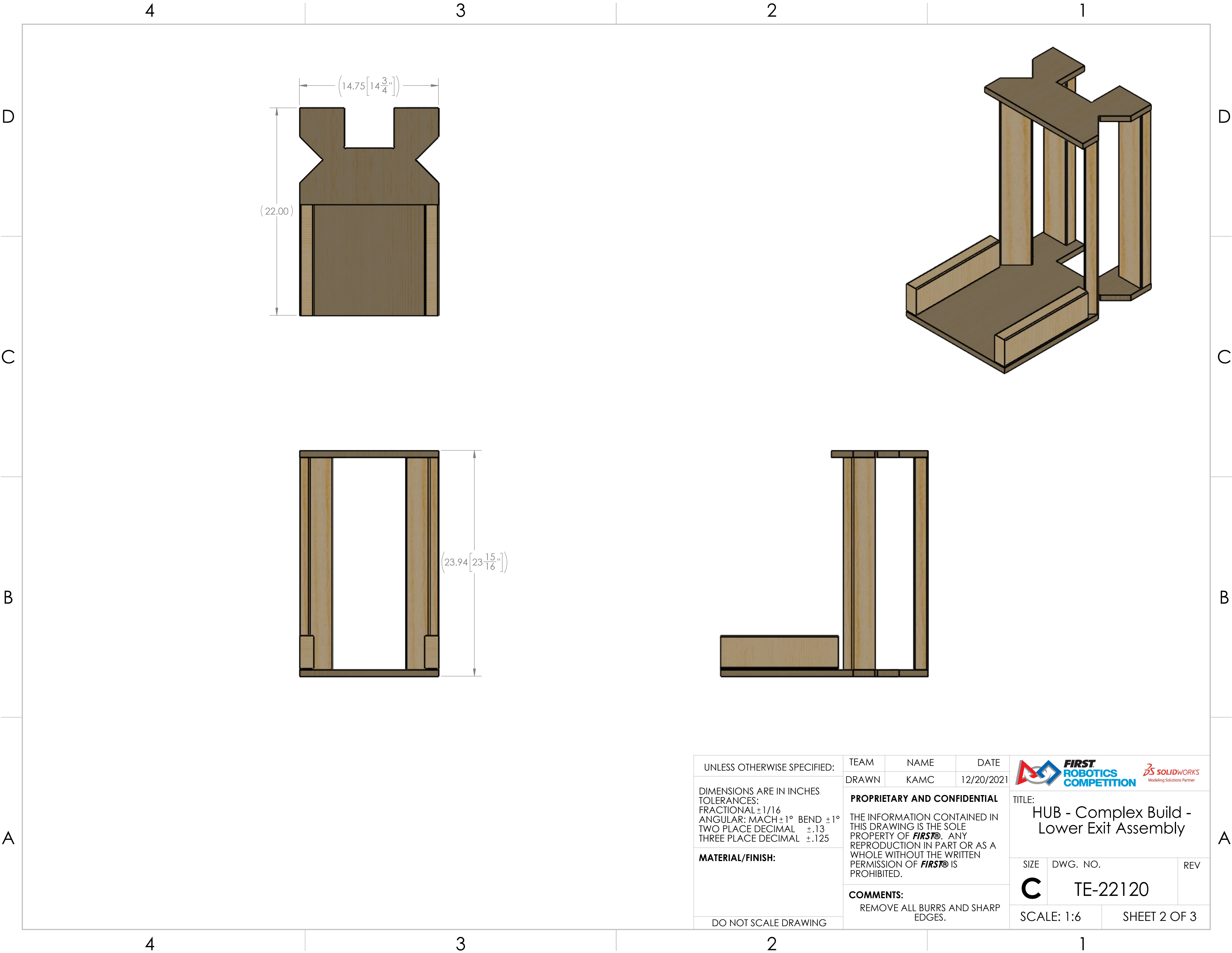
Exploded View





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

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|-------------|--|------|
| 1 | TE-22101 | HUB - Complex Build - Fender and Lower Exit Vertical 2x4 | 4 |
| 2 | TE-22122 | HUB - Complex Build - Lower Exit Bottom with Loop Assembly | 1 |
| 3 | TE-22124 | HUB - Complex Build - Lower Exit Removable Edge with Hook Assembly | 2 |
| 4 | TE-22125 | HUB - Complex Build - Lower Exit Top | 1 |

| | | | | | |
|---|---|------|------------|---|--------------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE |   | |
| | DRAWN | KAMC | 12/20/2021 | | |
| | 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. COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | TITLE: HUB - Complex Build - Lower Exit Assembly | |
| | | | SIZE | DWG. NO. | REV |
| | | | C | TE-22120 | |
| | | | SCALE: 1:6 | | SHEET 1 OF 3 |

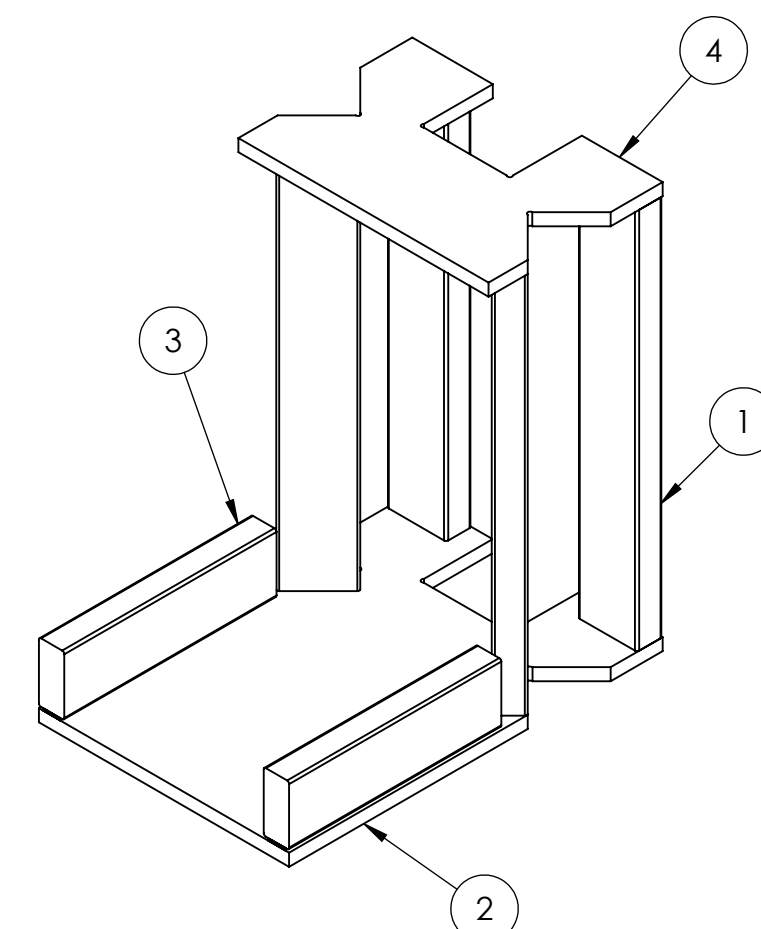




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|---|--|------|------------|---|----------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE |   | |
| | DRAWN | KAMC | 12/20/2021 | | |
| | 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. | | | TITLE: HUB - Complex Build - Lower Exit Assembly | |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE | DWG. NO. |
| C | | | | TE-22120 | |
| SCALE: 1:6 | | | | SHEET 2 OF 3 | |
| | | | | | |

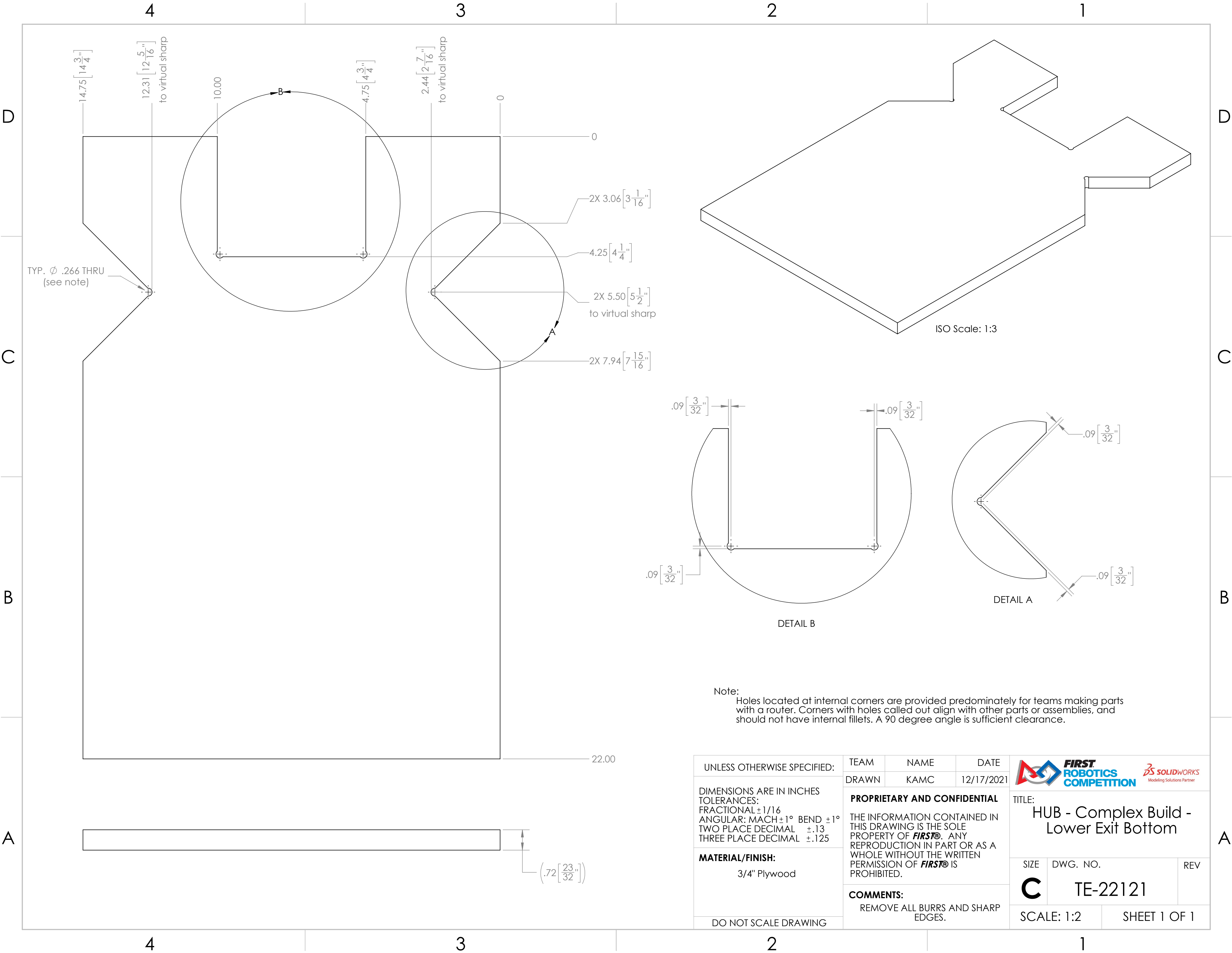
1

Isometric view of the assembly. The base plate is labeled with a dimension of $(3.50 [3 \frac{1}{2}"])$. Callout 1 points to the vertical plate, and callout 2 points to the horizontal plate.



The diagram shows a complex, symmetrical shape with a central rectangular area. Two arrows point from the text "Align to Edge" to the left and right vertical edges of the central rectangle, indicating alignment constraints.

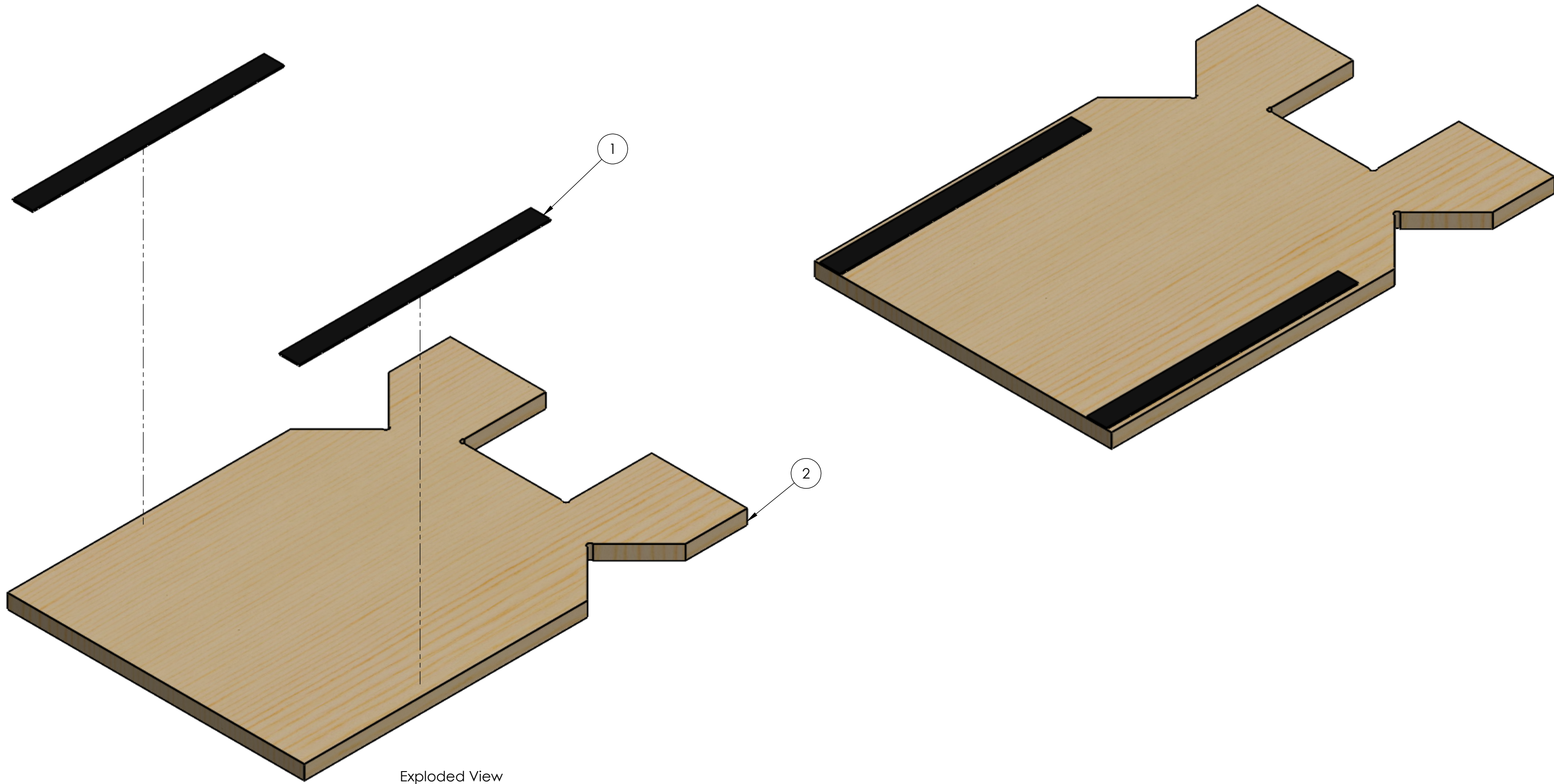


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|---|--|--|------|------------|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED: | | TEAM | NAME | DATE | <div></div> | | |
| | | DRAWN | KAMC | 12/20/2021 | | | |
| <p>DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$</p> <p>MATERIAL/FINISH:</p> | | <p>PROPRIETARY AND CONFIDENTIAL</p> <p>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.</p> | | | <p>TITLE:</p> <p>HUB - Complex Build - Lower Exit Assembly</p> | | |
| | | <p>COMMENTS:</p> <p>REMOVE ALL BURRS AND SHARP EDGES.</p> | | | | | |
| | | DO NOT SCALE DRAWING | | | | | SIZE |
| | | | | | C | TE-22120 | |
| | | | | | SCALE: 1:8 | | SHEET 3 OF 3 |



Note:
Holes located at internal corners are provided predominately for teams making parts with a router. Corners with holes called out align with other parts or assemblies, and should not have internal fillets. A 90 degree angle is sufficient clearance.

| | | | | | | |
|---|--|------|------------|---|----------|-----|
| 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 | <div></div> <div>TITLE: HUB - Complex Build - Lower Exit Bottom</div> | | |
| | DRAWN | KAMC | 12/17/2021 | | | |
| | 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. | | | SIZE | DWG. NO. | REV |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22121 | |
| | | | SCALE: 1:2 | SHEET 1 OF 1 | | |





Exploded View

Hardware Needed:
Optional: Wood Staples

Step 1

1. Attach ① to ② using adhesive backing. Align as shown on Sheet 2.
2. Optional: Use wood staples to connect ① to ② .

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|-------------|---|------|
| 1 | Loop_1_12.5 | 1" x 12.5" Loop, Adhesive Backed | 2 |
| 2 | TE-22121 | HUB - Complex Build - Lower Exit Bottom | 1 |

| | | | | |
|--|--|------|------------|--|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> <div>TITLE: HUB - Complex Build - Lower Exit Bottom with Loop Assembly</div> <div><div>SIZE</div><div>DWG. NO.</div><div>REV</div></div> <div><div>SCALE: 1:3</div><div>SHEET 1 OF 2</div></div> |
| | DRAWN | KAMC | 12/20/2021 | |
| | 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. | | | |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | |

D

C

B

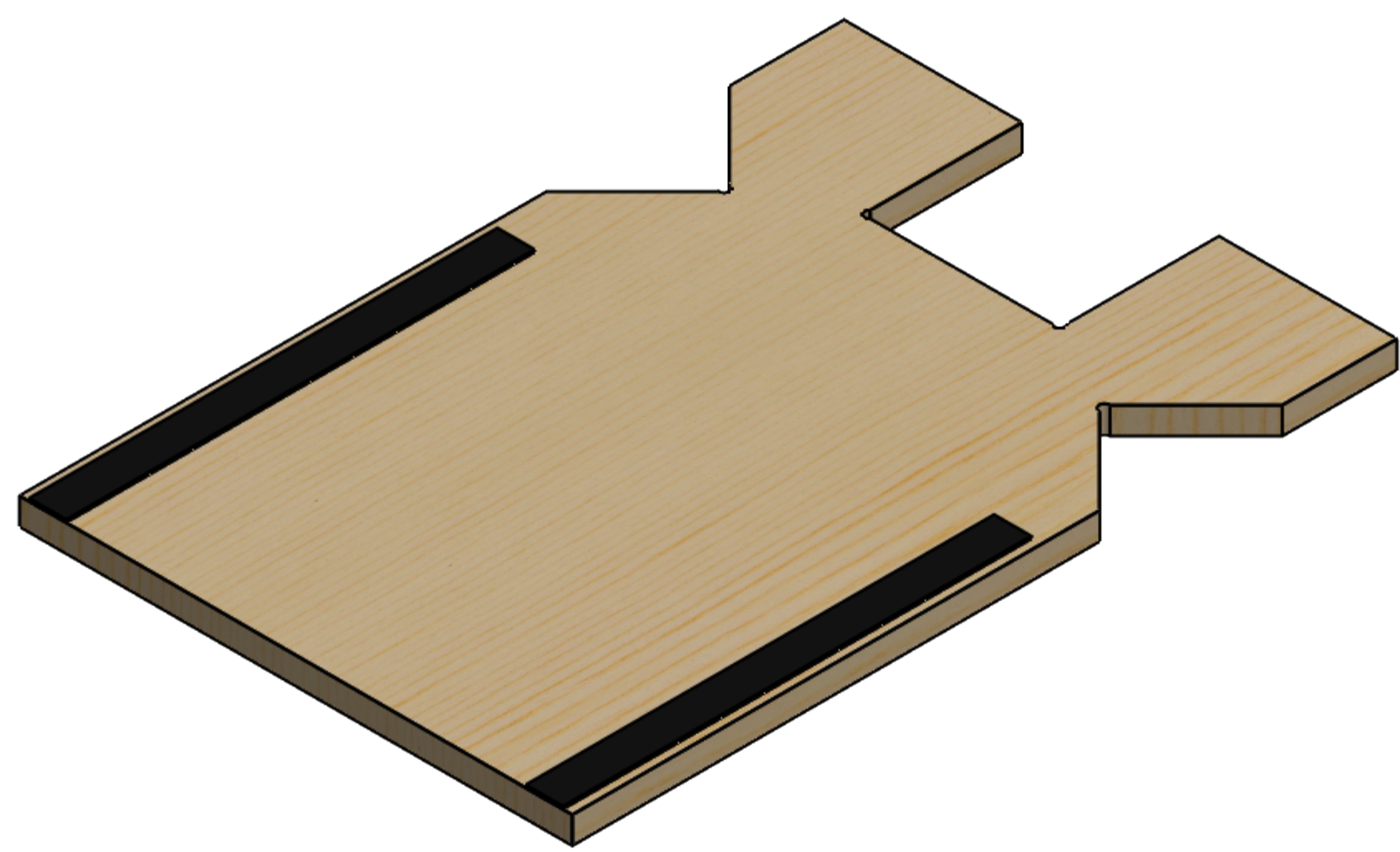
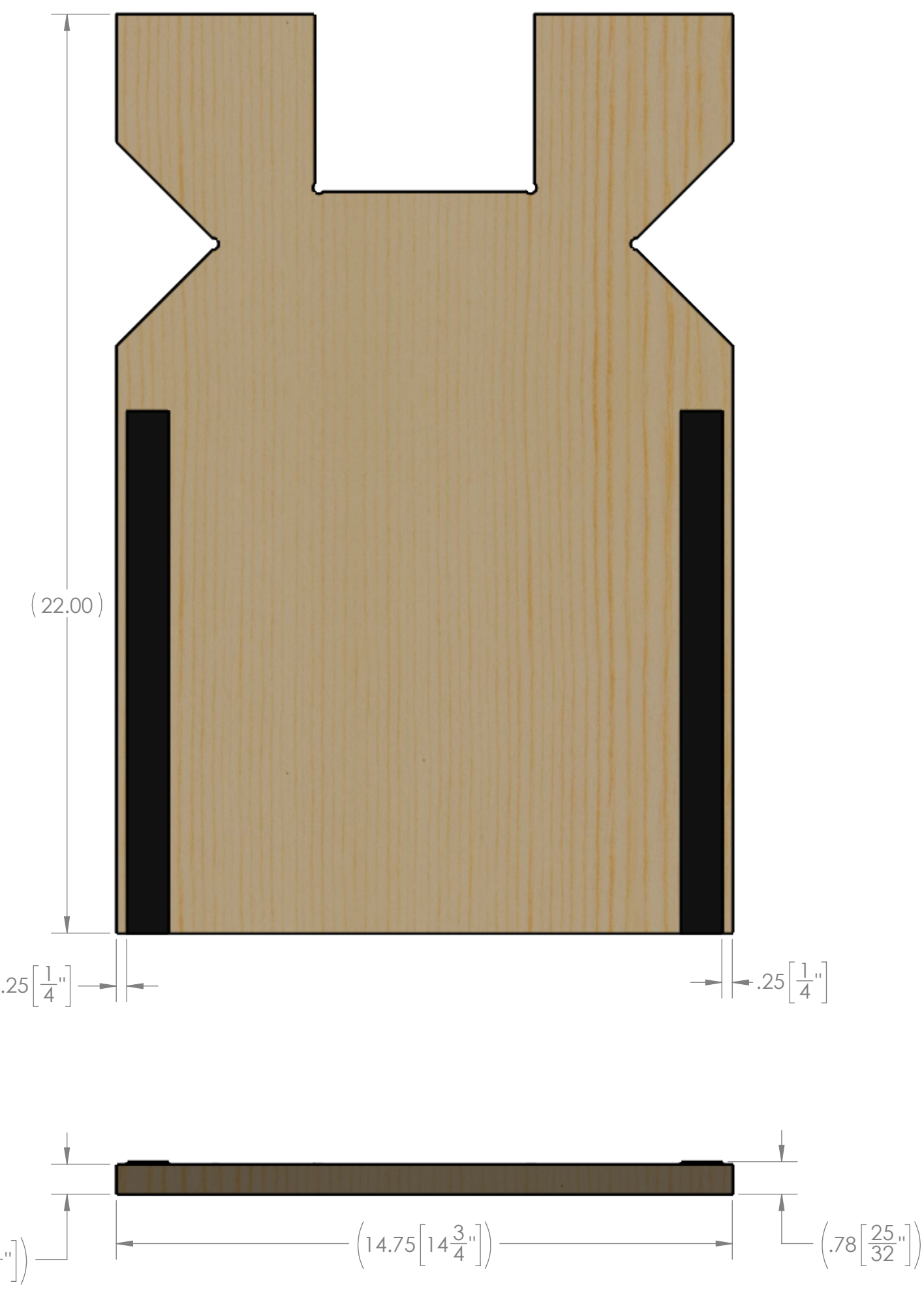
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D

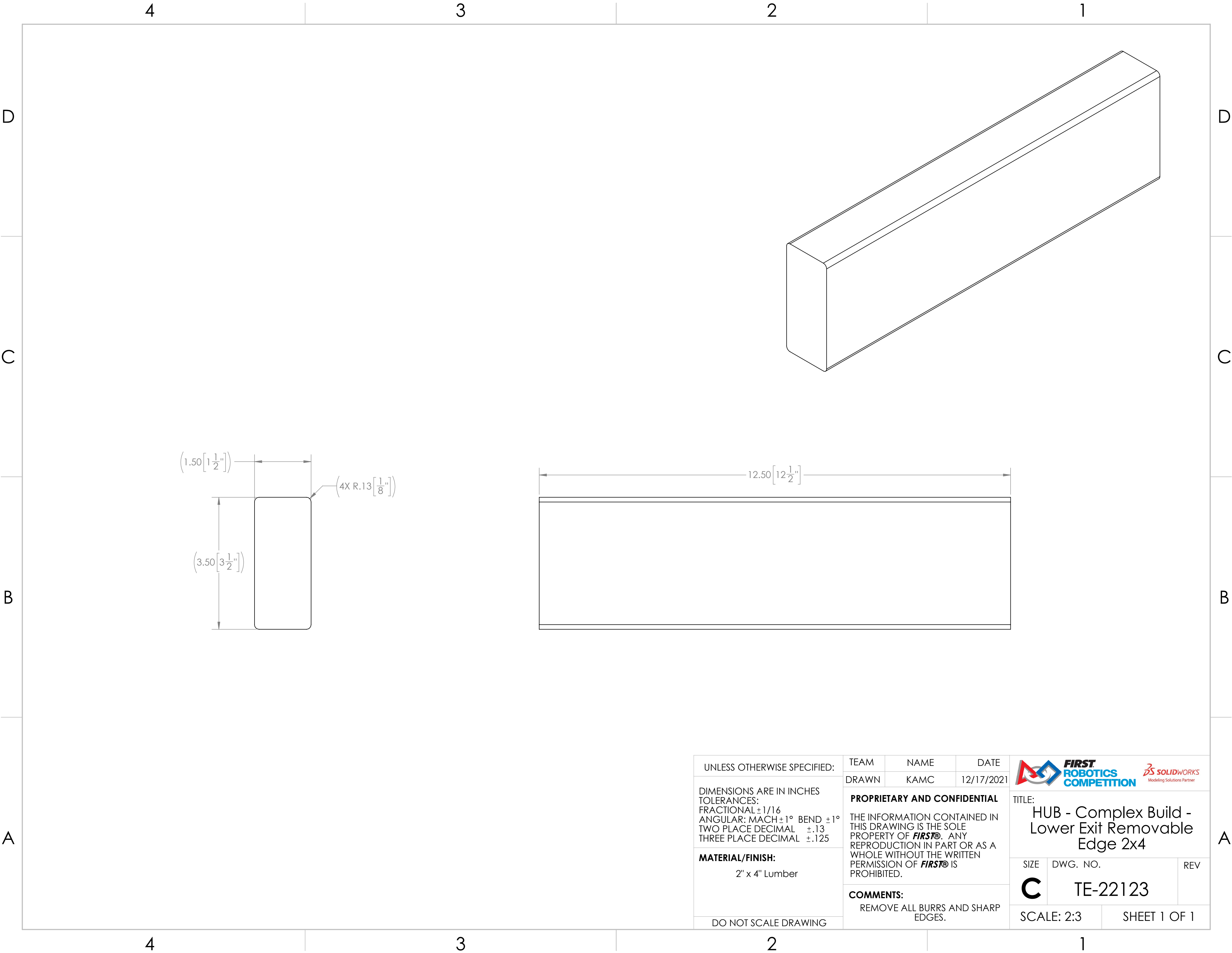
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B

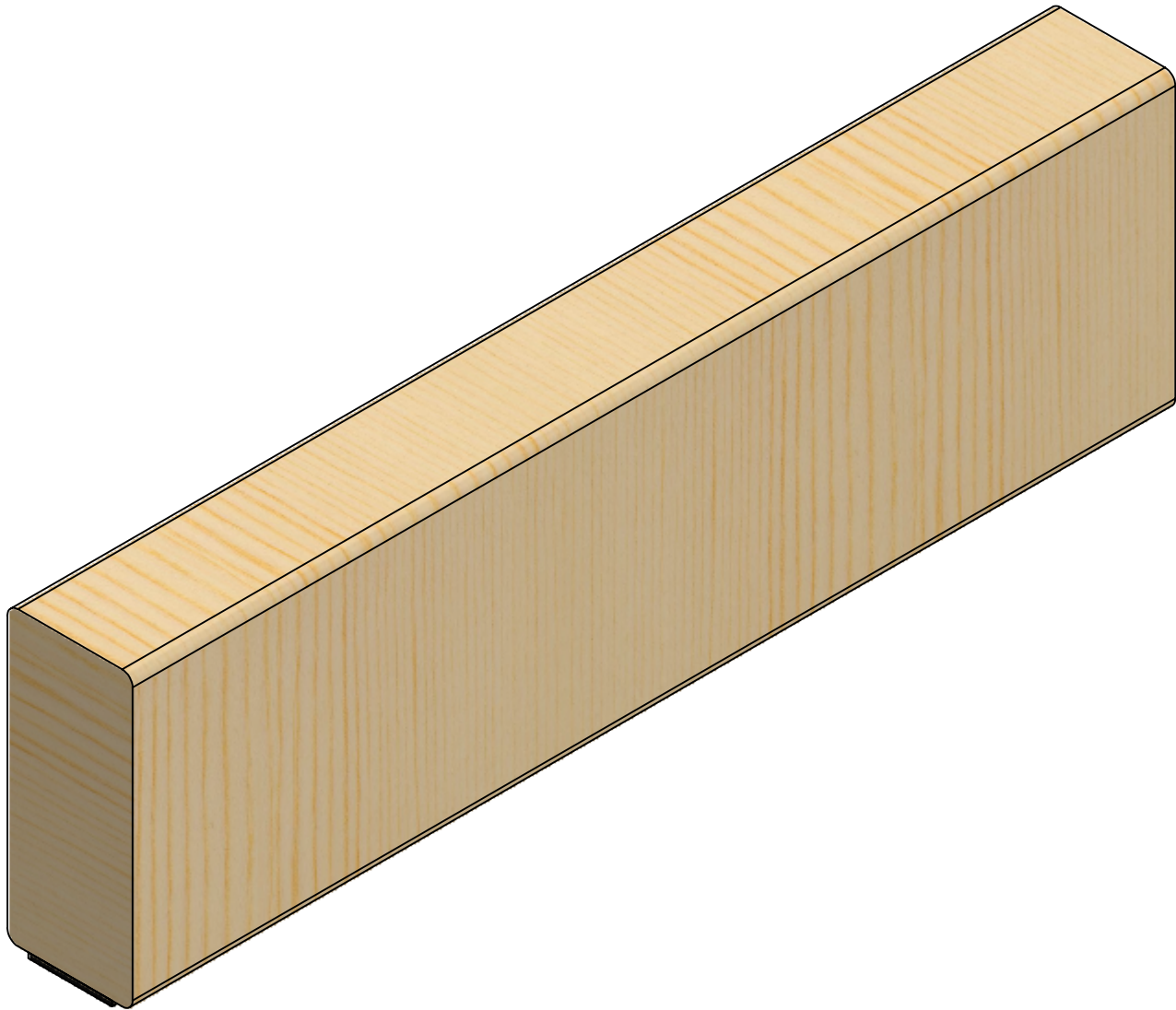
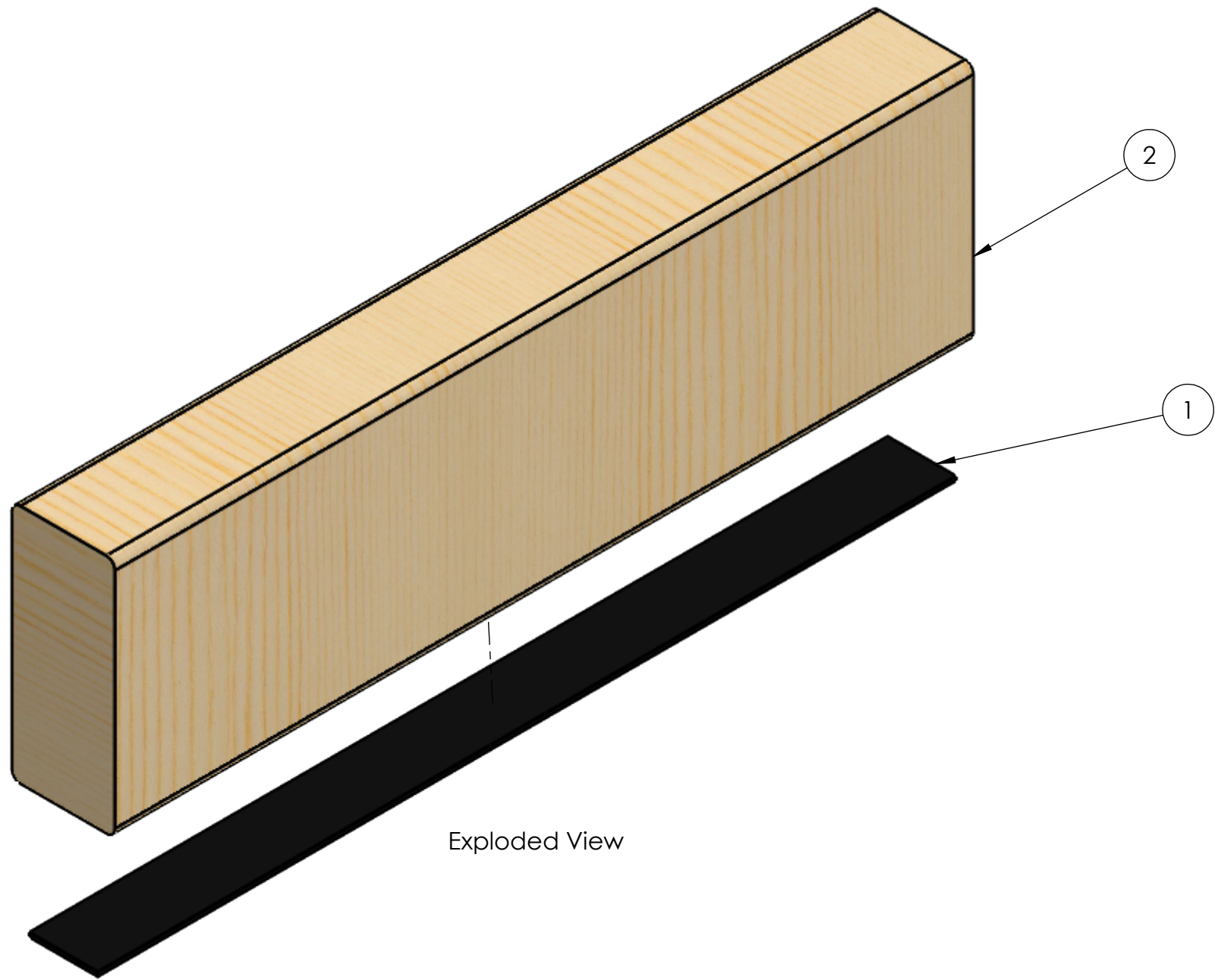
A



| | | | | | |
|---|---|-----------------------------------|------------|---|--|
| 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: DO NOT SCALE DRAWING | TEAM | NAME | DATE |   | |
| | DRAWN | KAMC | 12/20/2021 | | |
| | PROPRIETARY AND CONFIDENTIAL | | | TITLE: | |
| | 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. | | | HUB - Complex Build - Lower Exit Bottom with Loop Assembly | |
| | | SIZE | DWG. NO. | REV | |
| | | C | TE-22122 | | |
| | | SCALE: 1:3 | | SHEET 2 OF 2 | |
| | | COMMENTS: | | | |
| | | REMOVE ALL BURRS AND SHARP EDGES. | | | |



| | | | | | | |
|--|---|------|------------|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE | <div></div> | | |
| | DRAWN | KAMC | 12/17/2021 | | | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 | PROPRIETARY AND CONFIDENTIAL | | | TITLE: | | |
| | 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. | | | HUB - Complex Build - Lower Exit Removable Edge 2x4 | | |
| | | | | SIZE | DWG. NO. | REV |
| MATERIAL/FINISH: 2" x 4" Lumber | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22123 | |
| DO NOT SCALE DRAWING | | | | | | |
| | | | | SCALE: 2:3 | | SHEET 1 OF 1 |




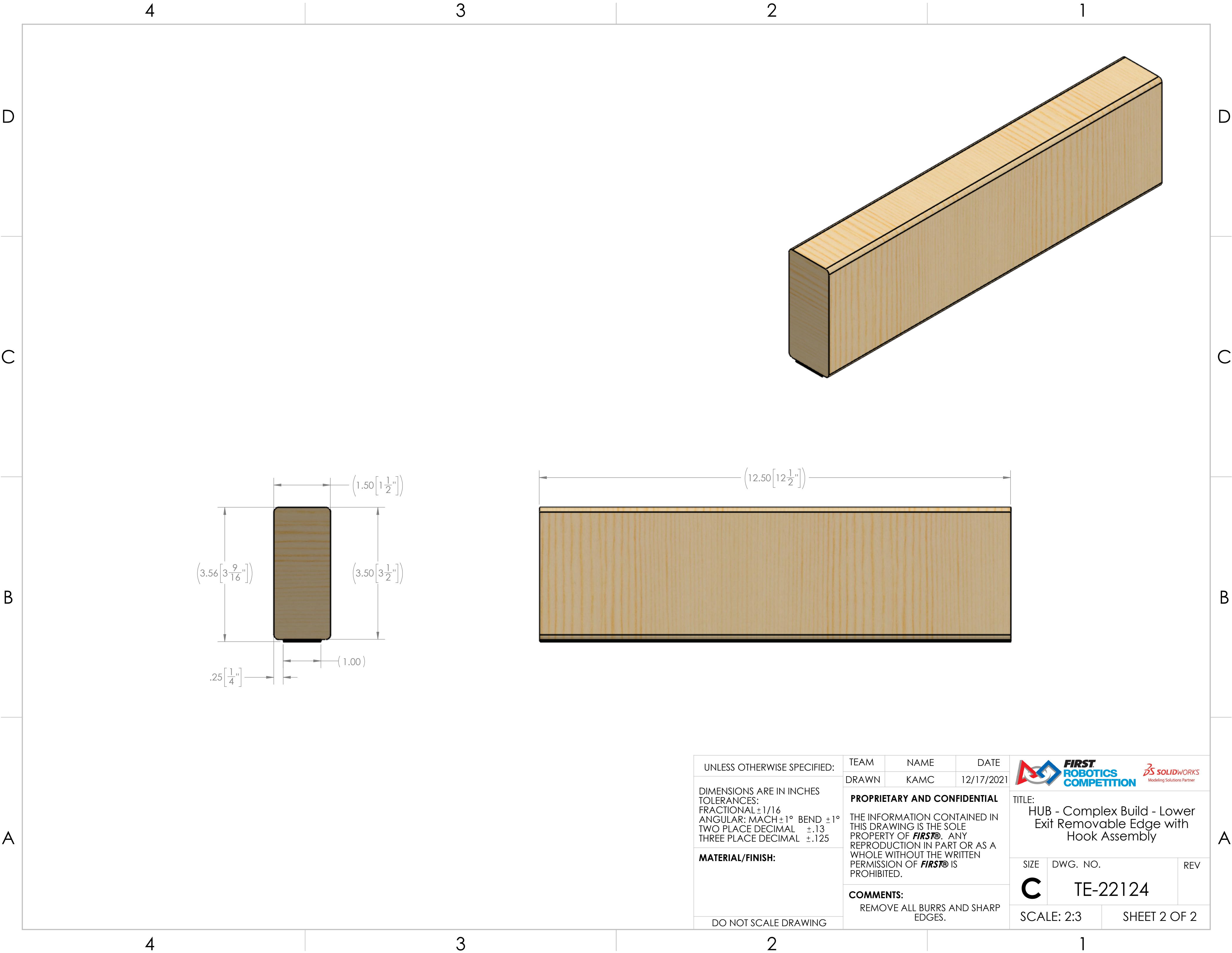
Step 1



- 1. Attach (1) to (2) as shown using adhesive backing.
- 2. Optional: Use wood staples to connect (1) to (2) .

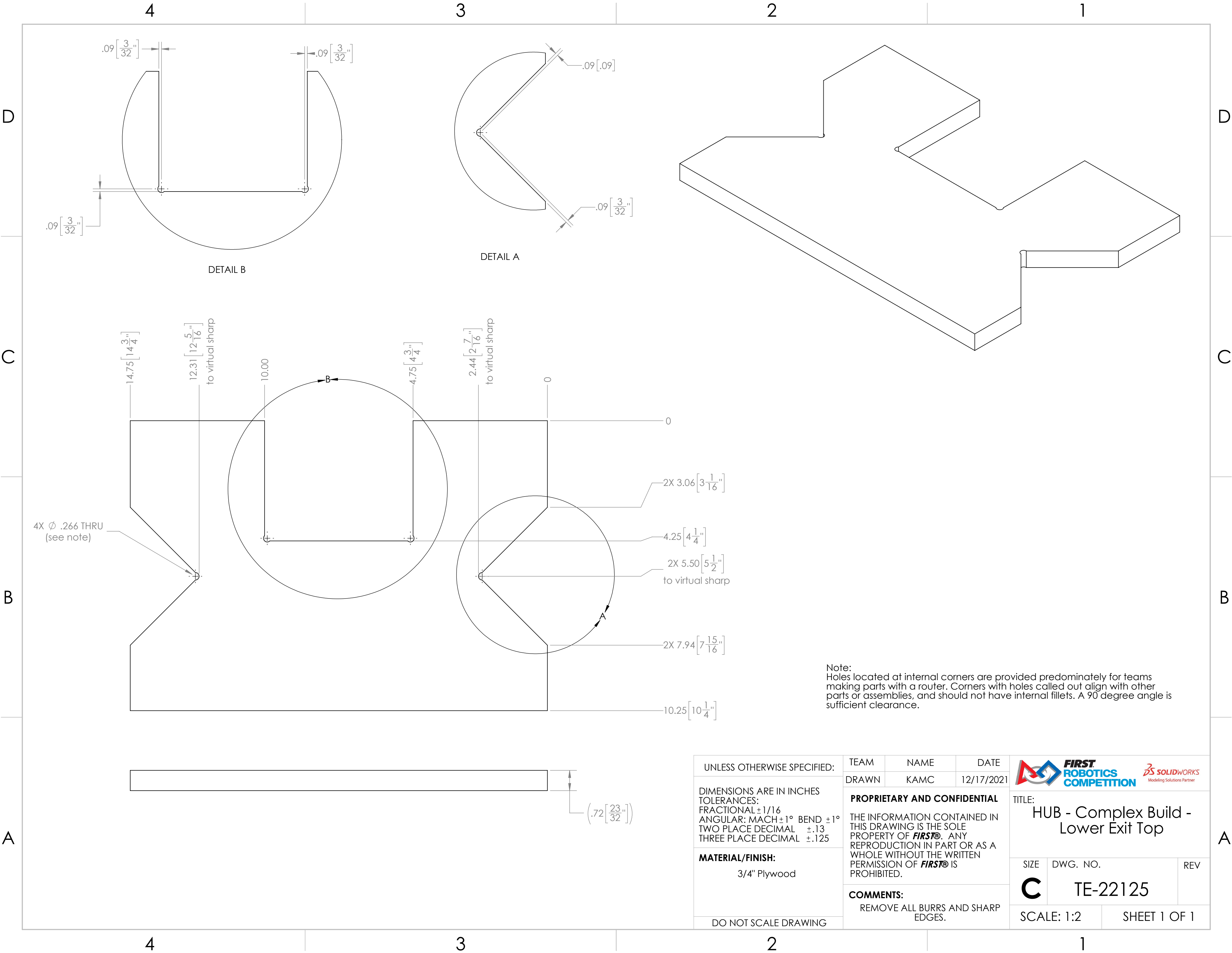
Hardware Needed:
Optional: Wood Staples

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|-------------|---|------|
| 1 | Hook_1_12.5 | 1" x 12.5" Hook, Adhesive Backed | 1 |
| 2 | TE-22123 | HUB - Complex Build - Lower Exit Removable Edge 2x4 | 1 |



| | | | | | | |
|---|------------------------------|------|------------|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE |  | | |
| | DRAWN | KAMC | 12/17/2021 | | | |
| | PROPRIETARY AND CONFIDENTIAL | | | | TITLE: | |
| 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. | | | | HUB - Complex Build - Lower Exit Removable Edge with Hook Assembly | | |
| | | | | SIZE | DWG. NO. | REV |
| | | | | C | TE-22124 | |
| | | | | SCALE: 2:3 | | SHEET 1 OF 2 |

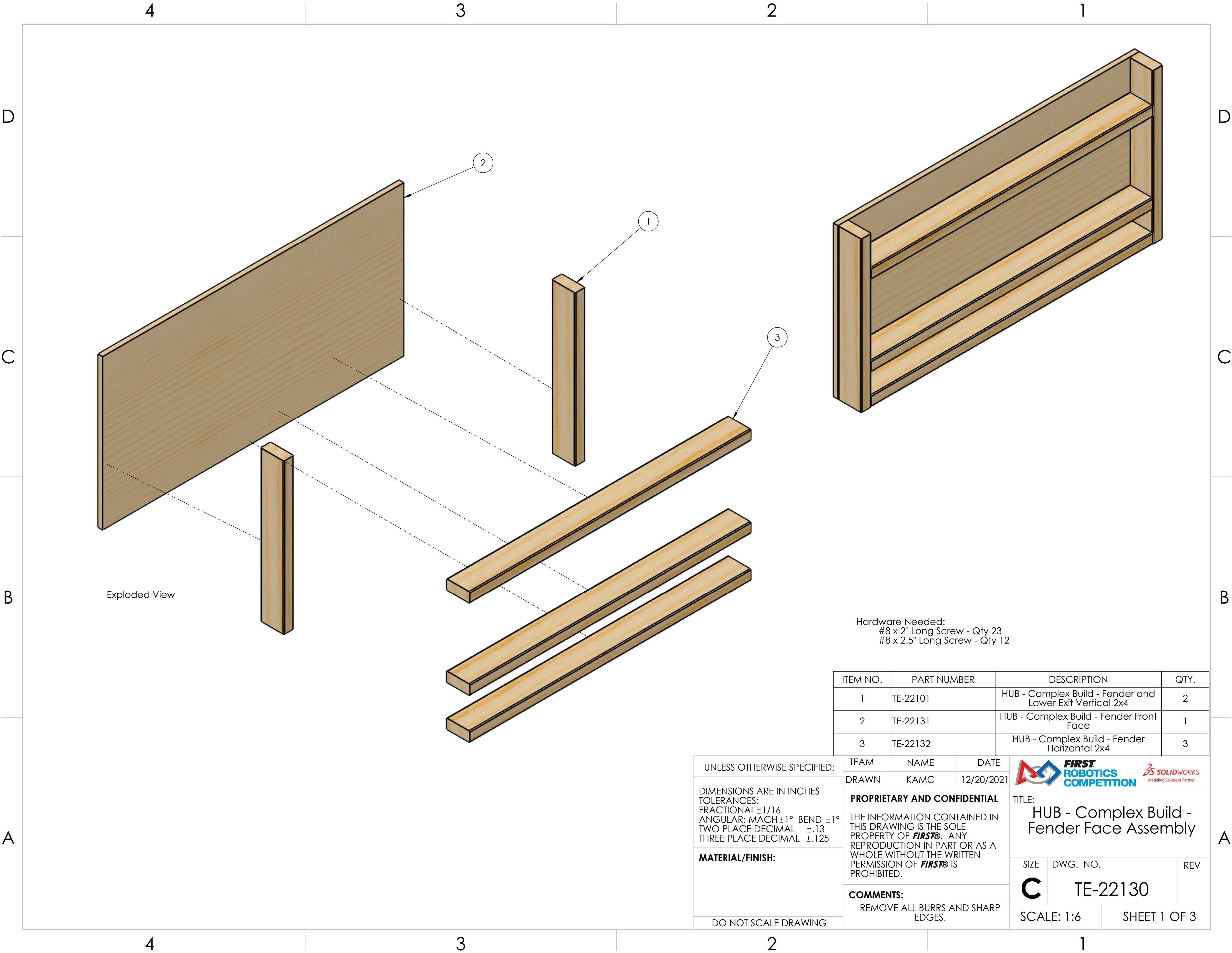


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|--|---|------|------------|---|--------------|--|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> | | |
| | DRAWN | KAMC | 12/17/2021 | | | |
| | PROPRIETARY AND CONFIDENTIAL | | | TITLE: | | |
| | 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. | | | HUB - Complex Build - Lower Exit Removable Edge with Hook Assembly | | |
| COMMENTS: | | | SIZE | DWG. NO. | REV | |
| REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22124 | | |
| | | | SCALE: 2:3 | | SHEET 2 OF 2 | |



Note:
Holes located at internal corners are provided predominately for teams making parts with a router. Corners with holes called out align with other parts or assemblies, and should not have internal fillets. A 90 degree angle is sufficient clearance.

| | | | | | | |
|---|--|--------------|------------|--|----------|-----|
| 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 | <div></div> <div>TITLE: HUB - Complex Build - Lower Exit Top</div> | | |
| | DRAWN | KAMC | 12/17/2021 | | | |
| | 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. | | | SIZE | DWG. NO. | REV |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22125 | |
| SCALE: 1:2 | | SHEET 1 OF 1 | | | | |



Exploded View

Hardware Needed:
#8 x 2" Long Screw - Qty 23
#8 x 2.5" Long Screw - Qty 12

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|-------------|--|------|
| 1 | TE-22101 | HUB - Complex Build - Fender and Lower Exit Vertical 2x4 | 2 |
| 2 | TE-22131 | HUB - Complex Build - Fender Front Face | 1 |
| 3 | TE-22132 | HUB - Complex Build - Fender Horizontal 2x4 | 3 |

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:

DO NOT SCALE DRAWING

TEAM NAME DATE



DRAWN KAMC 12/20/2021

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.

COMMENTS:

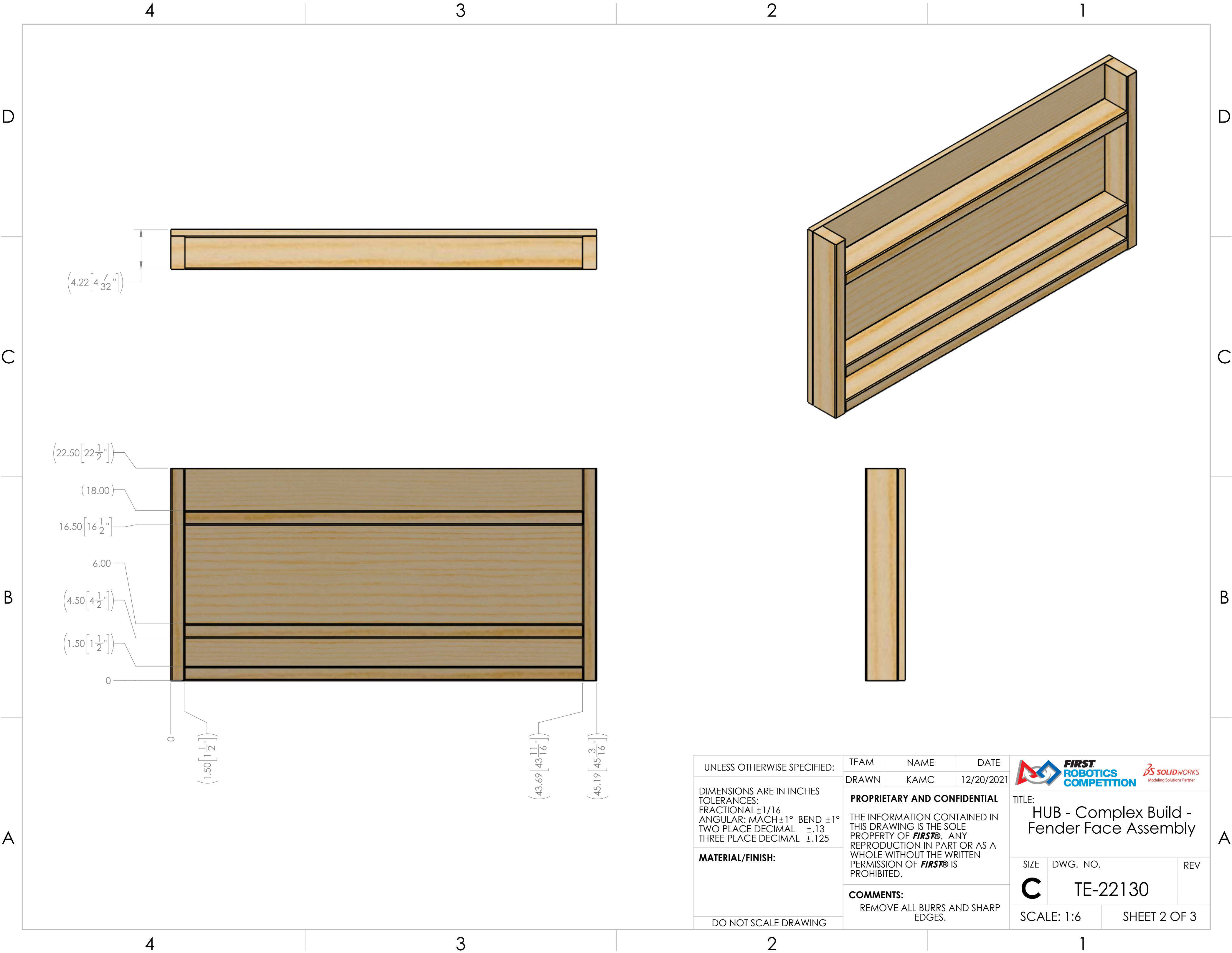
REMOVE ALL BURRS AND SHARP EDGES.





TITLE:

HUB - Complex Build - Fender Face Assembly

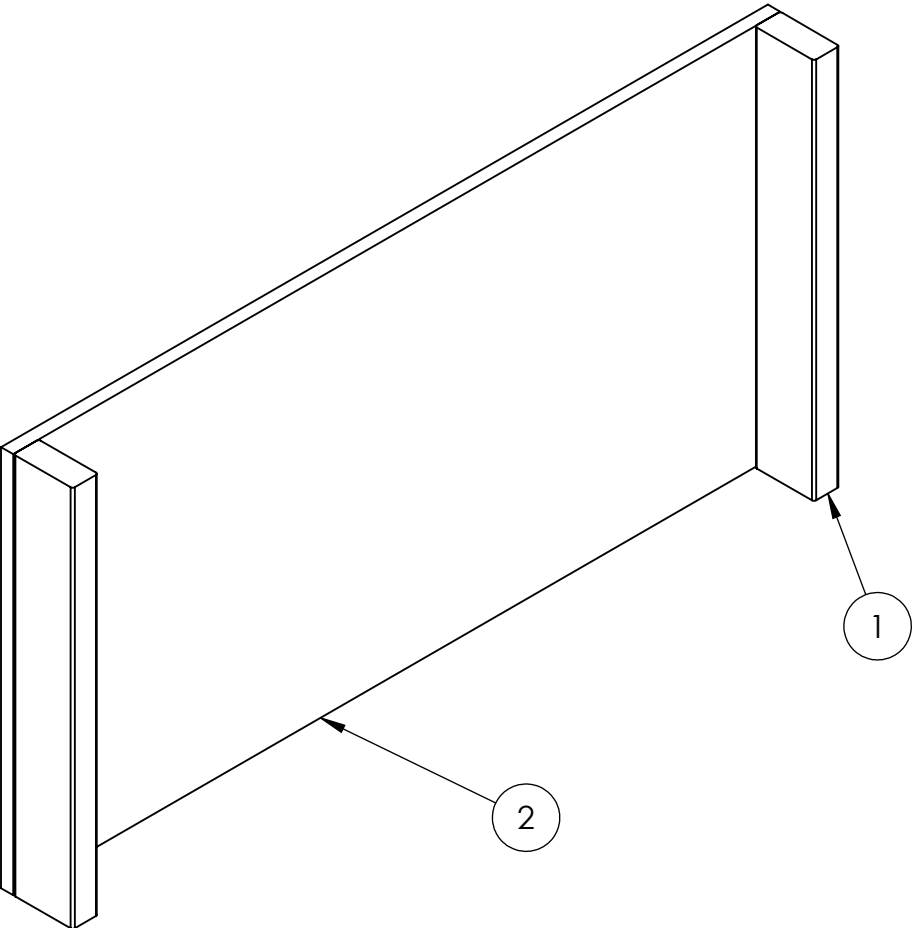
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|------------|----------|--------------|
| SIZE | DWG. NO. | REV |
| C | TE-22130 | |
| SCALE: 1:6 | | SHEET 1 OF 3 |



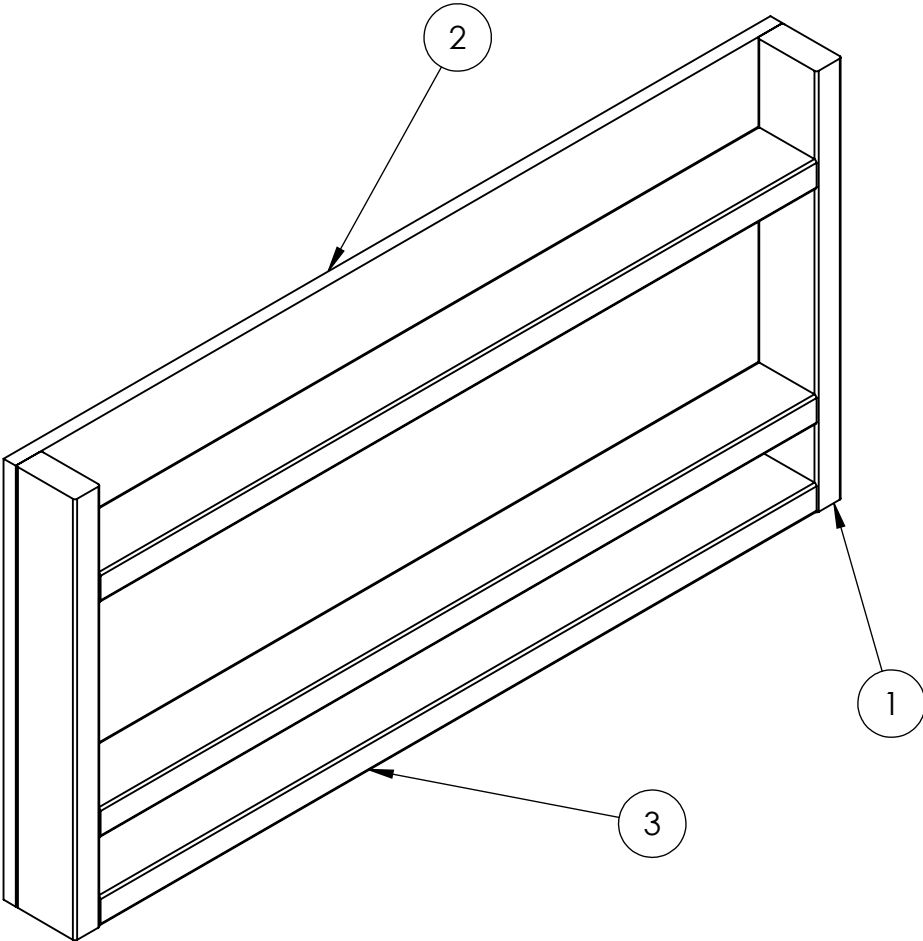
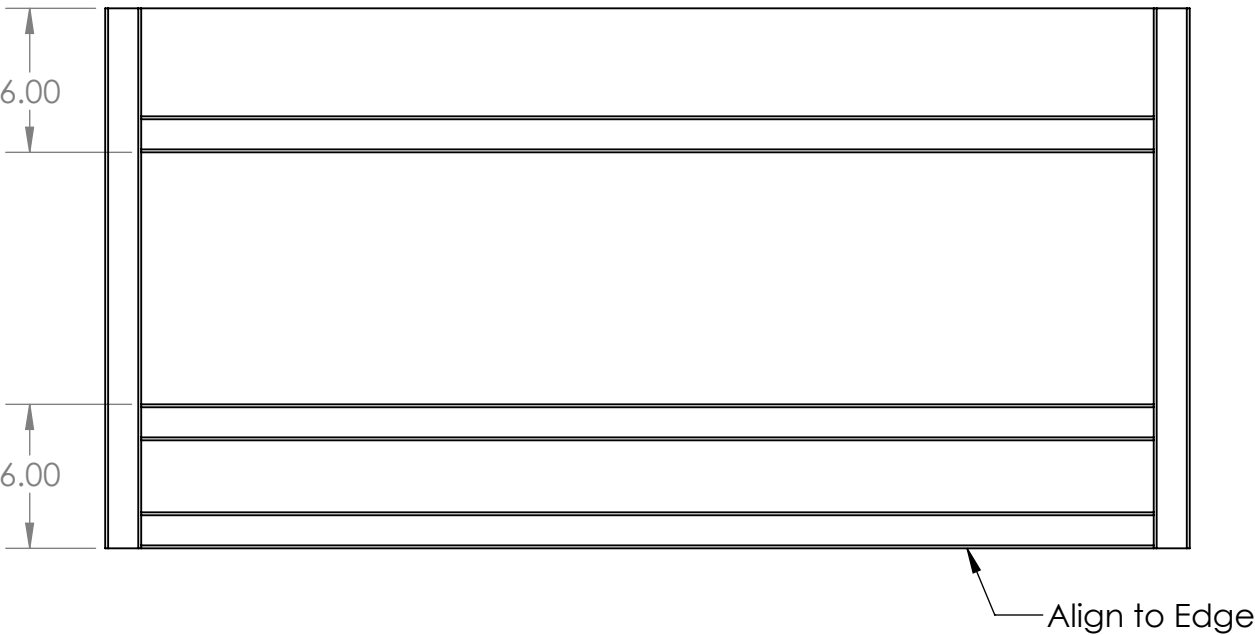
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|--|---|------|------------|---|----------|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE | <div></div> | |
| | DRAWN | KAMC | 12/20/2021 | | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 | PROPRIETARY AND CONFIDENTIAL | | | TITLE: | |
| | 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. | | | HUB - Complex Build - Fender Face Assembly | |
| MATERIAL/FINISH: | COMMENTS: | | | SIZE | DWG. NO. |
| | REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22130 |
| DO NOT SCALE DRAWING | | | | SCALE: 1:6 | |
| | | | | SHEET 2 OF 3 | |



1

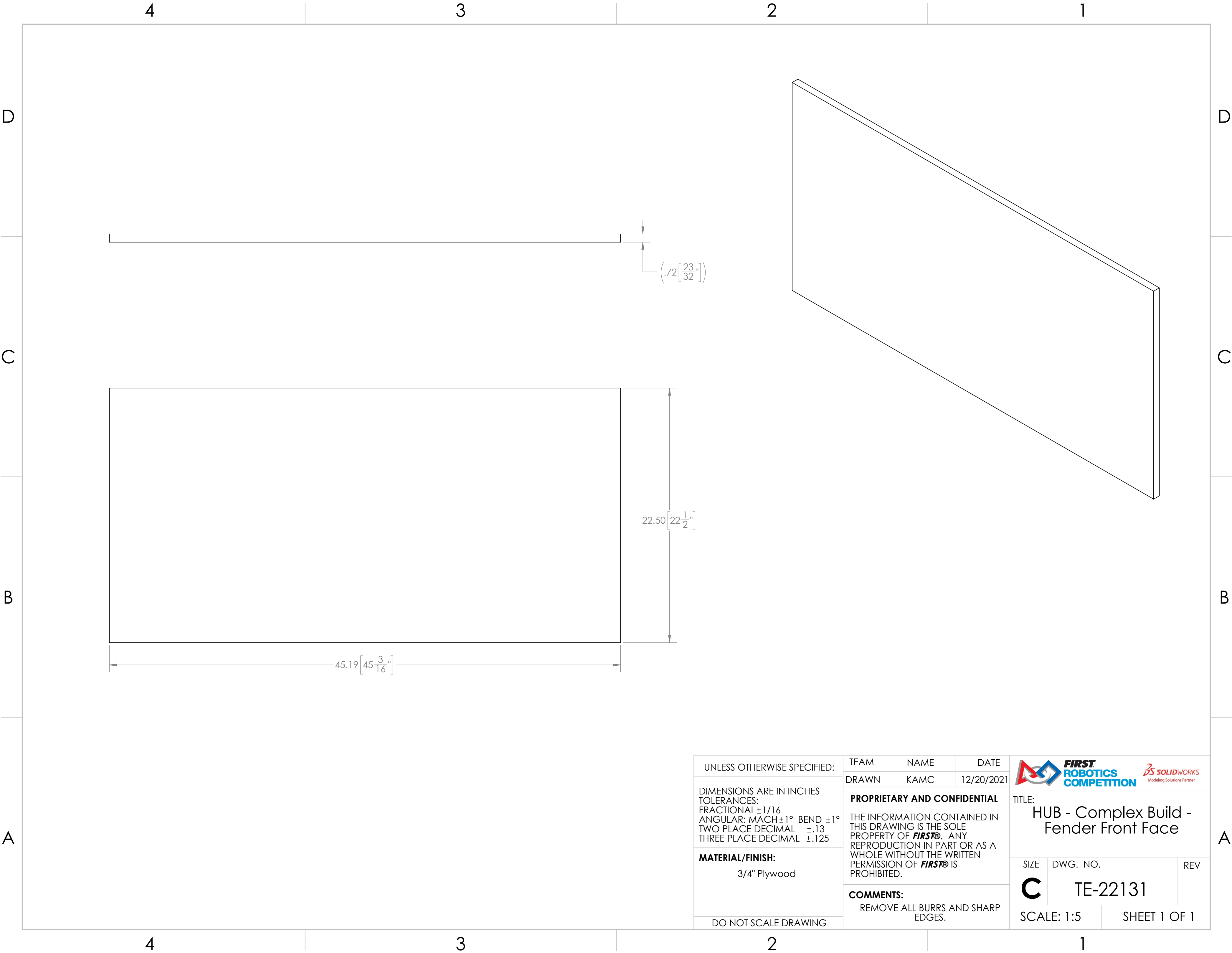
1. Align 2x (1) to the edges of (2), as shown.
2. Connect using 2" long screws. It is recommended to use 4x screws into each (1).





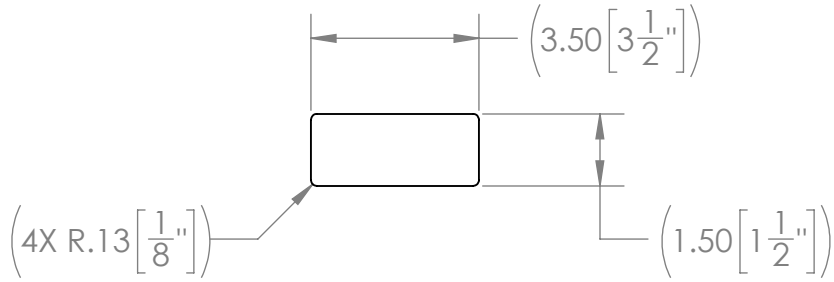
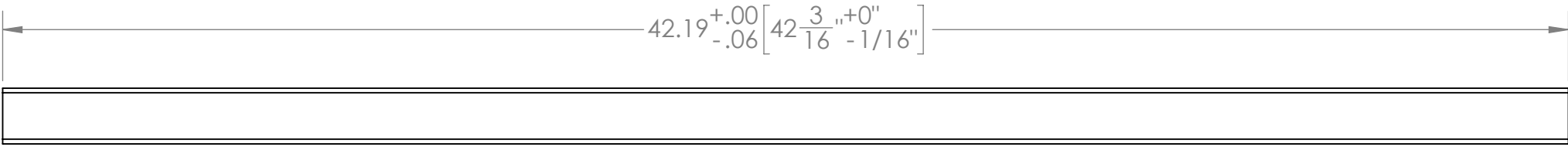
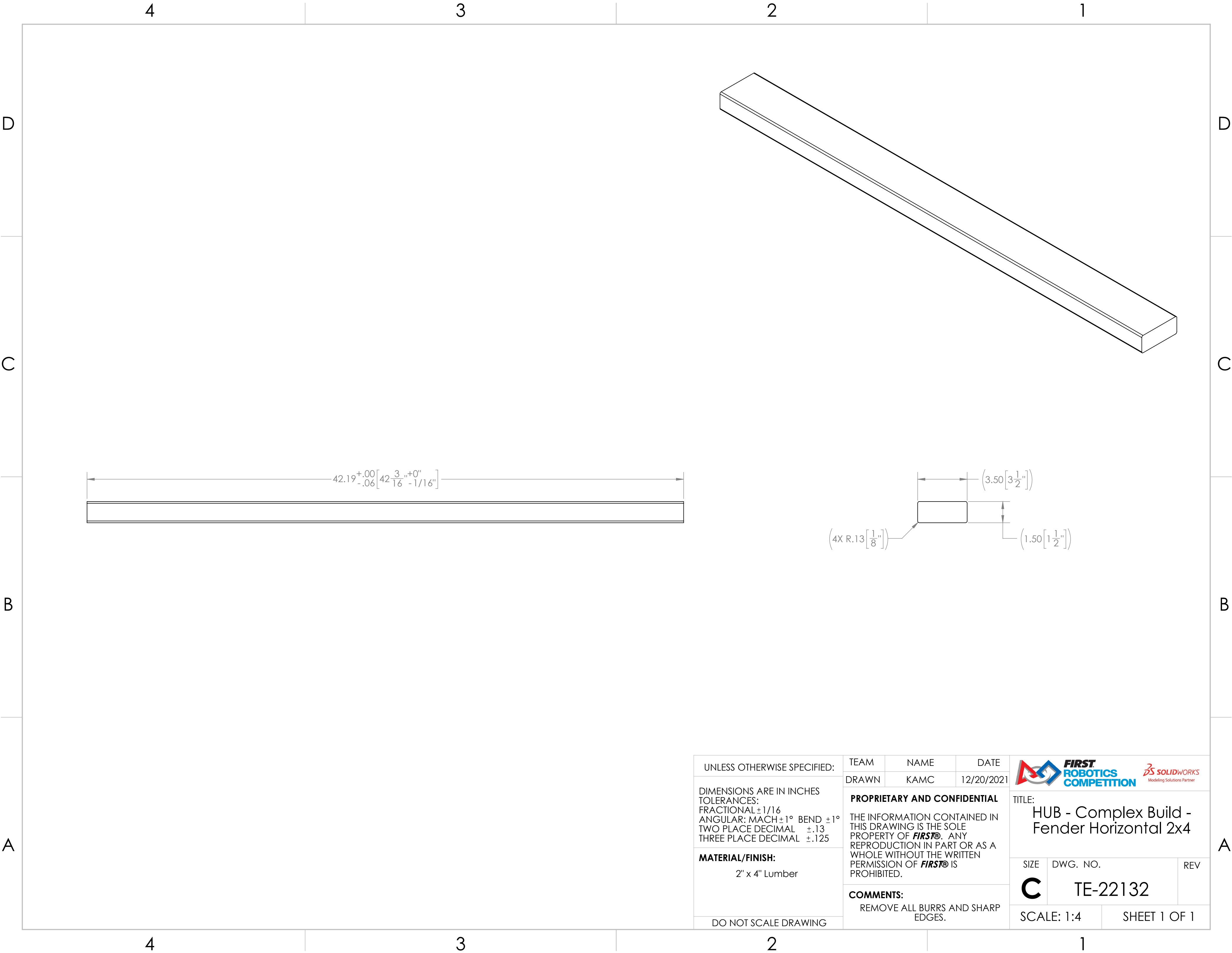
- Align 3x (3) between both (1), and position on (2) as shown. If needed, trim (3) to ensure fit.
- Secure each (3) to (1) using 2.5" long screws. It is recommended to use 2x screws into each end of (3).
- Secure (3) to (2) using 2" long screws. It is recommended to use 5x screws into each (3).





| | | | | | | | | | |
|--|--|--|--|------|--|---|--|---|--|
| UNLESS OTHERWISE SPECIFIED: | | TEAM | | NAME | | DATE | | | |
| | | DRAWN | | KAMC | | 12/20/2021 | | | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.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. | | | | TITLE: HUB - Complex Build - Fender Face Assembly | | | |
| MATERIAL/FINISH: | | | | | | SIZE | | DWG. NO. | |
| | | | | | | C | | | |
| DO NOT SCALE DRAWING | | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | | SCALE: 1:8 | | SHEET 3 OF 3 | |
| | | | | | |  | |  | |



| | | | | | | |
|--|--|---|------------|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE | <div></div> | | |
| | DRAWN | KAMC | 12/20/2021 | | | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.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. | | | TITLE: HUB - Complex Build - Fender Front Face | | |
| | | | | | | |
| | MATERIAL/FINISH: 3/4" Plywood | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE | DWG. NO. |
| | C | | | | TE-22131 | |
| DO NOT SCALE DRAWING | | | | SCALE: 1:5 | | SHEET 1 OF 1 |



| | | | | | | |
|--|---|------|------------|---|--------------|--|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: 2" x 4" Lumber DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> | | |
| | DRAWN | KAMC | 12/20/2021 | | | |
| | 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. COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | TITLE: HUB - Complex Build - Fender Horizontal 2x4 | | |
| | | | SIZE | DWG. NO. | REV | |
| | | | C | TE-22132 | | |
| | | | SCALE: 1:4 | | SHEET 1 OF 1 | |

4

3

2

1

D

D

C

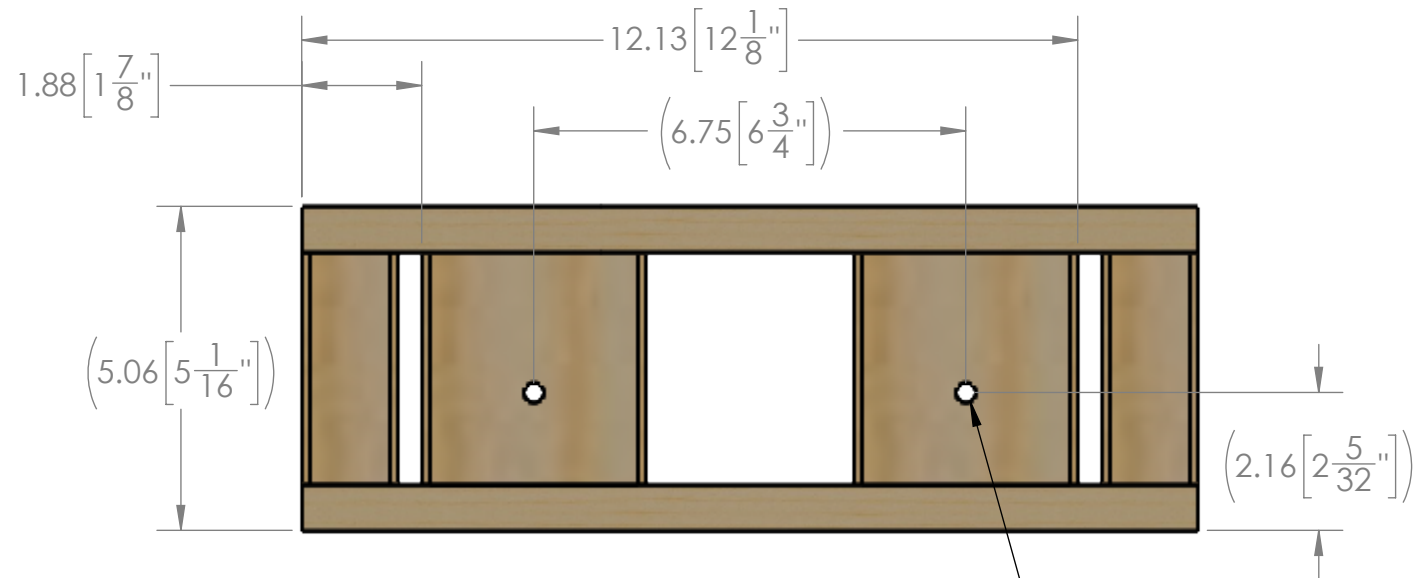
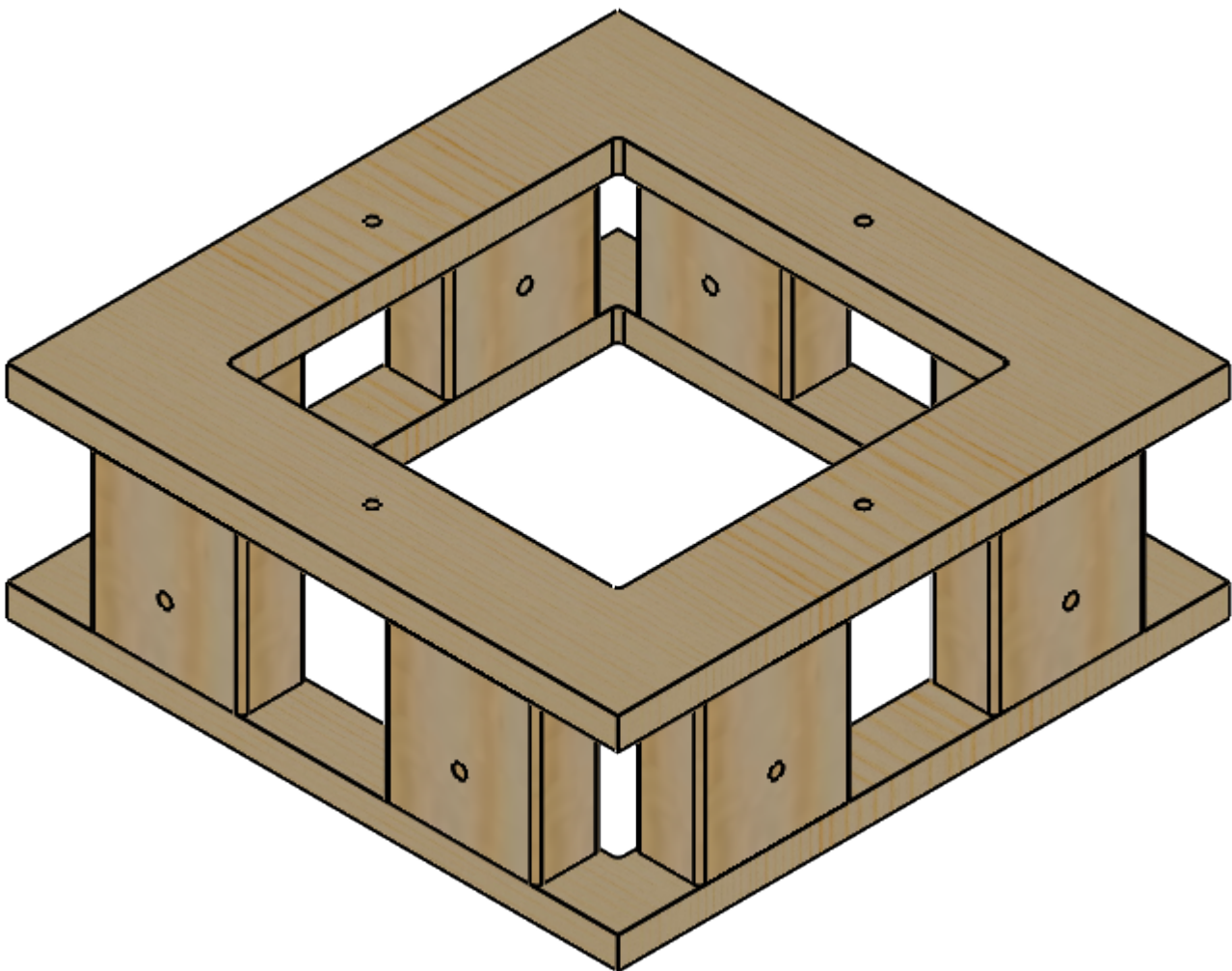
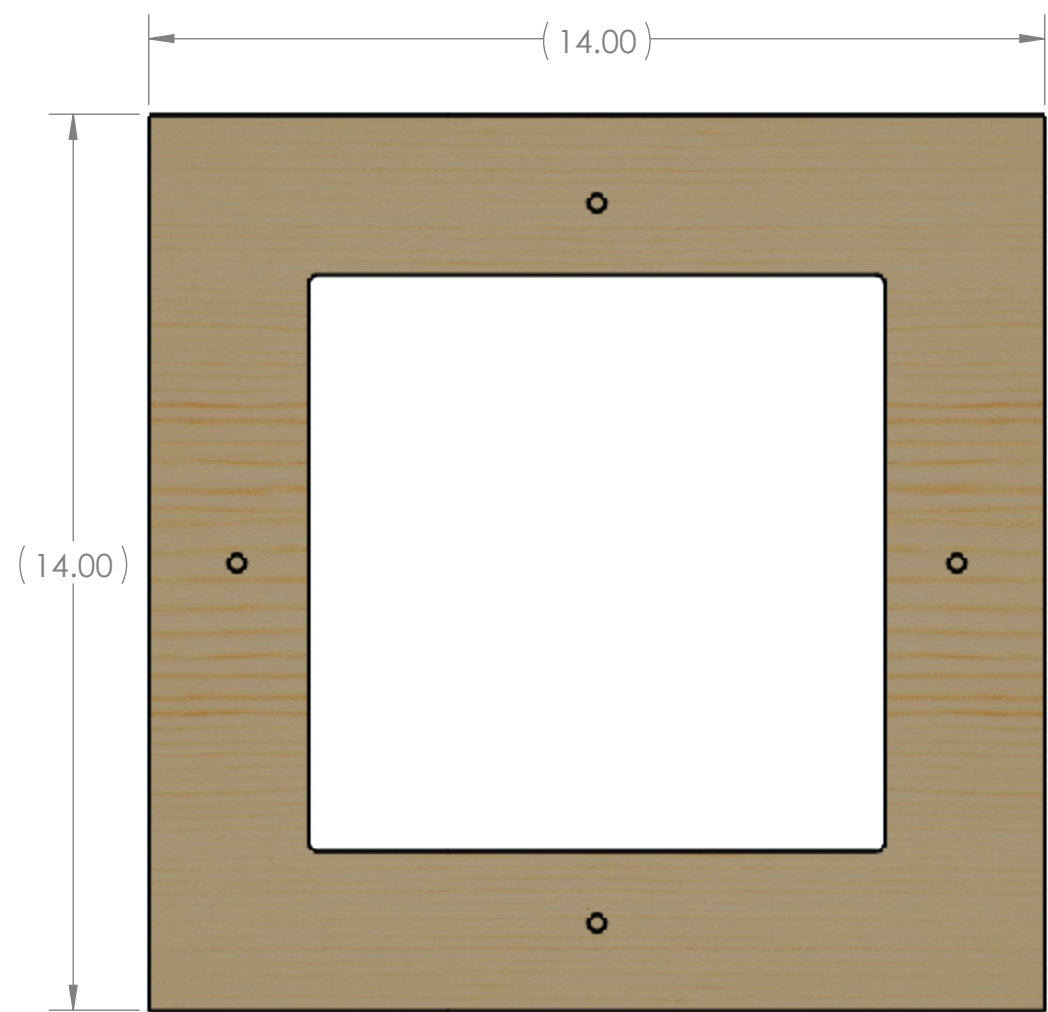
C

B

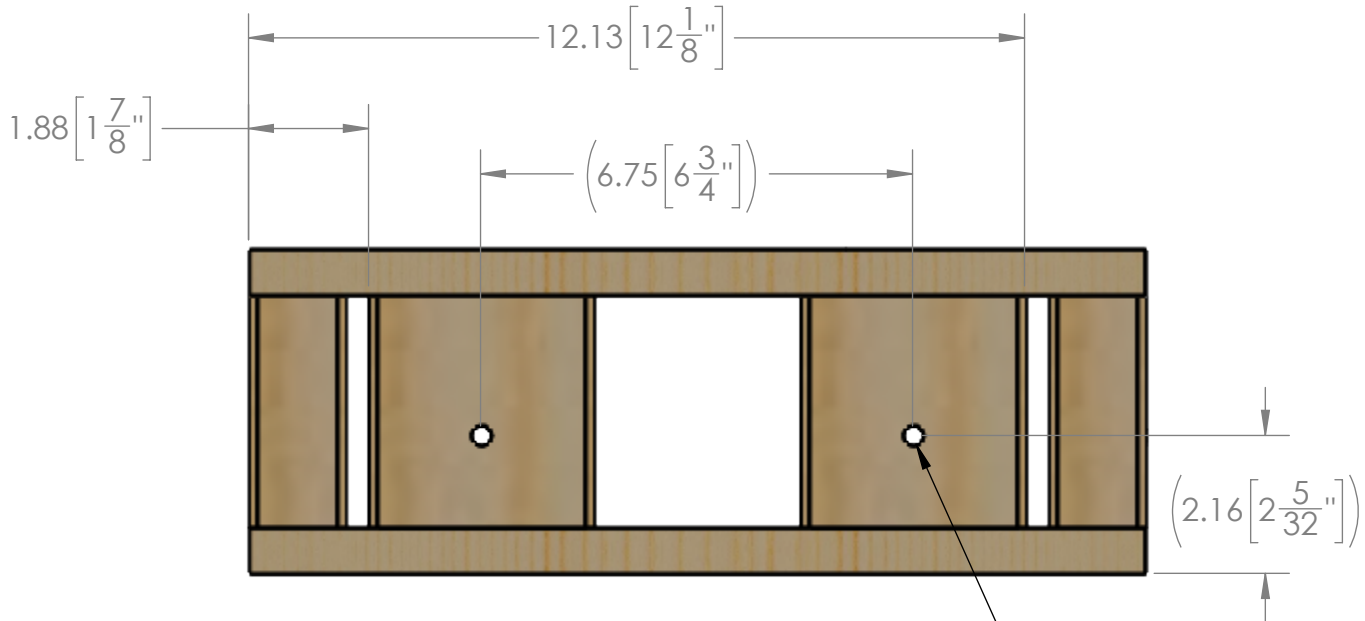
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A

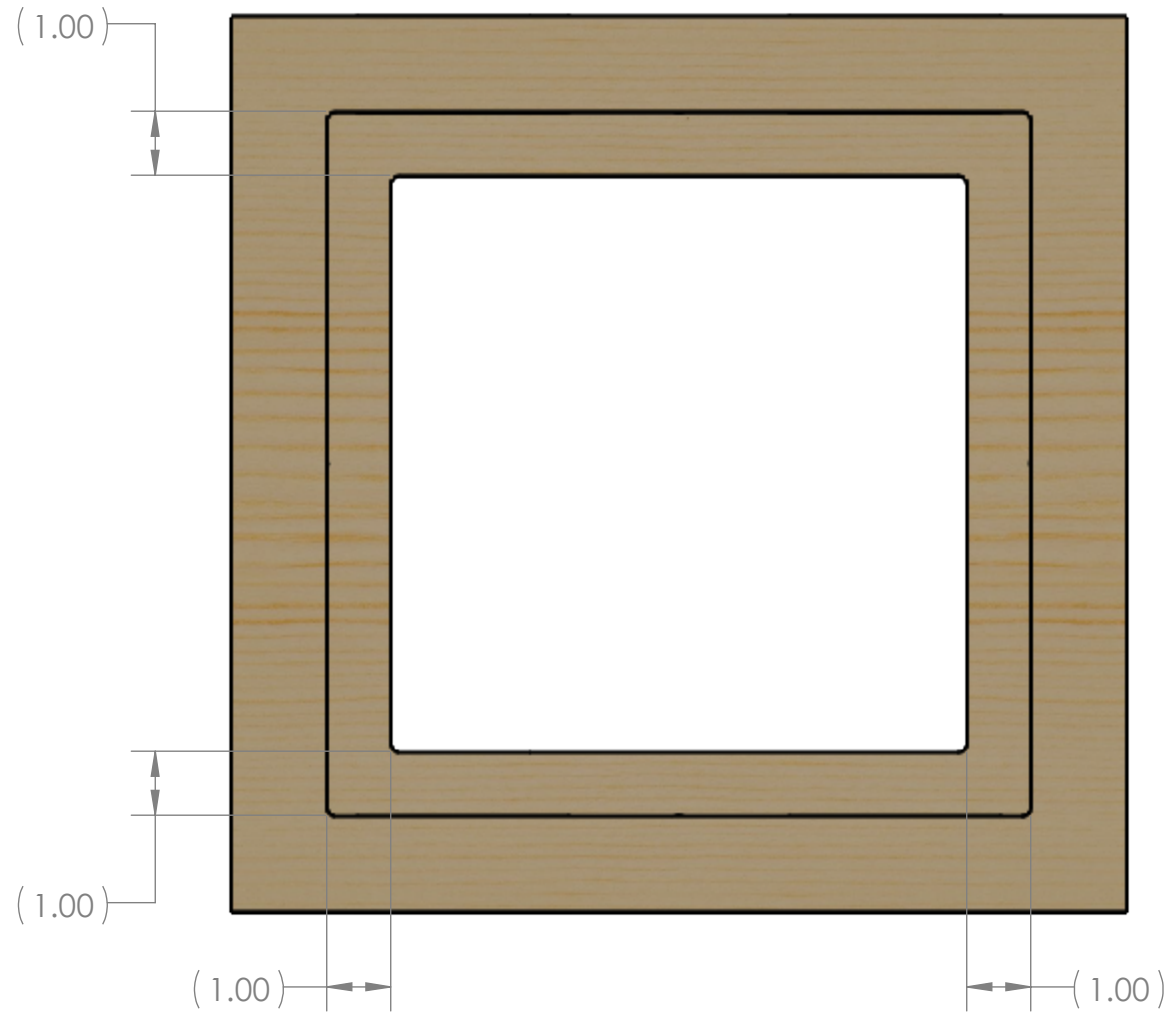
A





Note hole location relative to bottom of assembly



Note hole location relative to bottom of assembly



| | | | | | |
|---|--|--------------|------------|---|--------------------------------|
| 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: DO NOT SCALE DRAWING | TEAM | NAME | DATE |   | |
| | DRAWN | KAMC | 12/20/2021 | | |
| | 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. | | | TITLE: HUB - Complex Build - Connection Box Assembly for AndyMark Upper Hub (AM-4671) | |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE C | DWG. NO. TE-22140-AM REV |
| SCALE: 1:3 | | SHEET 2 OF 3 | | | |

D

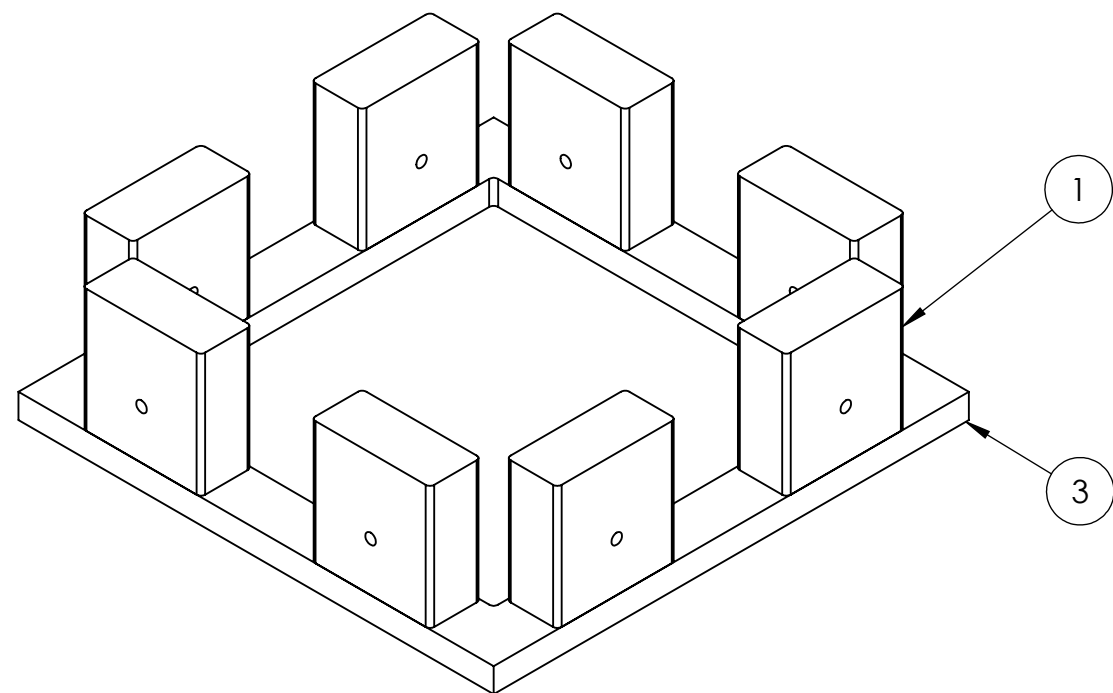
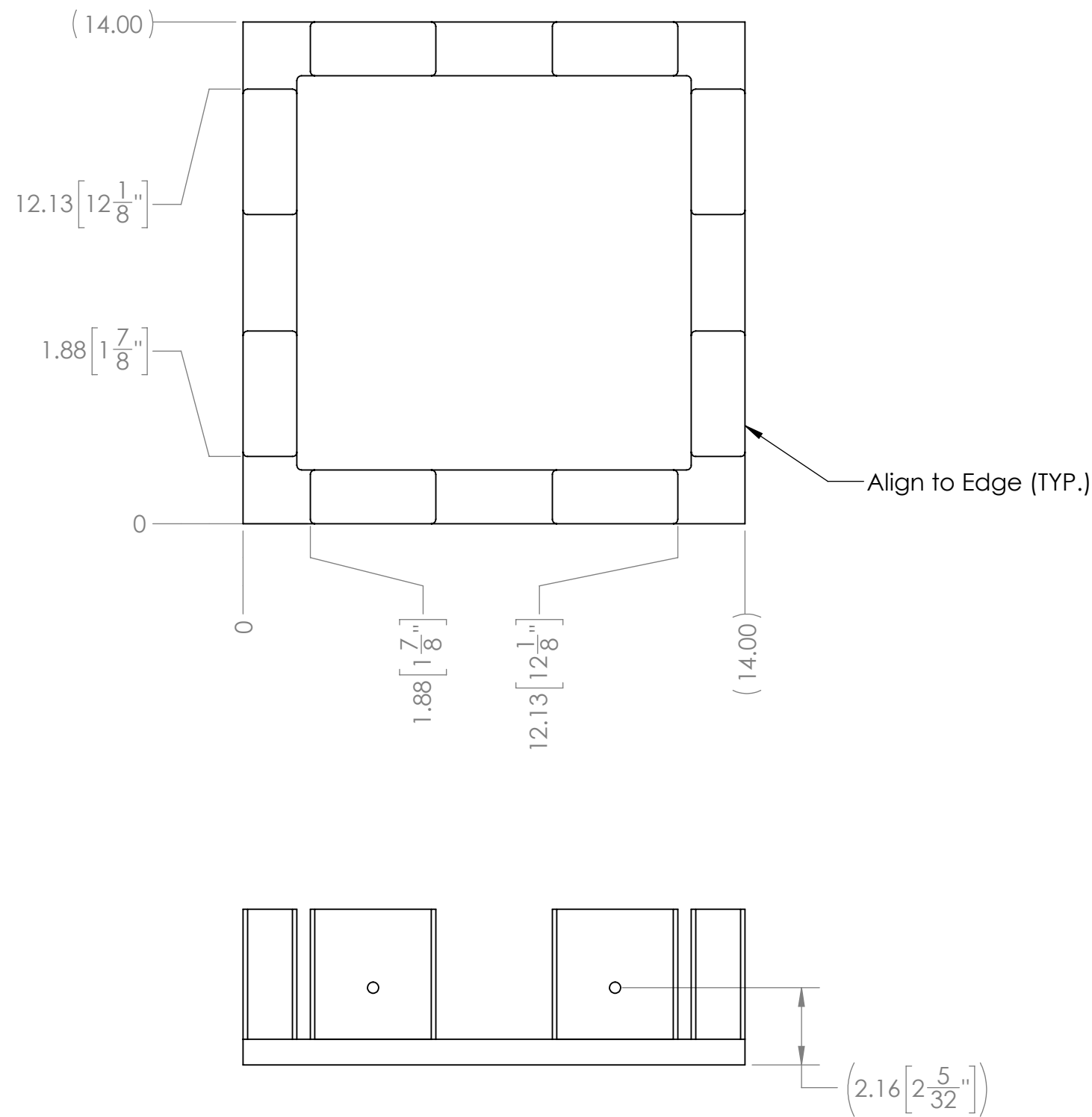
C

B

A

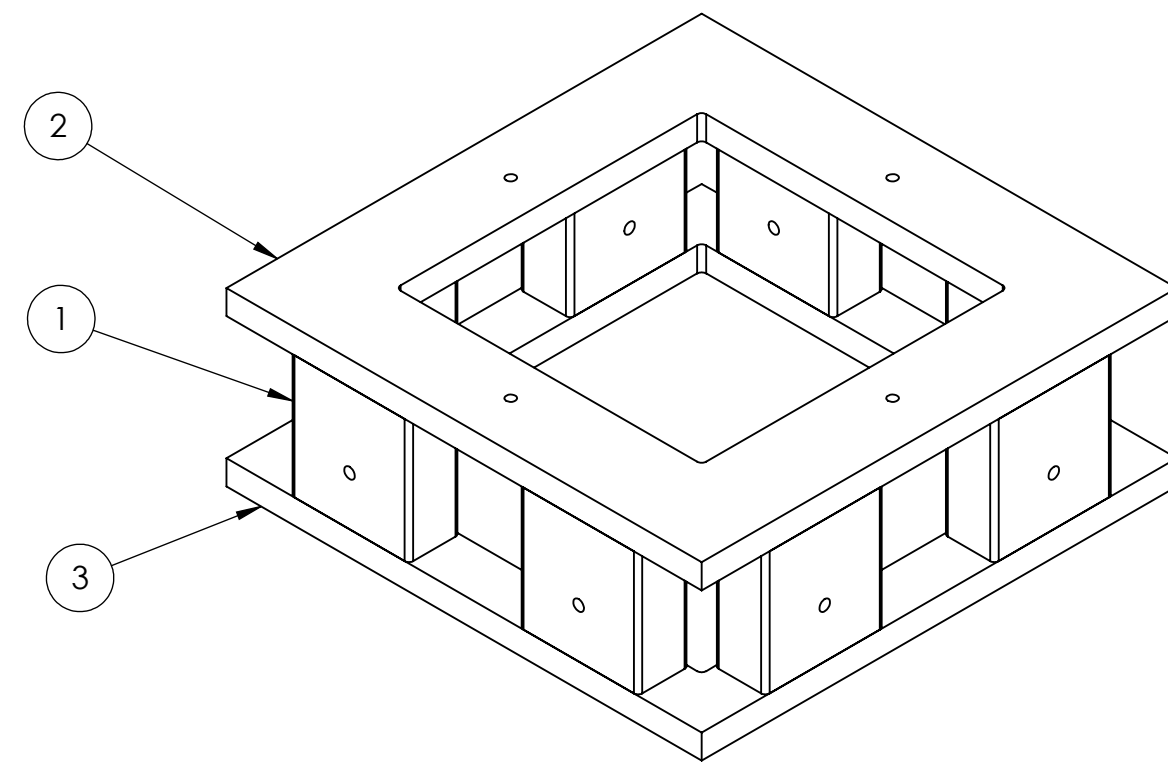
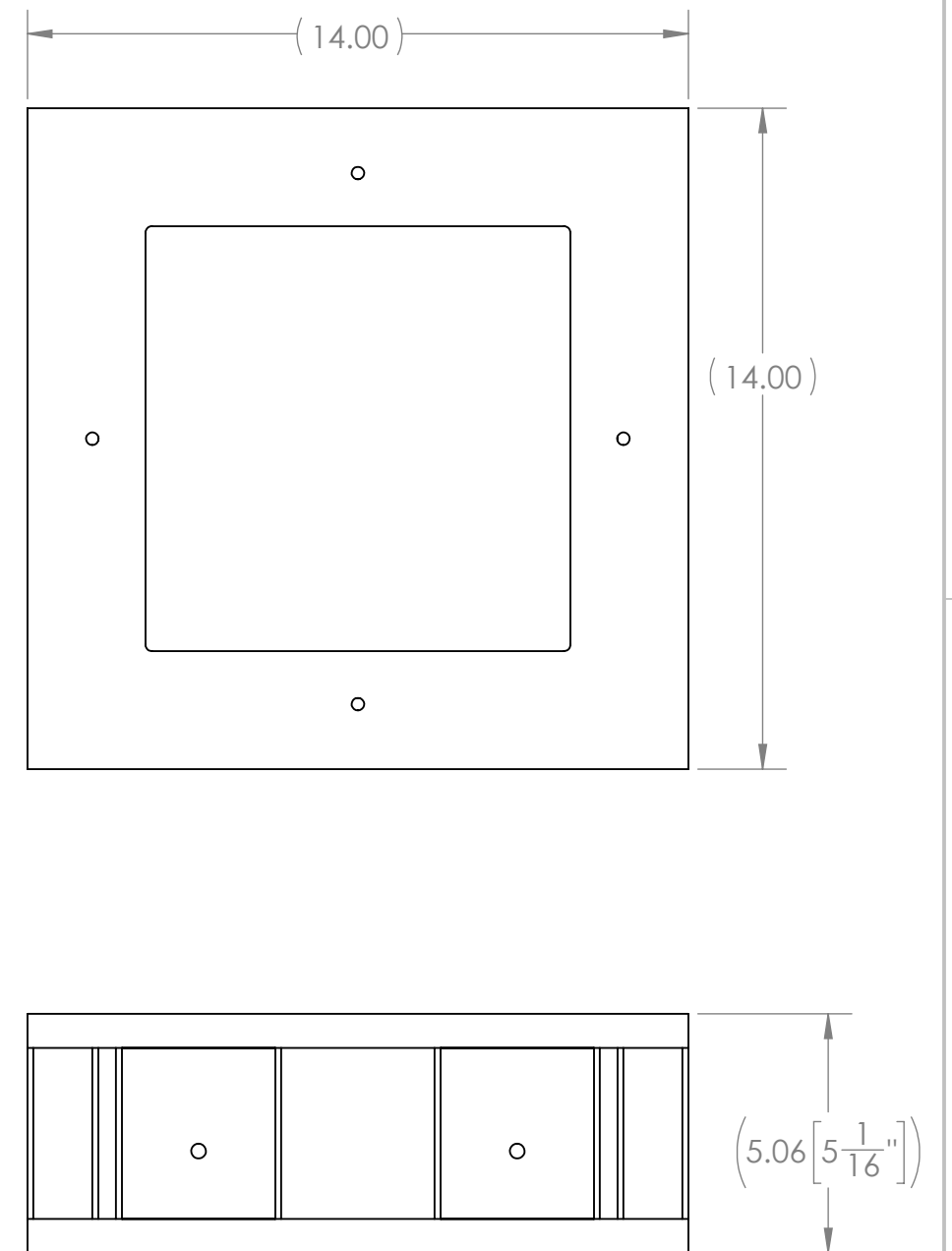
Step 1



- Align 8x (1) on (3), as shown. Note hole location on (1).
- Connect using 2" long screws. It is recommended to use 2x screws into each (1).



Step 2

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



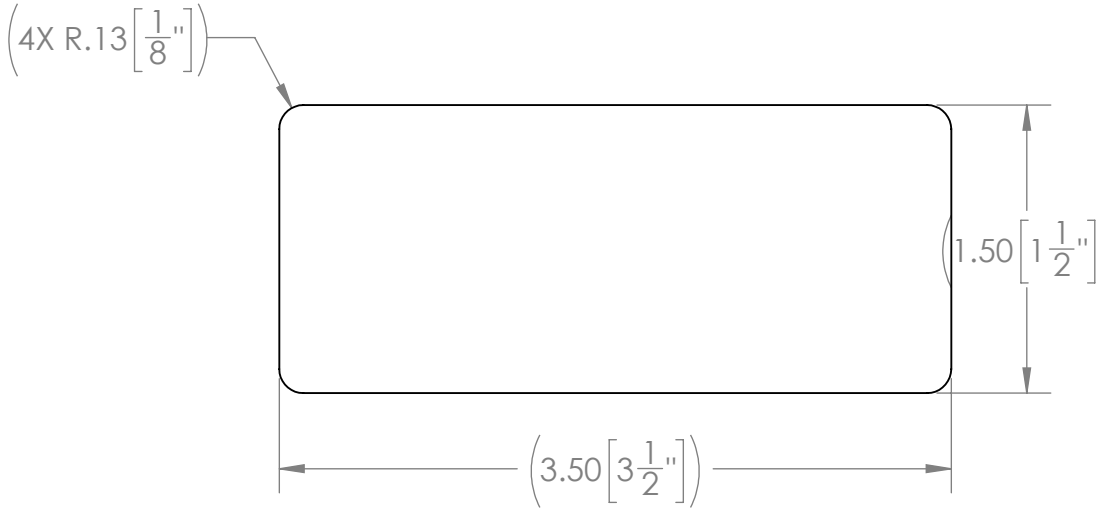
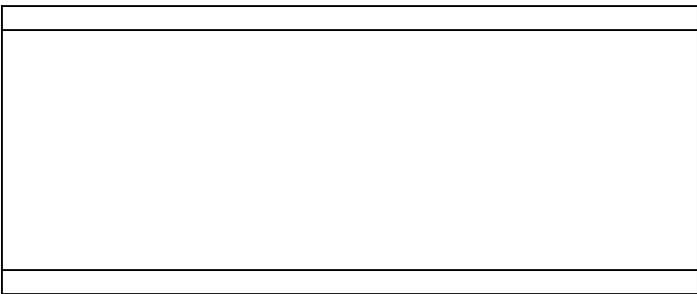
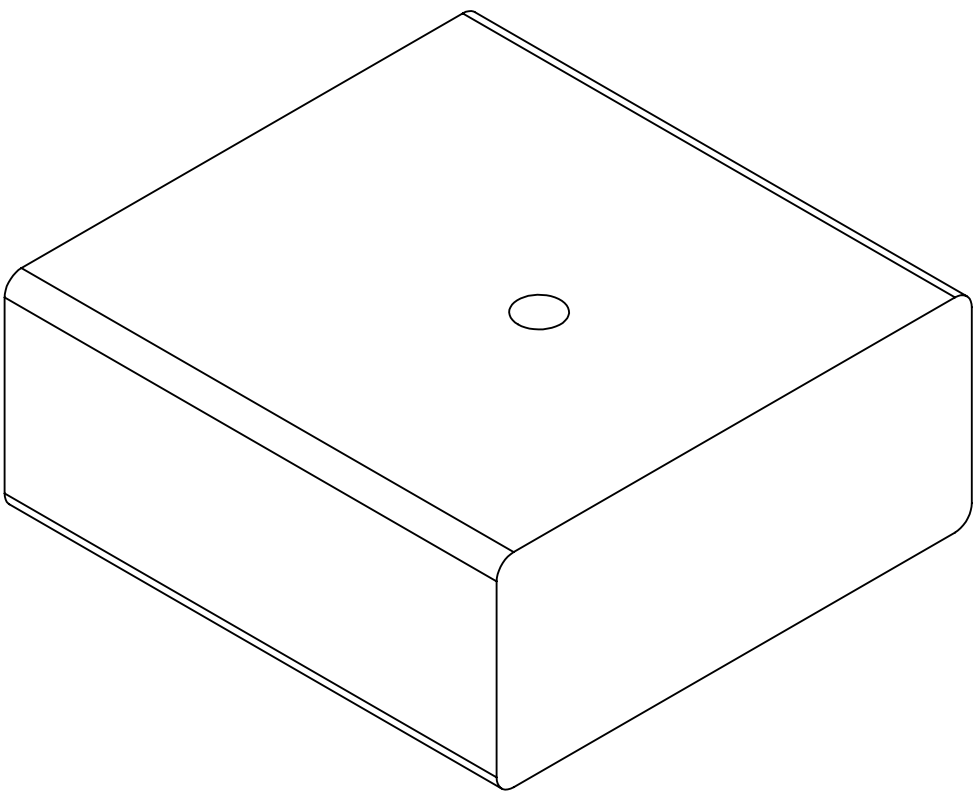
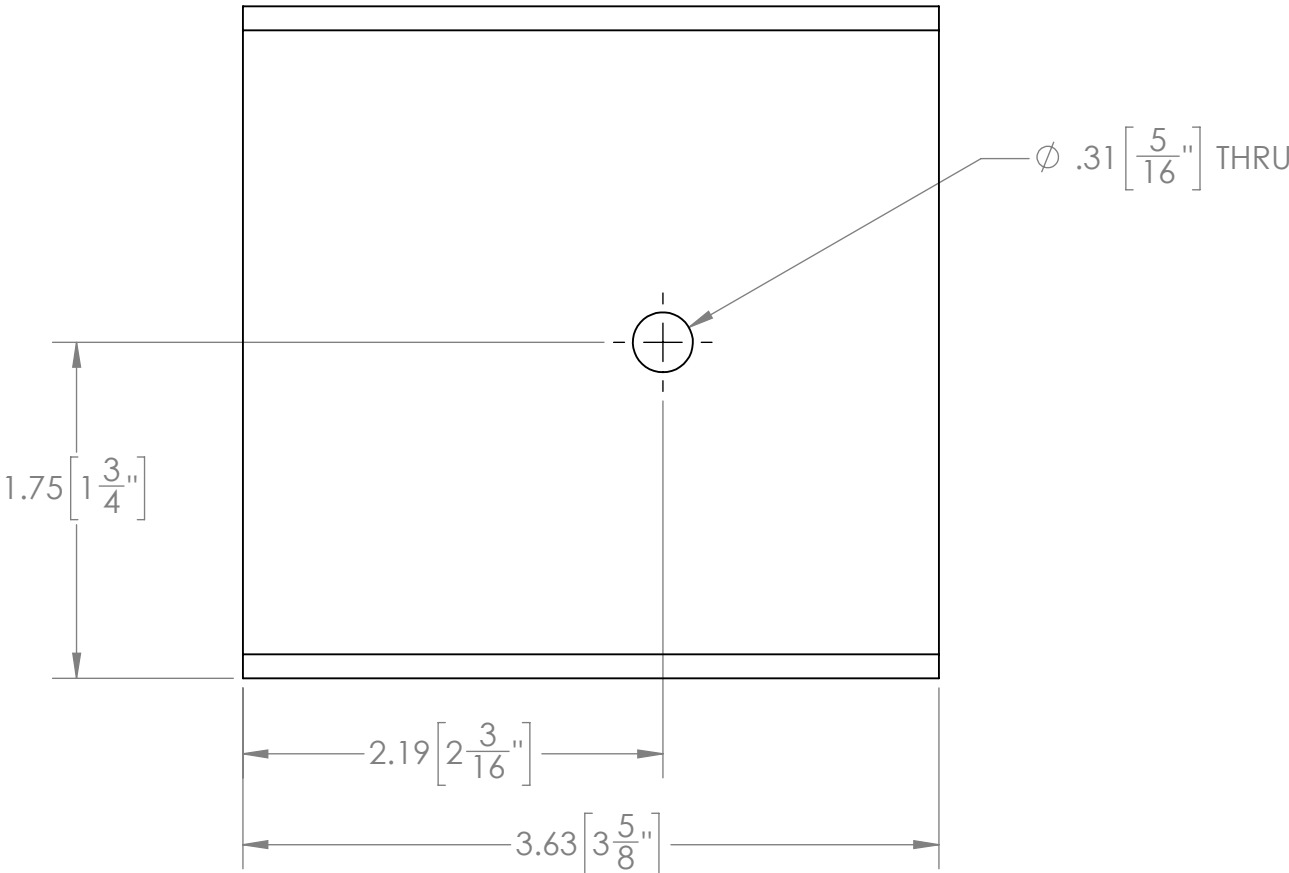
| | | | | |
|---|---|------|------------|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |   |
| | DRAWN | KAMC | 12/20/2021 | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 | PROPRIETARY AND CONFIDENTIAL | | | TITLE: HUB - Complex Build - Connection Box Assembly for AndyMark Upper Hub (AM-4671) |
| | 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: | | | SIZE DWG. NO. REV |
| | REMOVE ALL BURRS AND SHARP EDGES. | | | |
| DO NOT SCALE DRAWING | | | | SCALE: 1:4 SHEET 3 OF 3 |

D



C

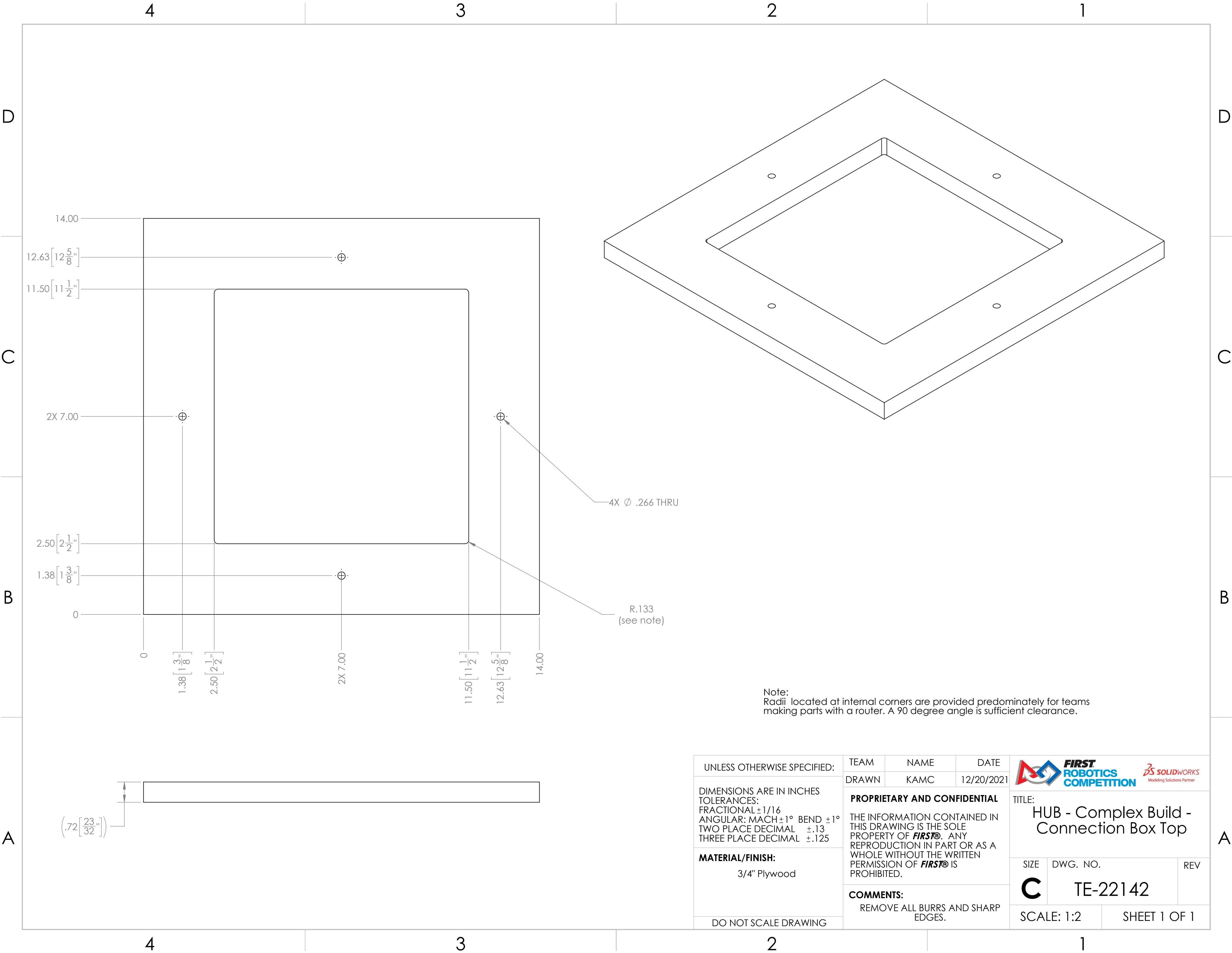
B



A

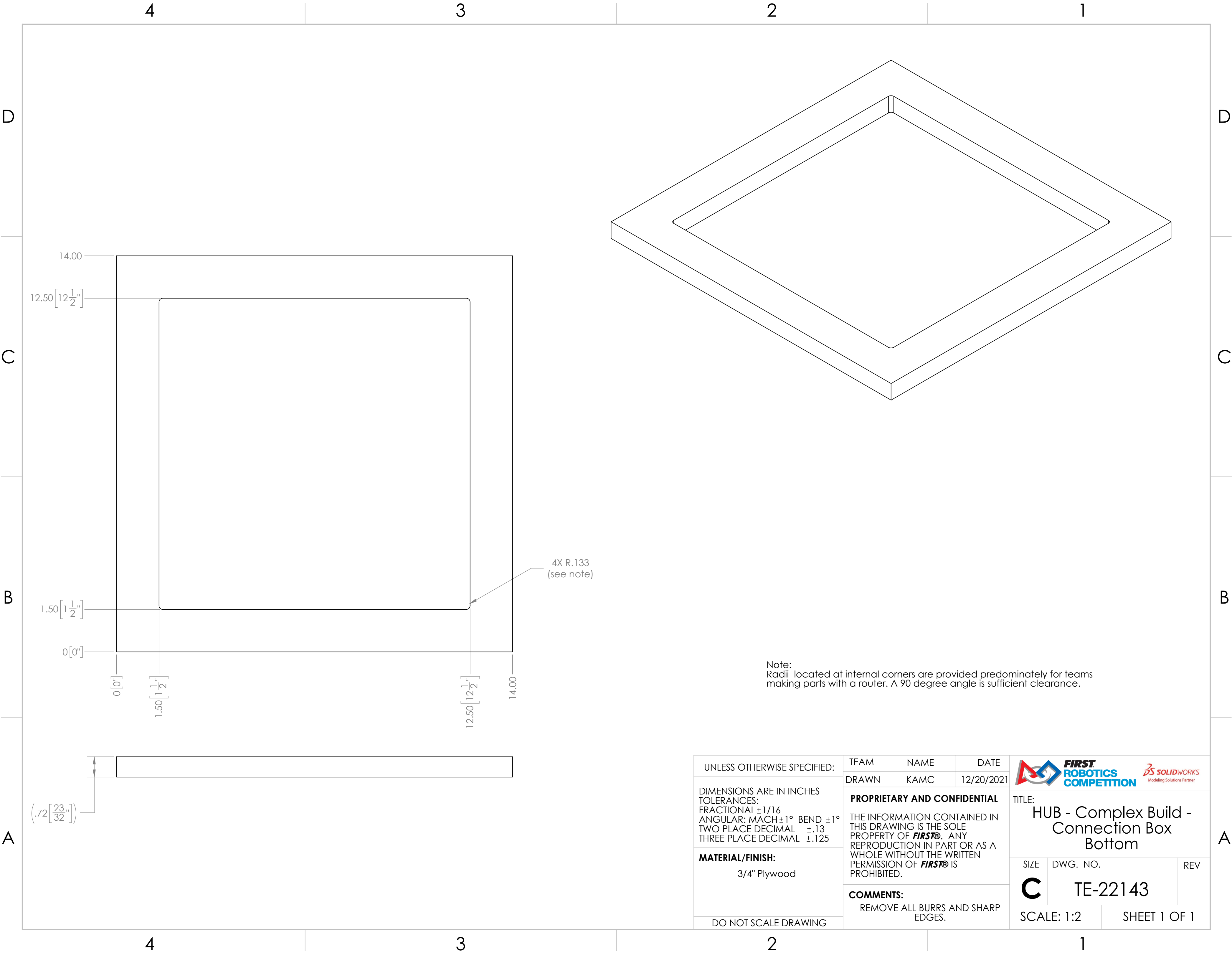




Note:
Use TE-22141 if NOI pairing with AndyMark Upper Hub (AM-4671)

| | | | | | | |
|---|--|--------------|------------|---|-------------|-----|
| 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: 2" x 4" Lumber DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div><div></div><div>TITLE: HUB - Complex Build - Connection Box 2x4 for AndyMark Upper Hub (AM-4671)</div></div> | | |
| | DRAWN | KAMC | 12/20/2021 | | | |
| | 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. | | | SIZE | DWG. NO. | REV |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22141-AM | |
| SCALE: 1:1 | | SHEET 1 OF 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: 3/4" Plywood DO NOT SCALE DRAWING | TEAM | NAME | DATE |   | |
| | DRAWN | KAMC | 12/20/2021 | | |
| | 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. | | | | TITLE: HUB - Complex Build - Connection Box Top |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | SIZE C | DWG. NO. TE-22142 | REV |
| SCALE: 1:2 | | SHEET 1 OF 1 | | | |



| | | | | | | |
|--|--|------|------------|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: 3/4" Plywood DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> <div>TITLE: HUB - Complex Build - Connection Box Bottom</div> | | |
| | DRAWN | KAMC | 12/20/2021 | | | |
| | 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. | | | | | |
| COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | | SIZE | DWG. NO. | REV |
| | | | | C | TE-22143 | |
| | | | | SCALE: 1:2 | | SHEET 1 OF 1 |

D

C

B

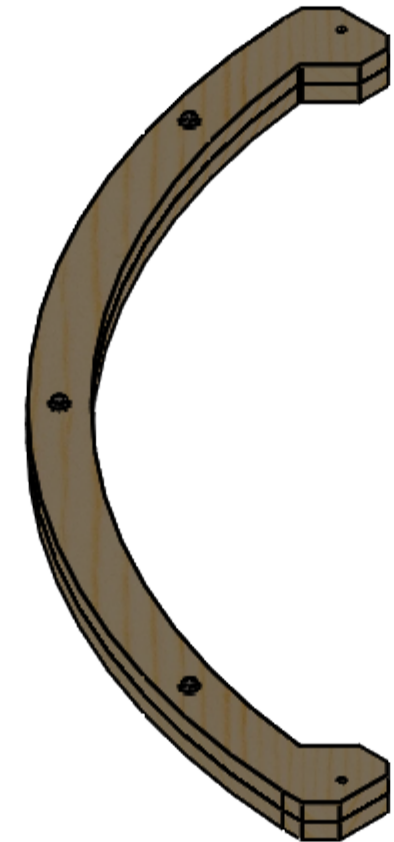
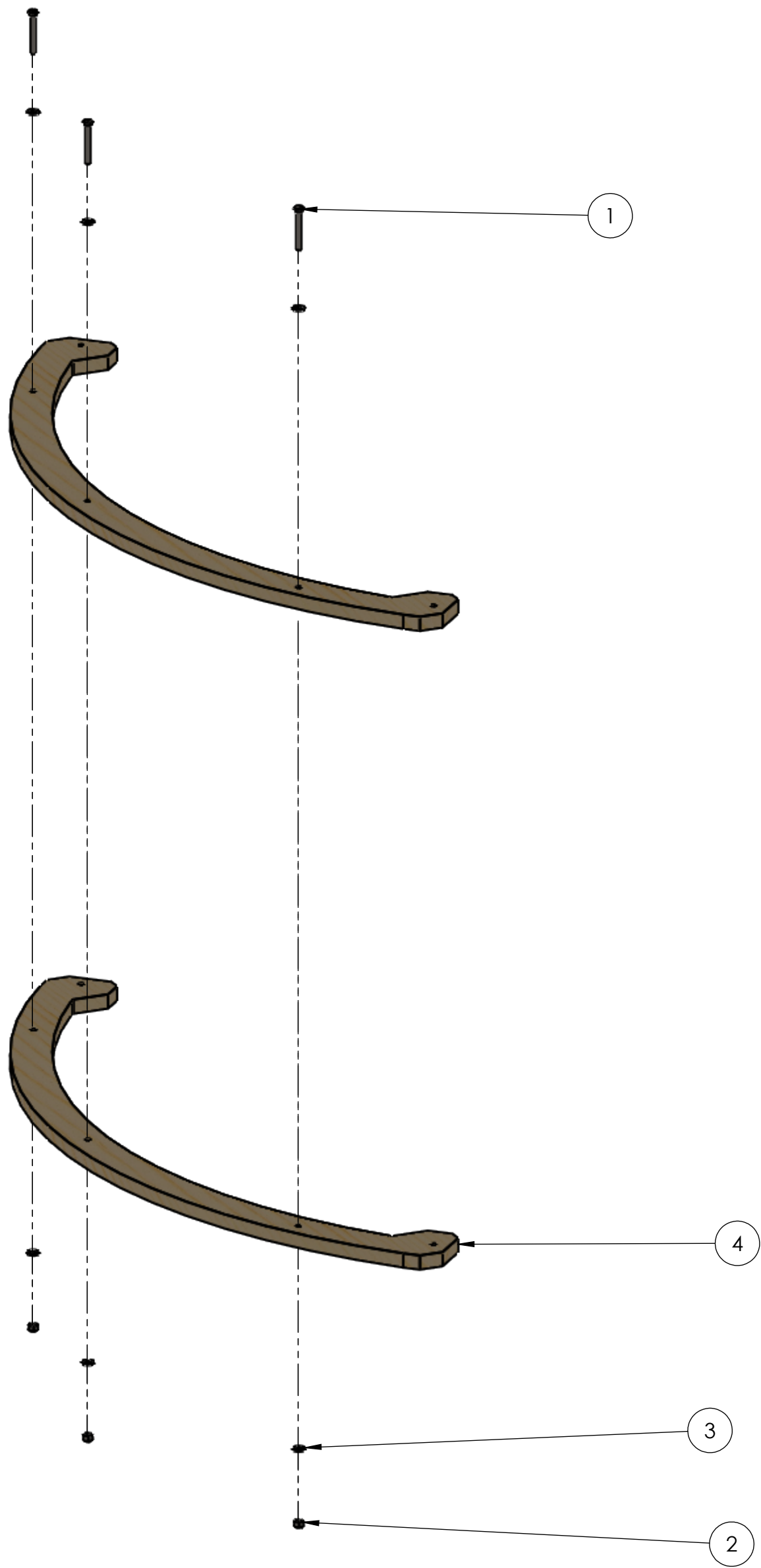
A

D

C



B

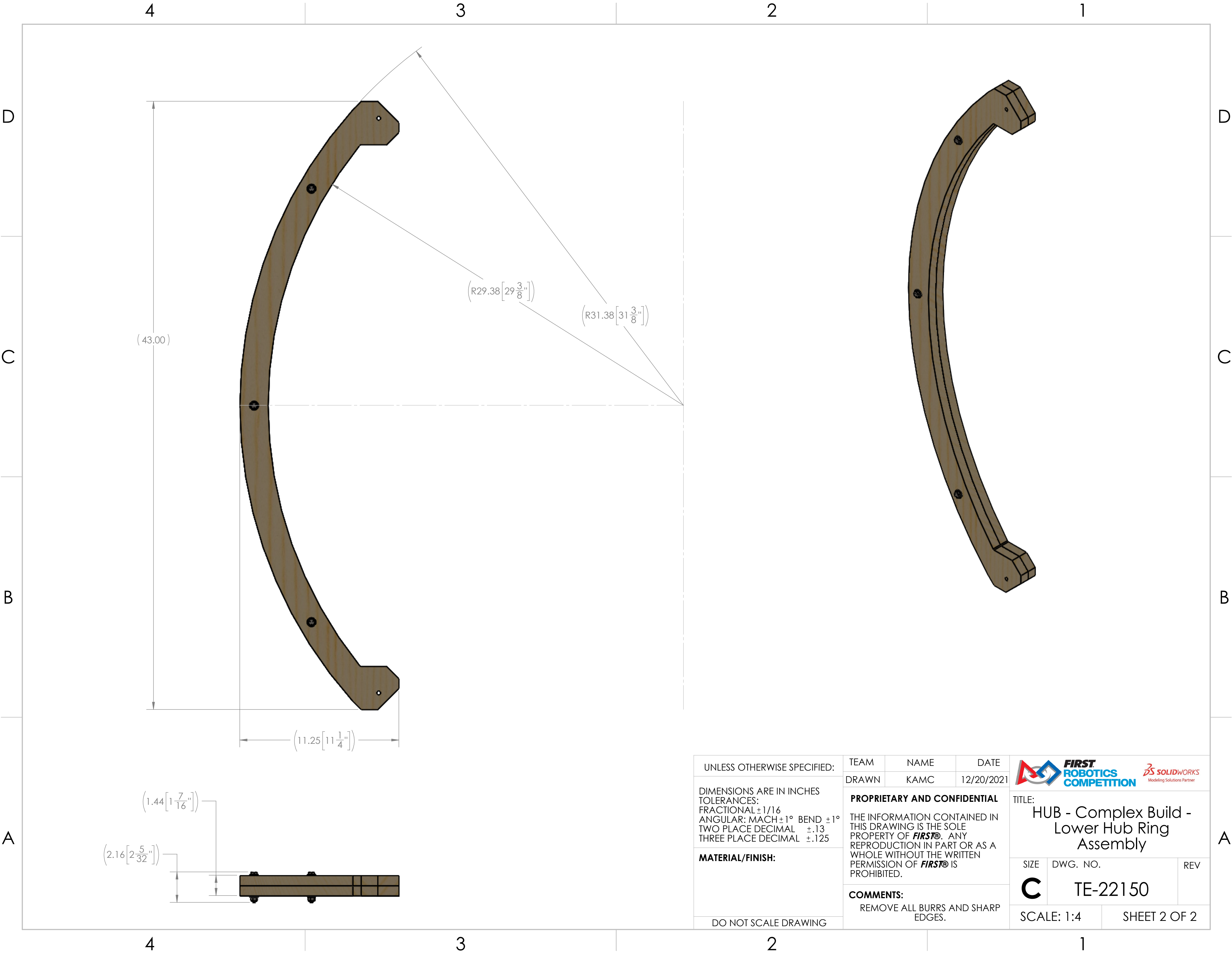
A





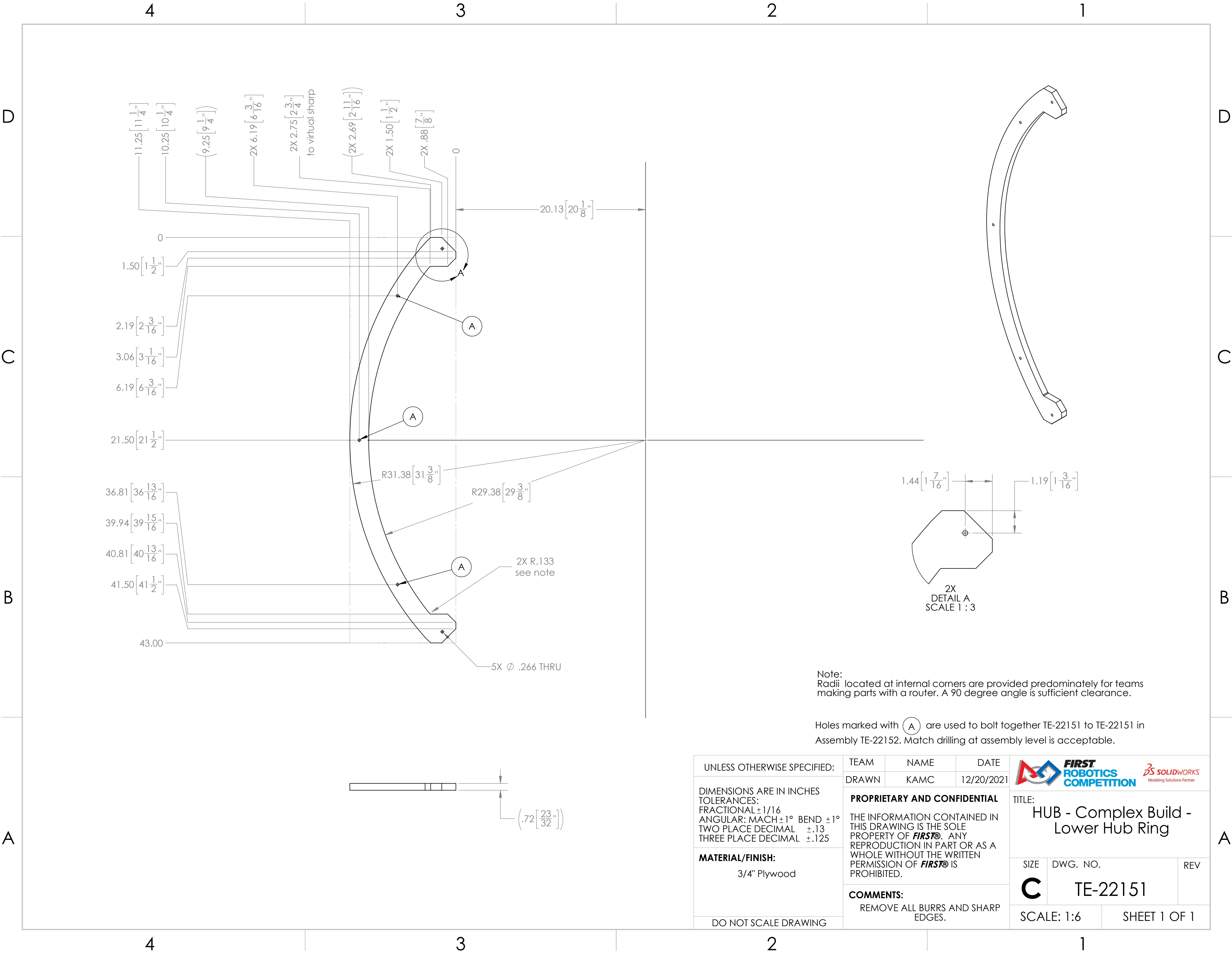
- Step 1
1. Align 2x (4) to each other.
- Step 2:
2. Connect Step 1 using the center 3 holes in (4). Use 1x (1), 2x (4), and 1x (2) per hole.

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|-----------------|---|------|
| 1 | hex_.25_20_2 | Steel Hex Head Screw, 1/4"-20 x 2" long, fully threaded | 3 |
| 2 | nylock_.25_20 | Steel Nylon-Insert Locknut, 1/4"-20 | 3 |
| 3 | washer_flat_.25 | Flat Washer for 1/4" Screw | 6 |
| 4 | TE-22151 | HUB - Complex Build - Lower Hub Ring | 2 |

| | | | | | | | |
|--|--|--|------|------------|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED: | | TEAM | NAME | DATE | <div></div> | | |
| | | DRAWN | KAMC | 12/20/2021 | | | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.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. | | | TITLE: HUB - Complex Build - Lower Hub Ring Assembly | | |
| MATERIAL/FINISH: | | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE | DWG. NO. | REV |
| | | | | | C | TE-22150 | |
| DO NOT SCALE DRAWING | | | | | SCALE: 1:6 | | SHEET 1 OF 2 |





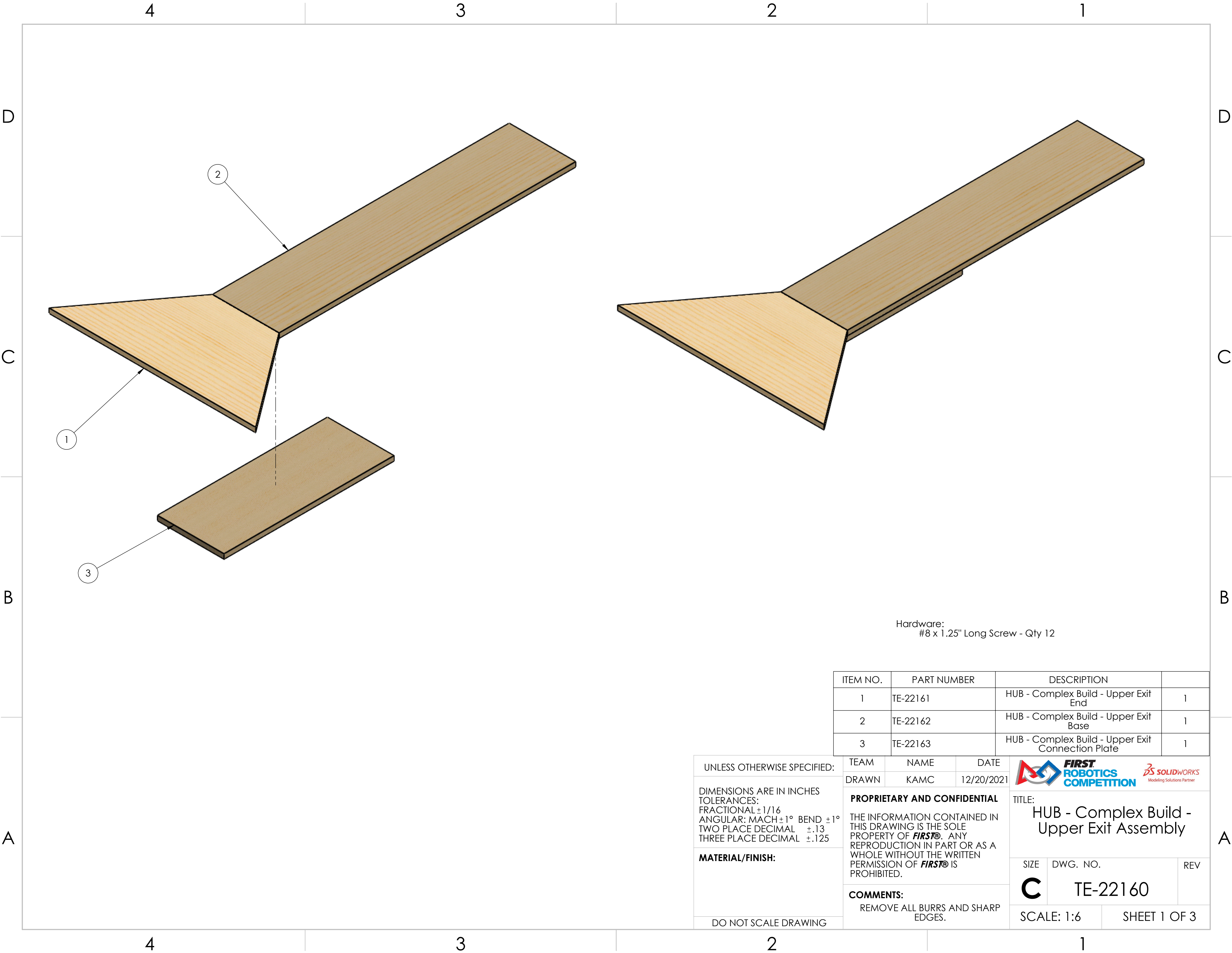
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|---|---|------|--------------|---|--|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> | |
| | DRAWN | KAMC | 12/20/2021 | | |
| | PROPRIETARY AND CONFIDENTIAL | | | TITLE: | |
| | 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. | | | HUB - Complex Build - Lower Hub Ring Assembly | |
| COMMENTS: | | SIZE | DWG. NO. | REV | |
| REMOVE ALL BURRS AND SHARP EDGES. | | C | TE-22150 | | |
| SCALE: 1:4 | | | SHEET 2 OF 2 | | |

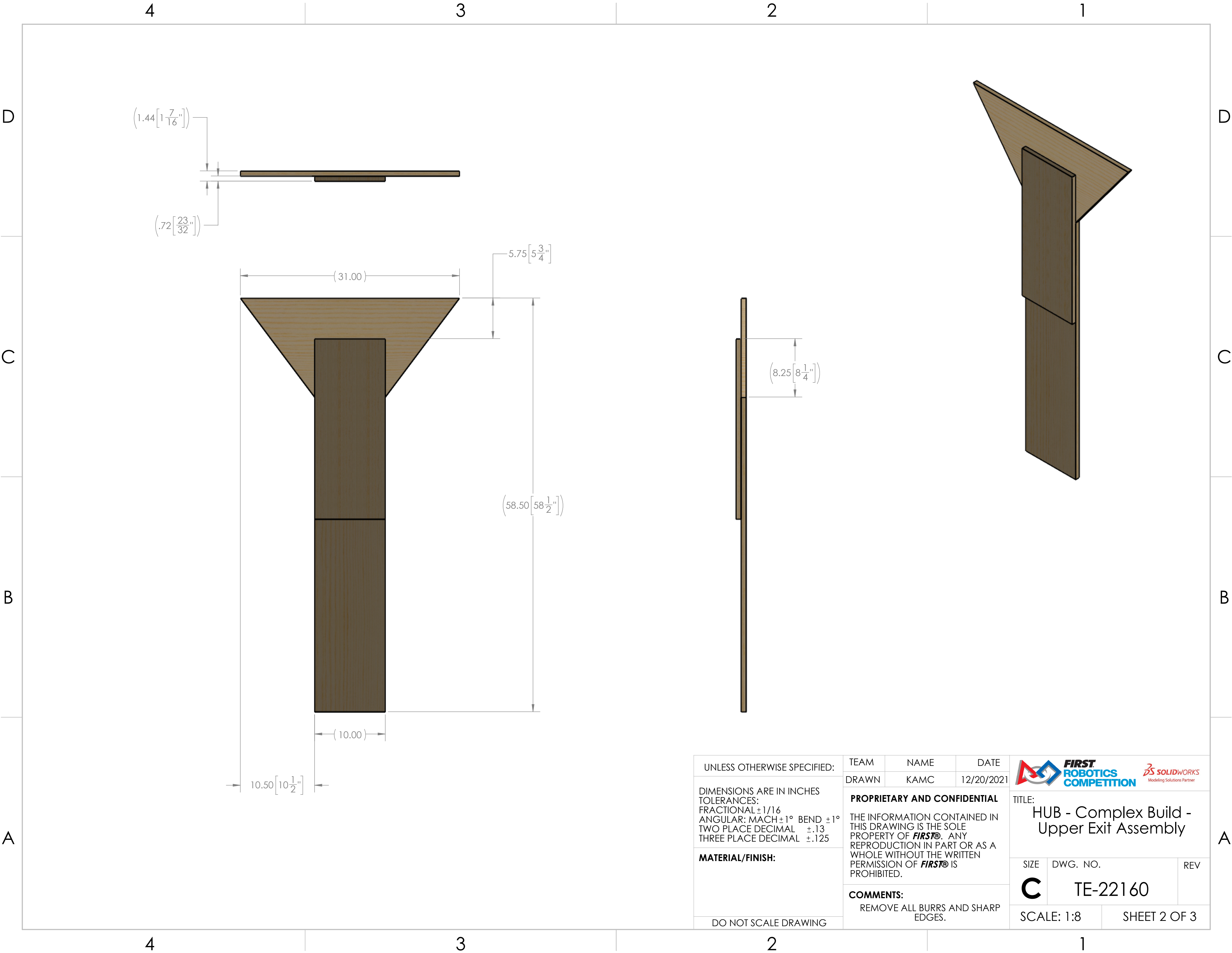


Note:
Radii located at internal corners are provided predominately for teams making parts with a router. A 90 degree angle is sufficient clearance.

Holes marked with (A) are used to bolt together TE-22151 to TE-22151 in Assembly TE-22152. Match drilling at assembly level is acceptable.

| | | | | | | |
|--|---|------|------------|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE | <div></div> | | |
| | DRAWN | KAMC | 12/20/2021 | | | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 | PROPRIETARY AND CONFIDENTIAL | | | TITLE: HUB - Complex Build - Lower Hub Ring | | |
| | 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 | COMMENTS: | | | SIZE | DWG. NO. | REV |
| | REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22151 | |
| DO NOT SCALE DRAWING | | | | SCALE: 1:6 | | SHEET 1 OF 1 |





$(1.44 [1 \frac{7}{16}"])$

$(.72 [\frac{23}{32}"])$

(31.00)



$5.75 [5 \frac{3}{4}"]$

$(58.50 [58 \frac{1}{2}"])$

(10.00)

$10.50 [10 \frac{1}{2}"]$

$(8.25 [8 \frac{1}{4}"])$

| | | | | | | |
|---|---|------|------------|---|--------------|-----|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> <div>TITLE: HUB - Complex Build - Upper Exit Assembly</div> | | |
| | DRAWN | KAMC | 12/20/2021 | | | |
| | 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. COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE | DWG. NO. | REV |
| | | | C | TE-22160 | | |
| | | | SCALE: 1:8 | | SHEET 2 OF 3 | |

4

3

2

1

Step 1

Bottom View

5.75 $\left[5\frac{3}{4}\right]$

10.50 $\left[10\frac{1}{2}\right]$

(10.00)

Top View

1. Align 3 and 1 as shown.

2. Connect parts using 1.25" Long screws. It is recommended to use 6x screws.

3

1

Step 2

Bottom View

Top View

Align Edges

$\left(58.50\left[58\frac{1}{2}\right]\right)$

1. Add 2 to Step 1 , as shown.

2. Connect parts using 1.25" Long screws. It is recommended to use 6x screws.

2

3

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:

DO NOT SCALE DRAWING

TEAM

DRAWN

NAME

KAMC

DATE


12/20/2021

PROPRIETARY AND CONFIDENTIAL


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COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.



FIRST
ROBOTICS
COMPETITION



Modeling Solutions Partner

TITLE:

HUB - Complex Build -
Upper Exit Assembly

SIZE

DWG. NO.

REV

C

TE-22160

SCALE: 1:8

SHEET 3 OF 3

4

3

2

1

A

B

C

D

D

C

B

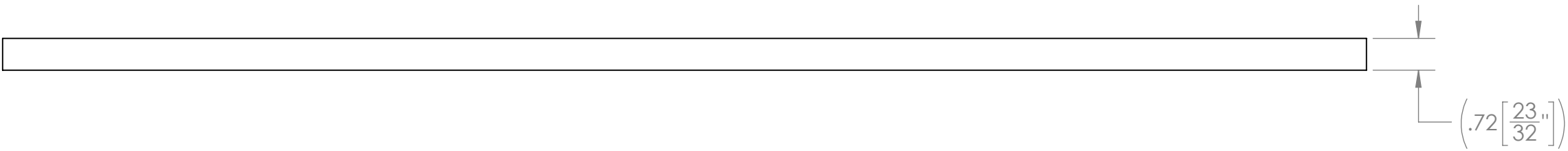
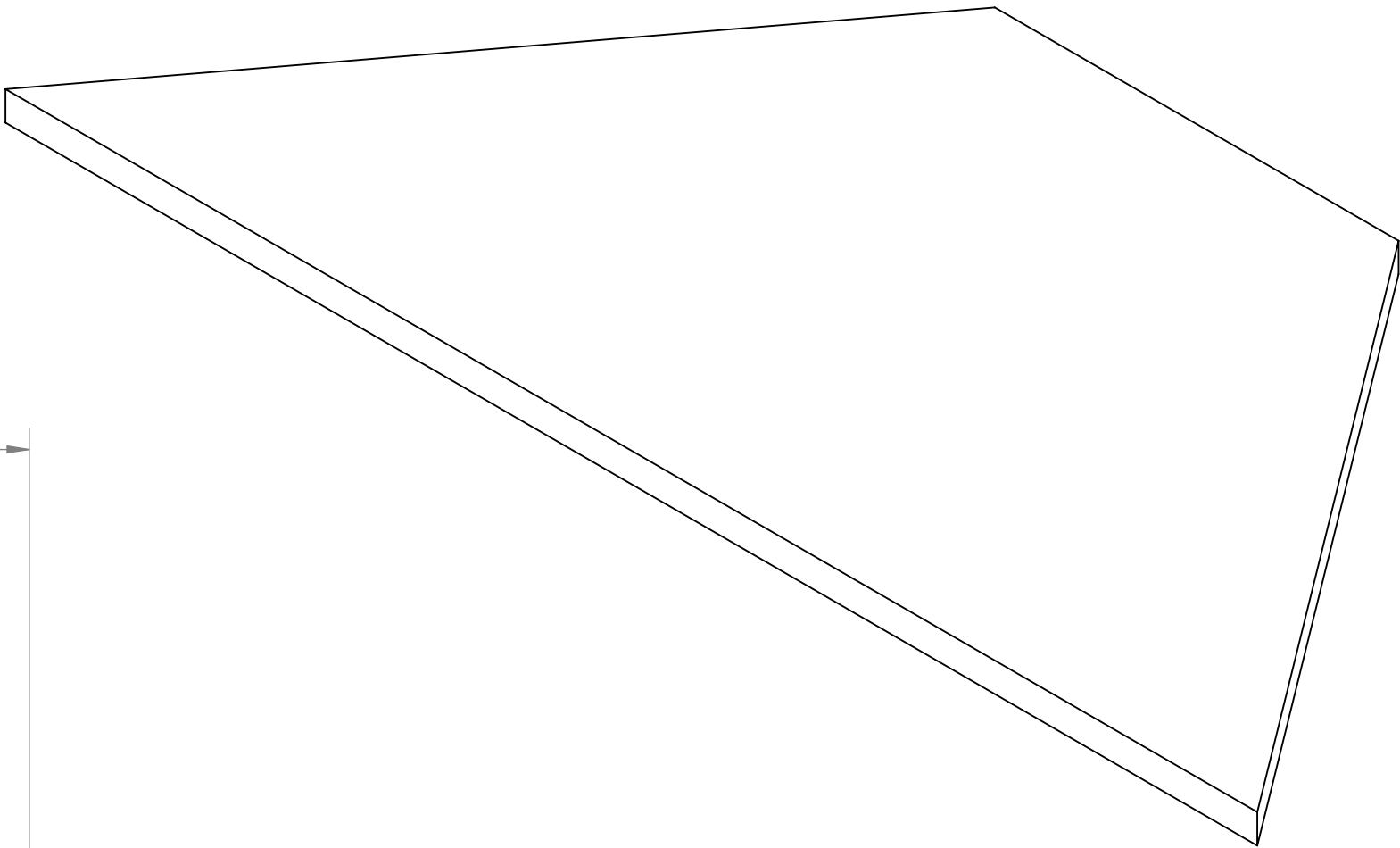
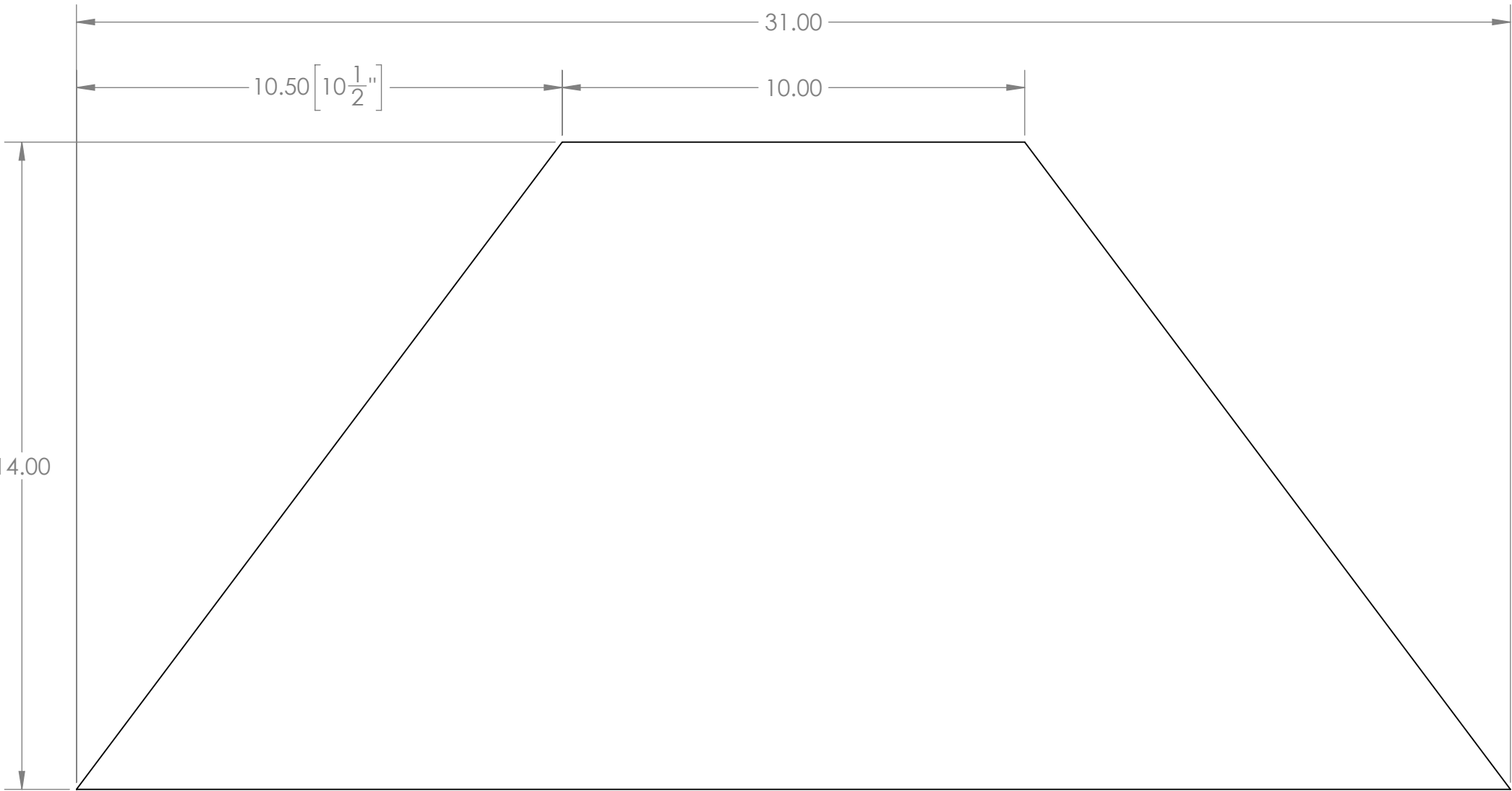
A

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

12/20/2021

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.

COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.



**FIRST
ROBOTICS
COMPETITION**

SOLIDWORKS
Modeling Solutions Partner

TITLE:

HUB - Complex Build -
Upper Exit End

SIZE

C

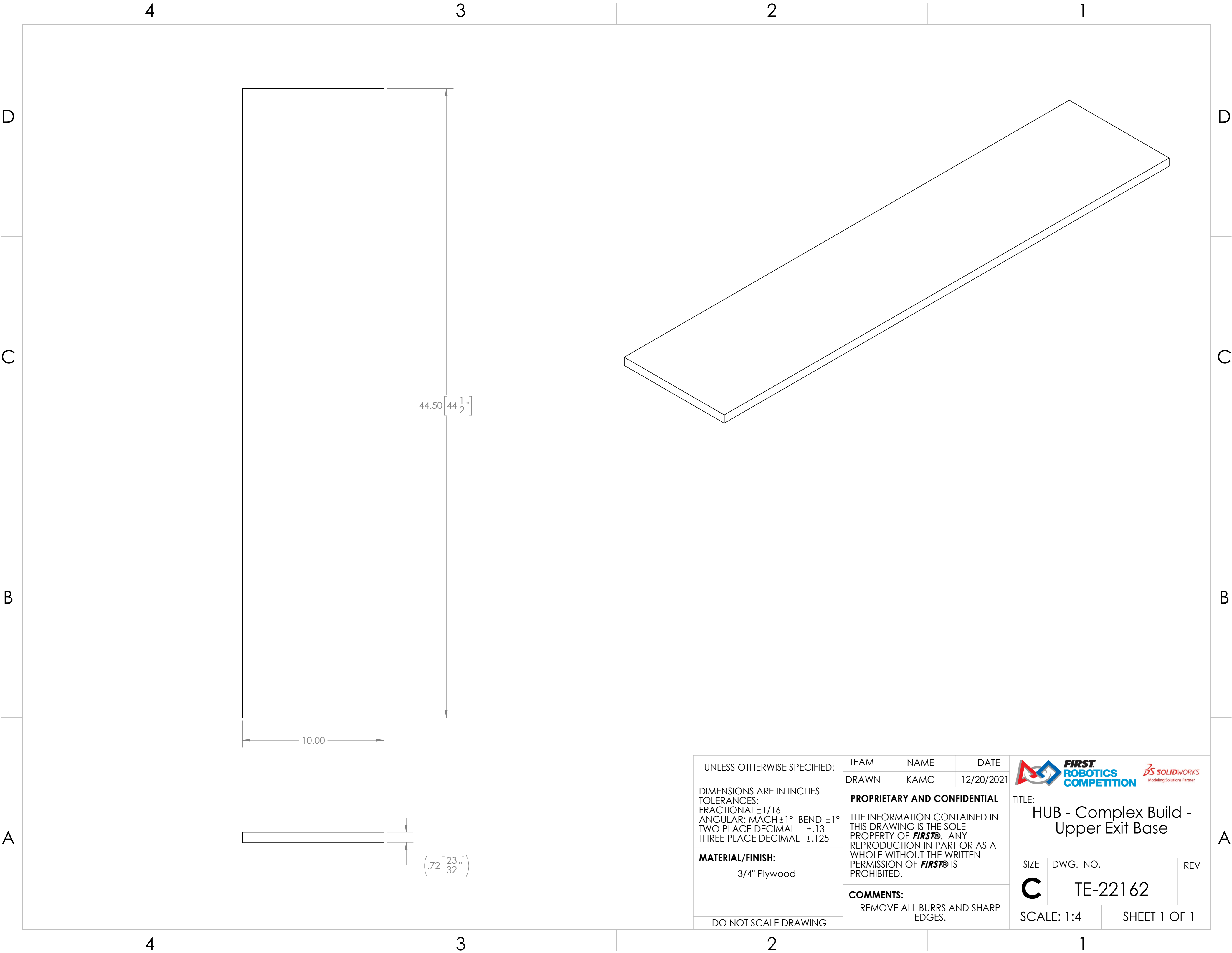
DWG. NO.



TE-22161

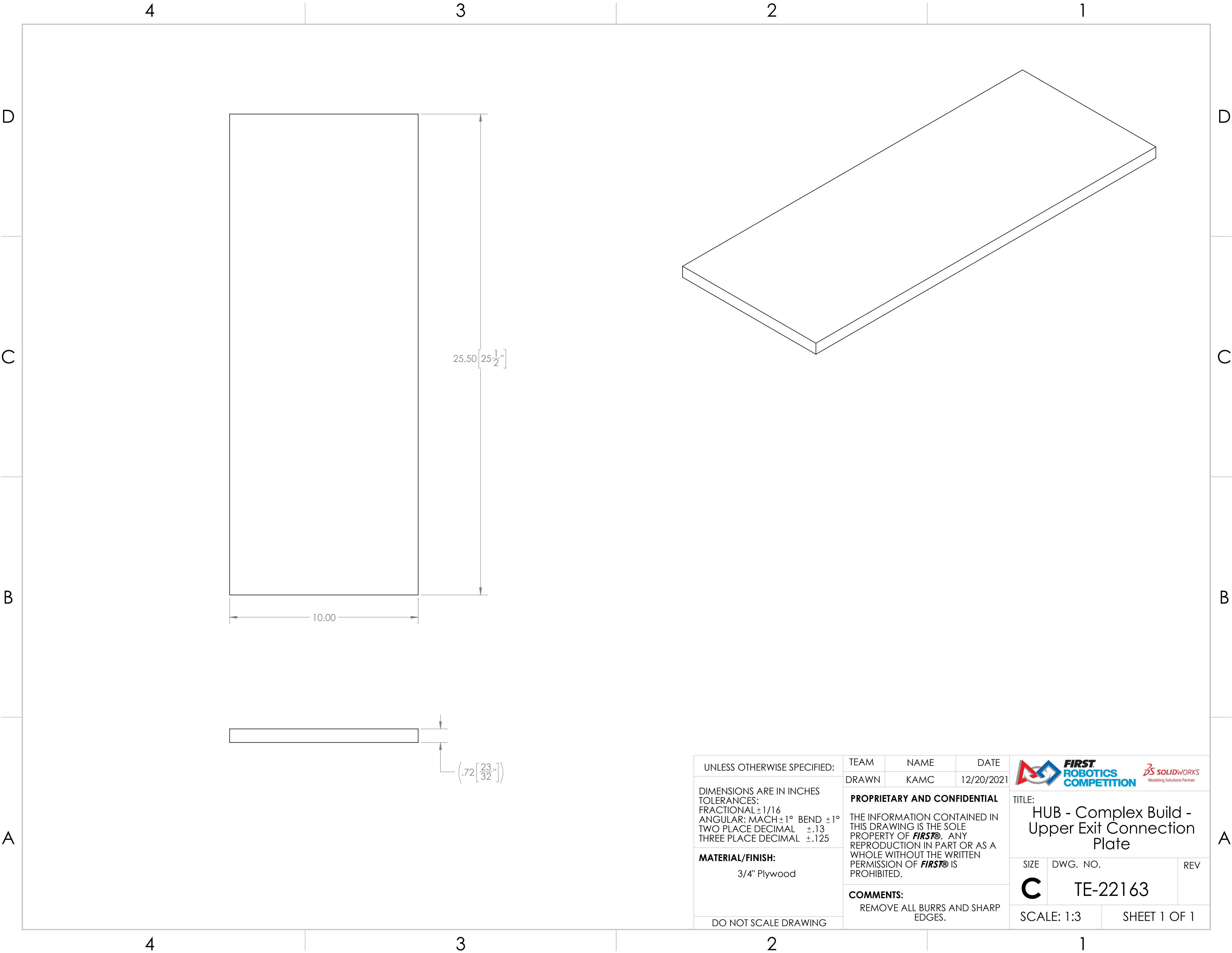
REV



SCALE: 1:3

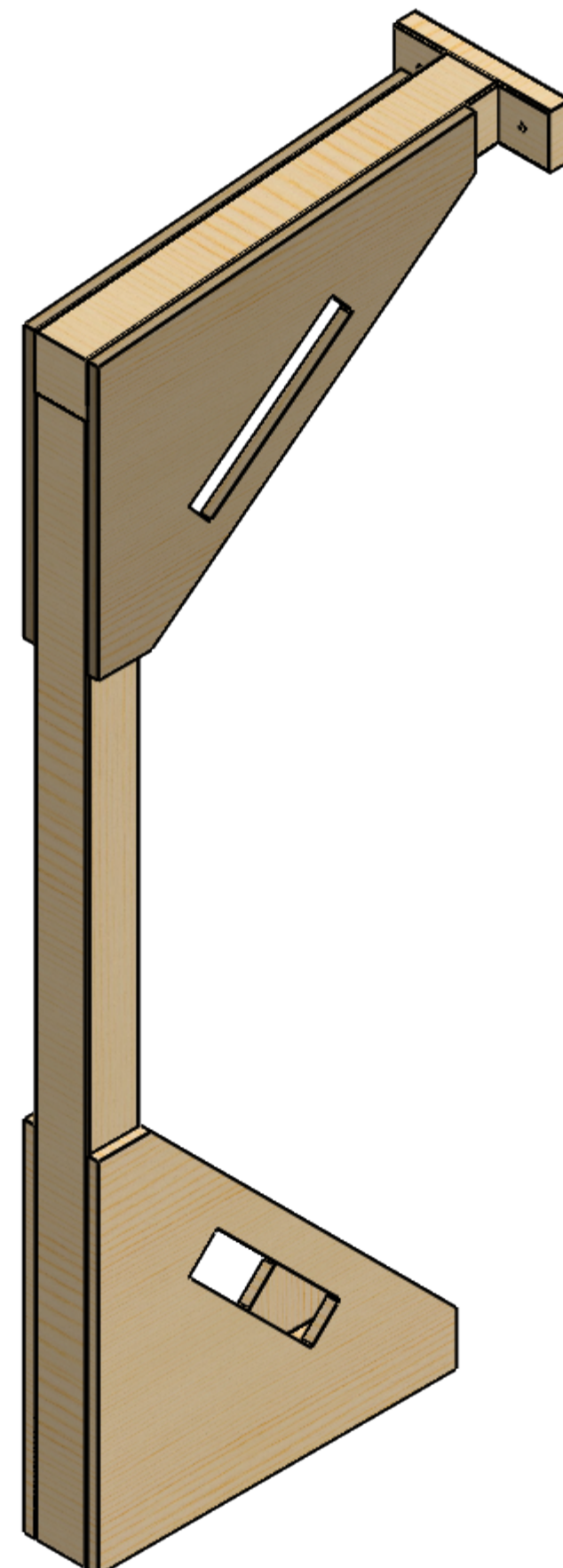
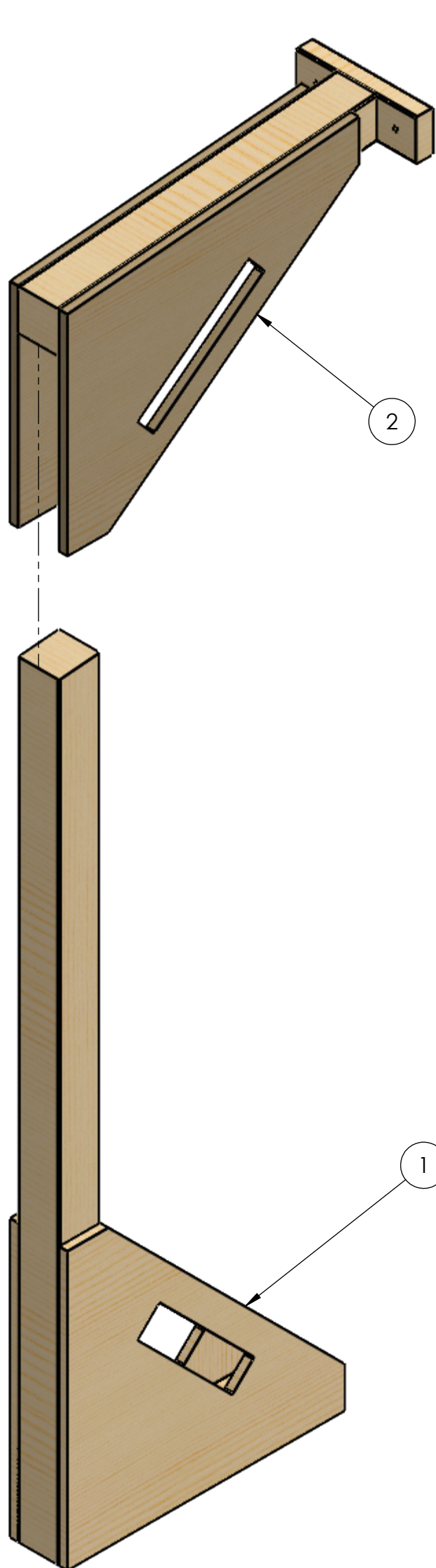
SHEET 1 OF 1



| | | | | | | |
|---|--|--------------|------------|---|----------|-----|
| 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: 3/4" Plywood DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> <div>TITLE: HUB - Complex Build - Upper Exit Base</div> | | |
| | DRAWN | KAMC | 12/20/2021 | | | |
| | 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. | | | SIZE | DWG. NO. | REV |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22162 | |
| SCALE: 1:4 | | SHEET 1 OF 1 | | | | |



| | | | | | | |
|--|---|------|------------|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE | <div></div> | | |
| | DRAWN | KAMC | 12/20/2021 | | | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 | PROPRIETARY AND CONFIDENTIAL | | | TITLE: HUB - Complex Build - Upper Exit Connection Plate | | |
| | 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 |
| MATERIAL/FINISH: 3/4" Plywood | | | | C | TE-22163 | |
| | | | | SCALE: 1:3 | | SHEET 1 OF 1 |
| DO NOT SCALE DRAWING | | | | | | |



- Step 1:
- Align (2) and (1), as shown.
- Step 2:
- Connect Step 1 using 2" long screws. It is recommended to use 5x screws on each side.

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

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|-------------|--|------|
| 1 | TE-22177 | HUB - Complex Build - Lower Leg Assembly | 1 |
| 2 | TE-22178 | HUB - Complex Build - Upper Leg Assembly | 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:

DO NOT SCALE DRAWING



| | | |
|-------|------|------------|
| TEAM | NAME | DATE |
| DRAWN | KAMC | 12/21/2021 |

PROPRIETARY AND CONFIDENTIAL

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COMMENTS:

REMOVE ALL BURRS AND SHARP EDGES.

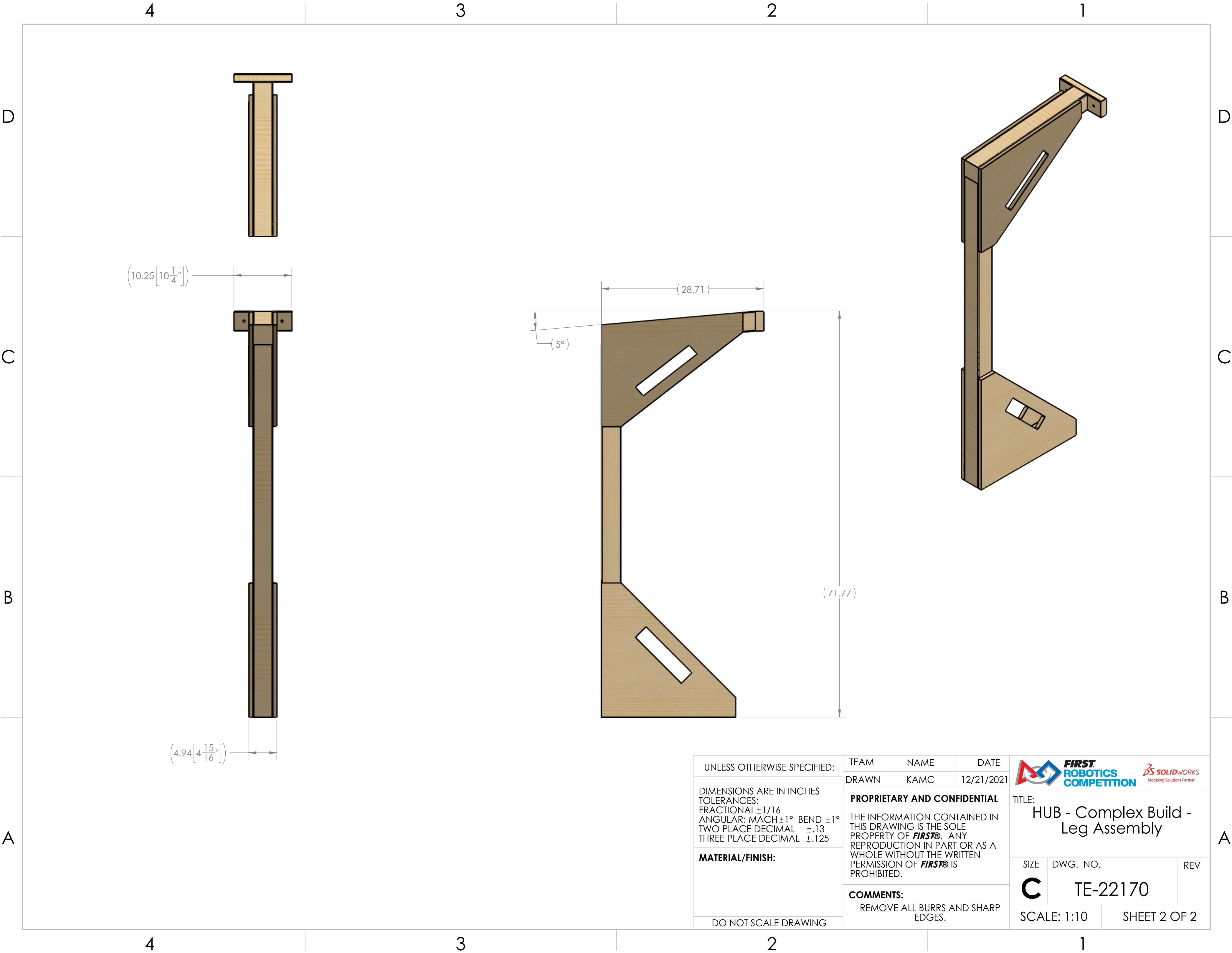




TITLE:

HUB - Complex Build - Leg Assembly

| | | |
|------|----------|-----|
| SIZE | DWG. NO. | REV |
| C | TE-22170 | |

| | |
|------------|--------------|
| SCALE: 1:8 | SHEET 1 OF 2 |
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|--|---|------|-------------|---|--------------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE |   | |
| | DRAWN | KAMC | 12/21/2021 | | |
| | 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. COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | TITLE: HUB - Complex Build - Leg Assembly | |
| | | | SIZE | DWG. NO. | REV |
| | | | C | TE-22170 | |
| | | | SCALE: 1:10 | | SHEET 2 OF 2 |

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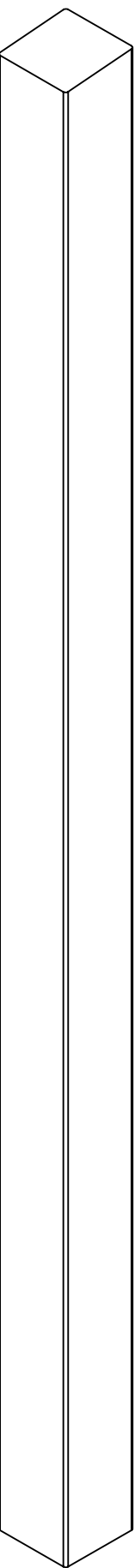
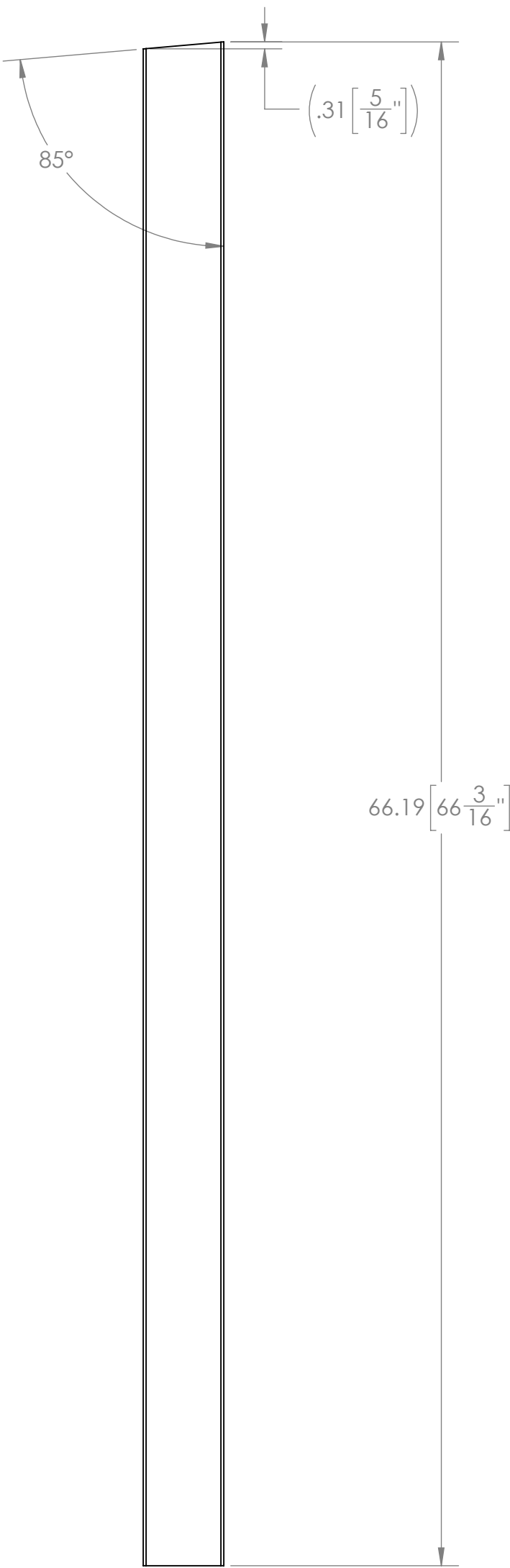
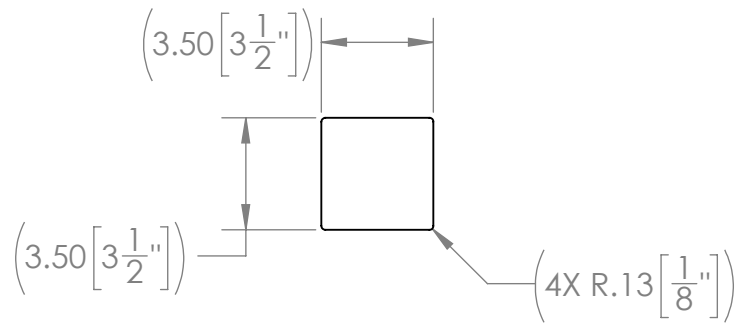
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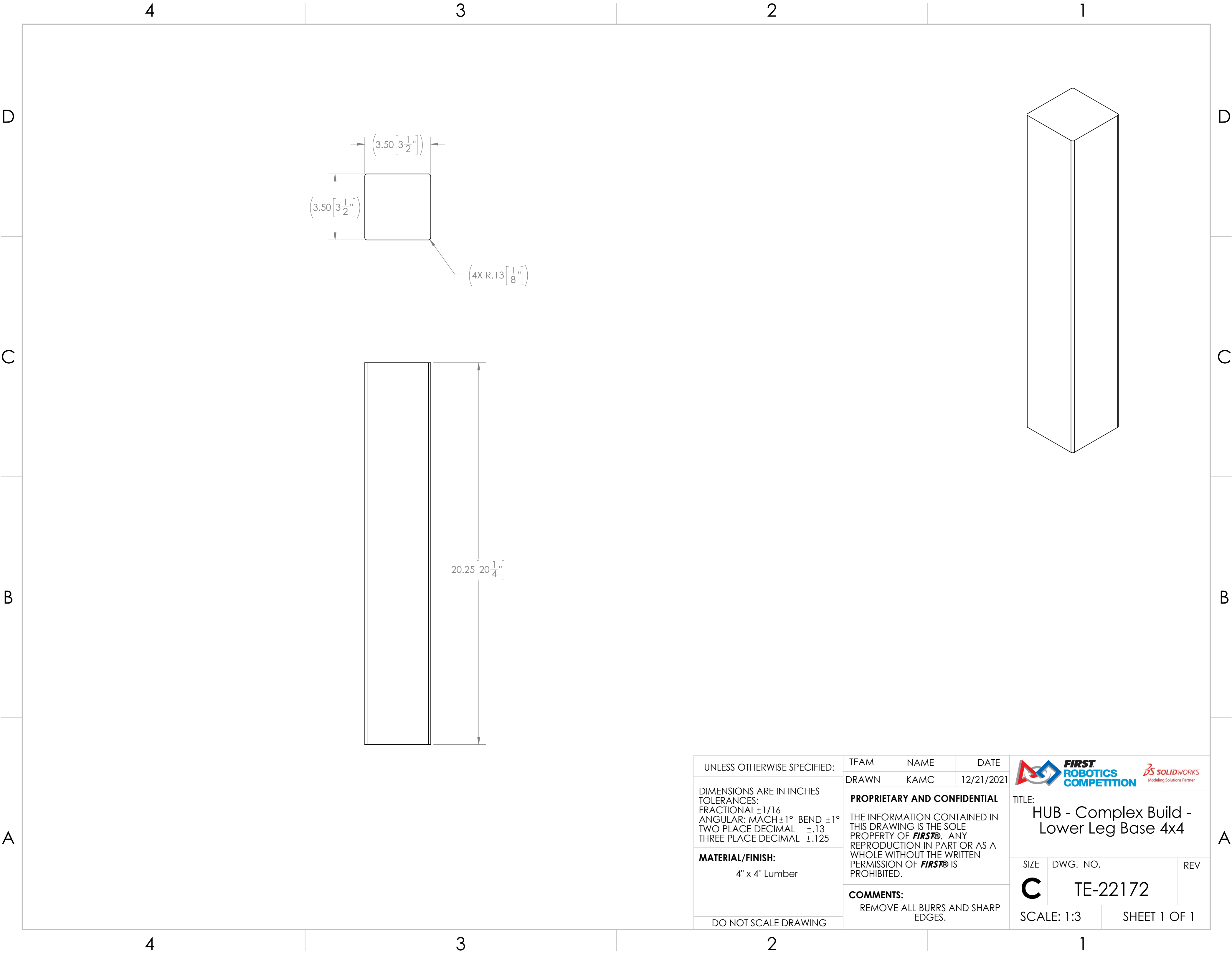
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| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$ MATERIAL/FINISH: 4" x 4" Lumber DO NOT SCALE DRAWING | TEAM | NAME | DATE |  TITLE: HUB - Complex Build - Lower Leg Vertical 4x4 | | |
| | DRAWN | KAMC | 12/21/2021 | | | |
| | 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. | | | SIZE | DWG. NO. | REV |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22171 | |
| SCALE: 1:6 | | SHEET 1 OF 1 | | | | |



4

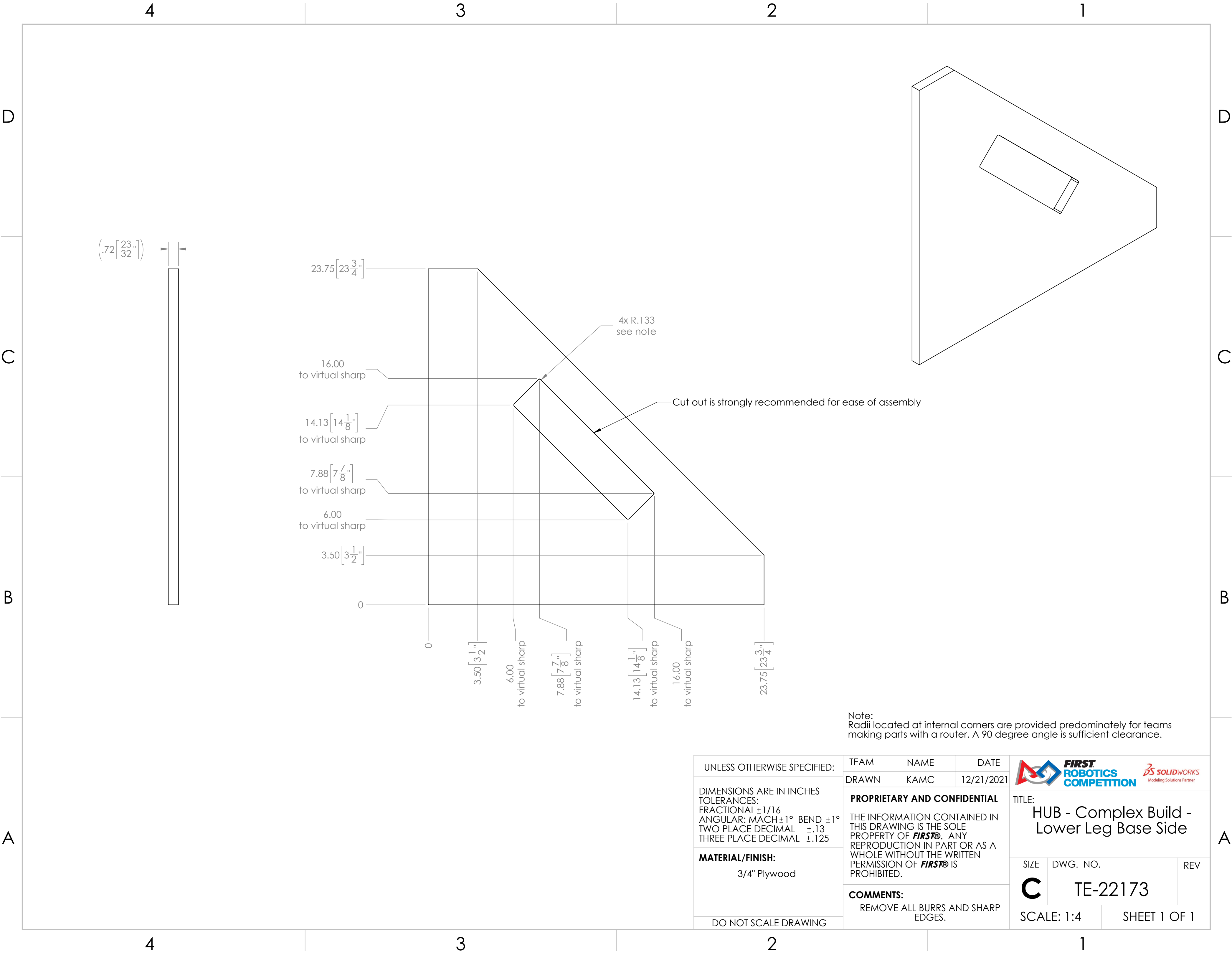
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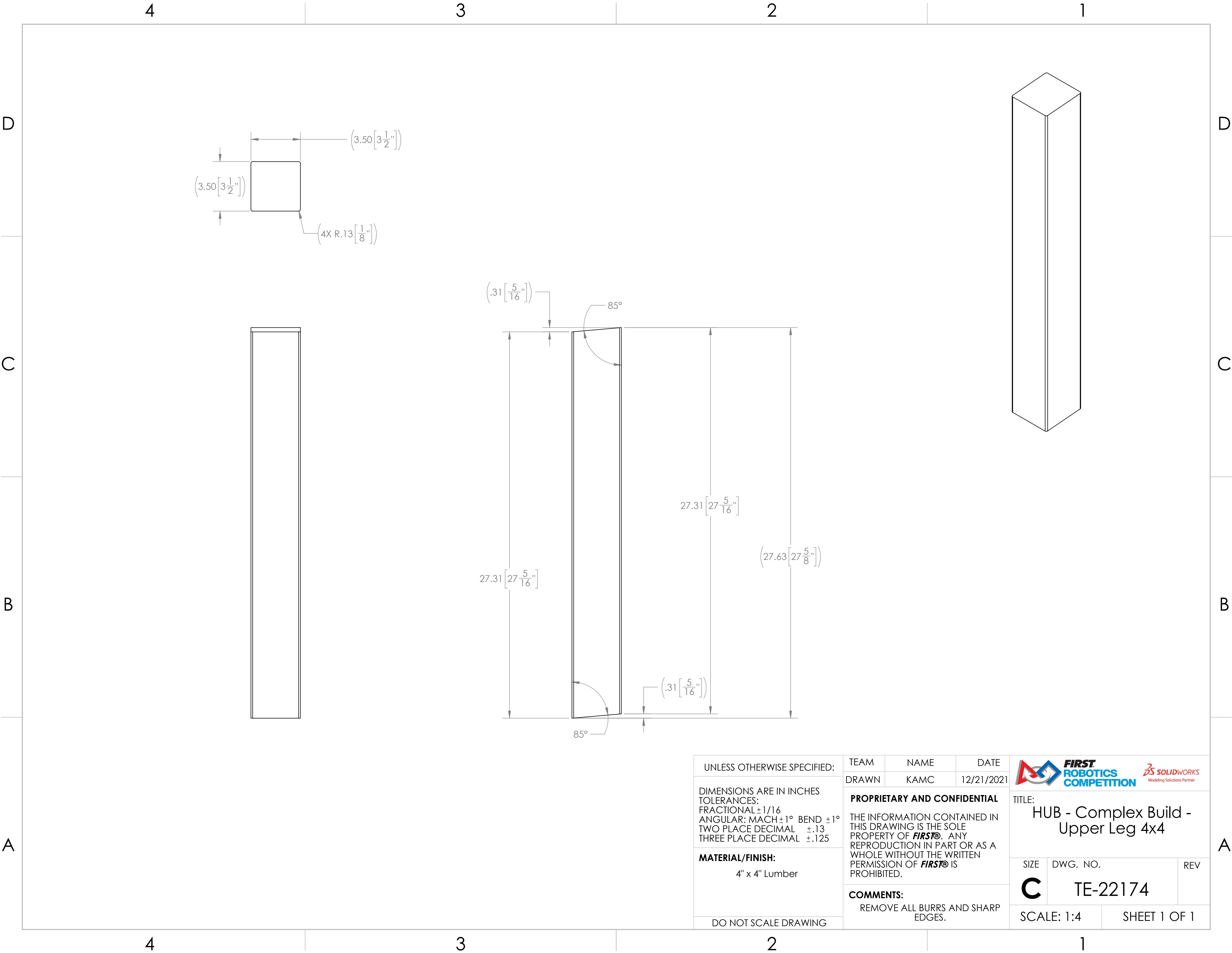
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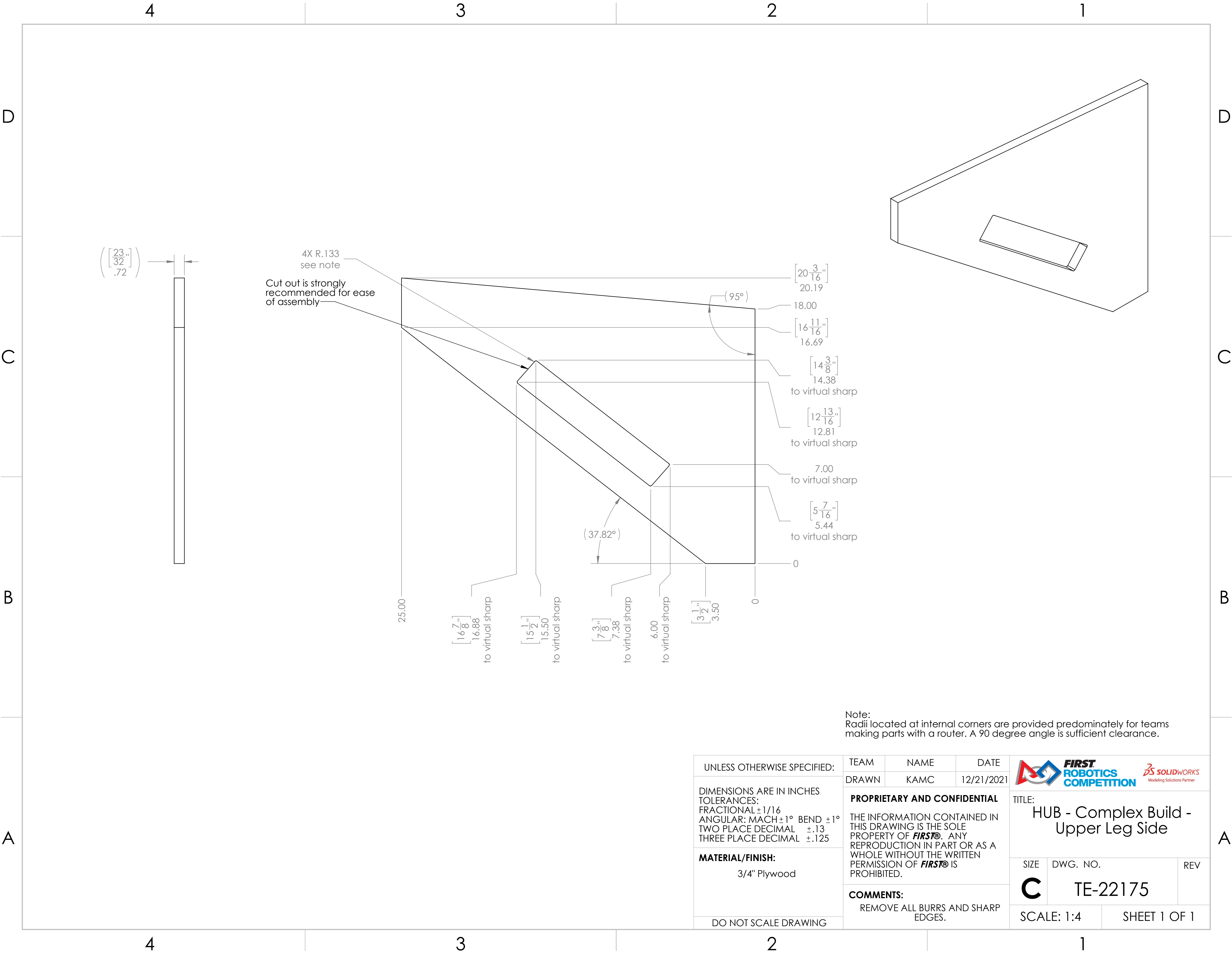


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| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: 4" x 4" Lumber DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div><div></div><div>TITLE: HUB - Complex Build - Lower Leg Base 4x4</div></div> | | |
| | DRAWN | KAMC | 12/21/2021 | | | |
| | 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. | | | SIZE | DWG. NO. | REV |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22172 | |
| SCALE: 1:3 | | SHEET 1 OF 1 | | | | |







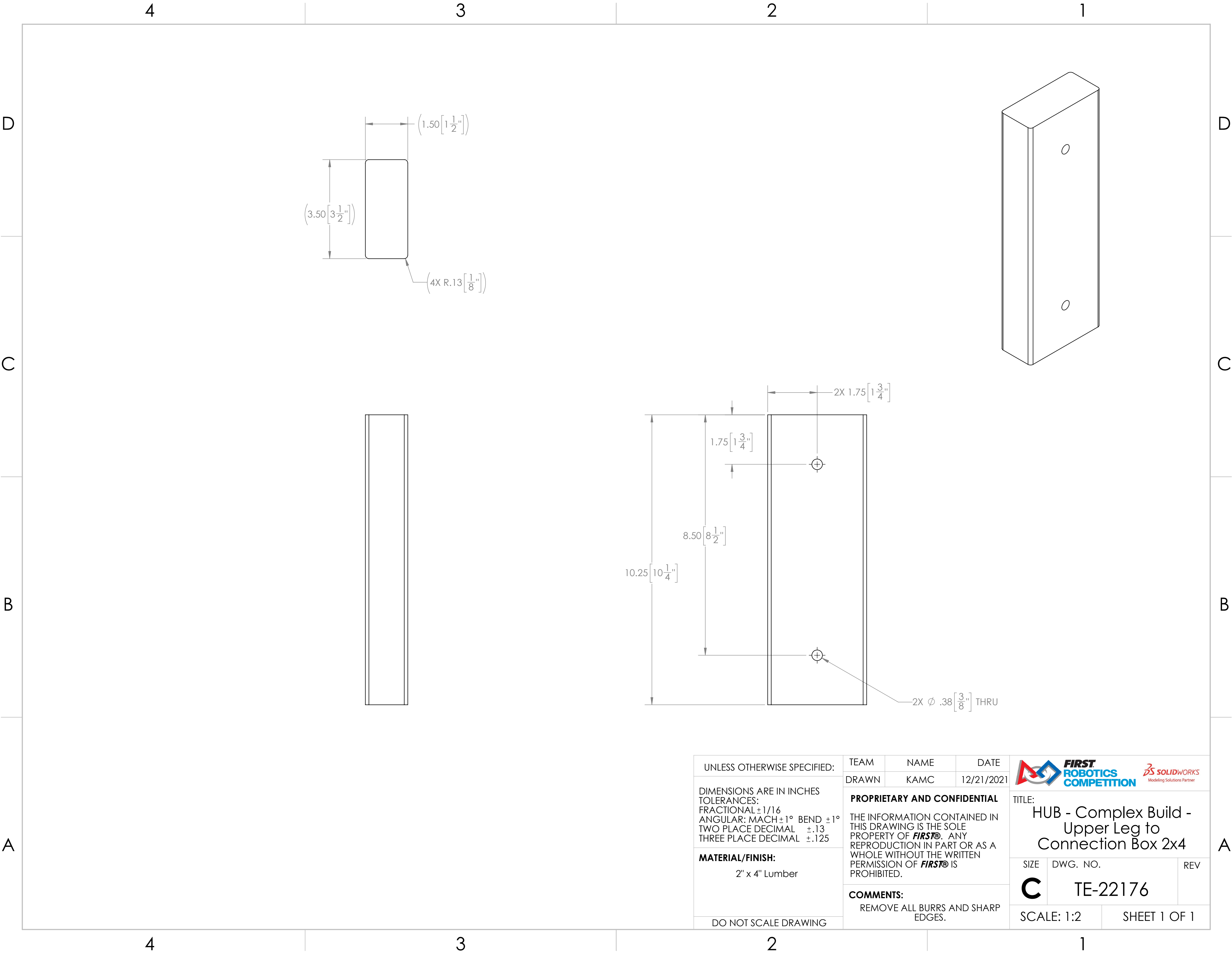
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| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$ MATERIAL/FINISH: 4" x 4" Lumber DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> <div>TITLE: HUB - Complex Build - Upper Leg 4x4</div> | | |
| | DRAWN | KAMC | 12/21/2021 | | | |
| | 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. | | | SIZE | DWG. NO. | REV |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22174 | |
| SCALE: 1:4 | | SHEET 1 OF 1 | | | | |





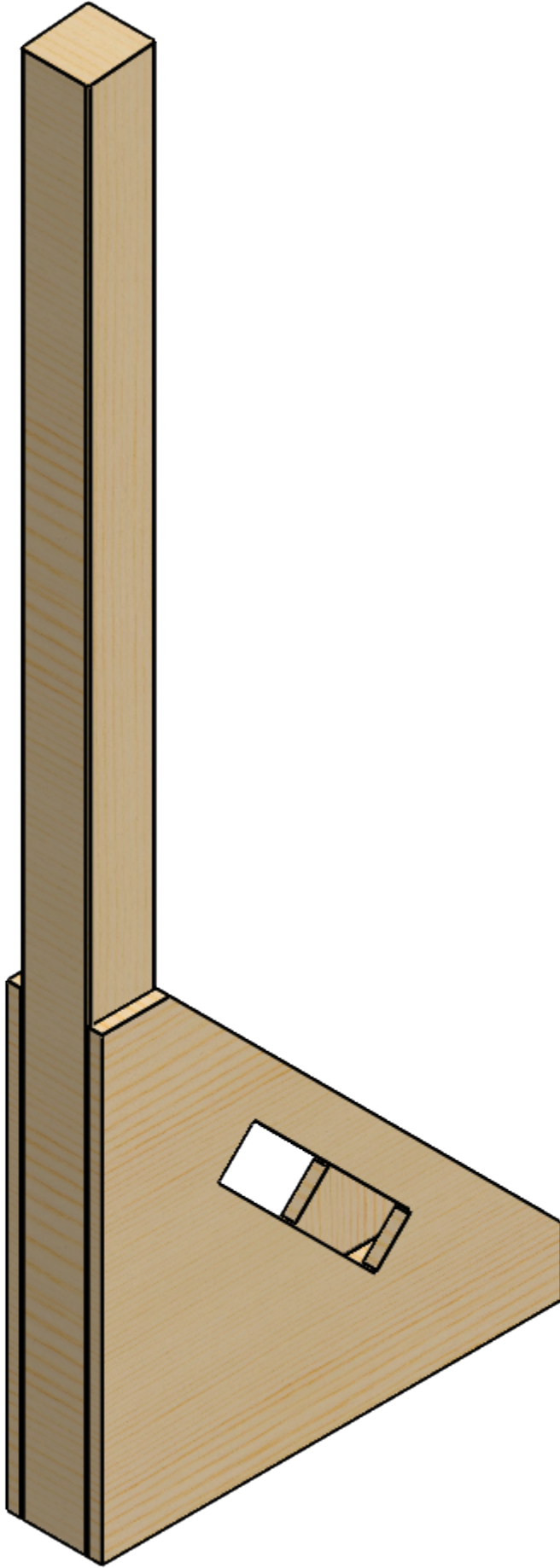
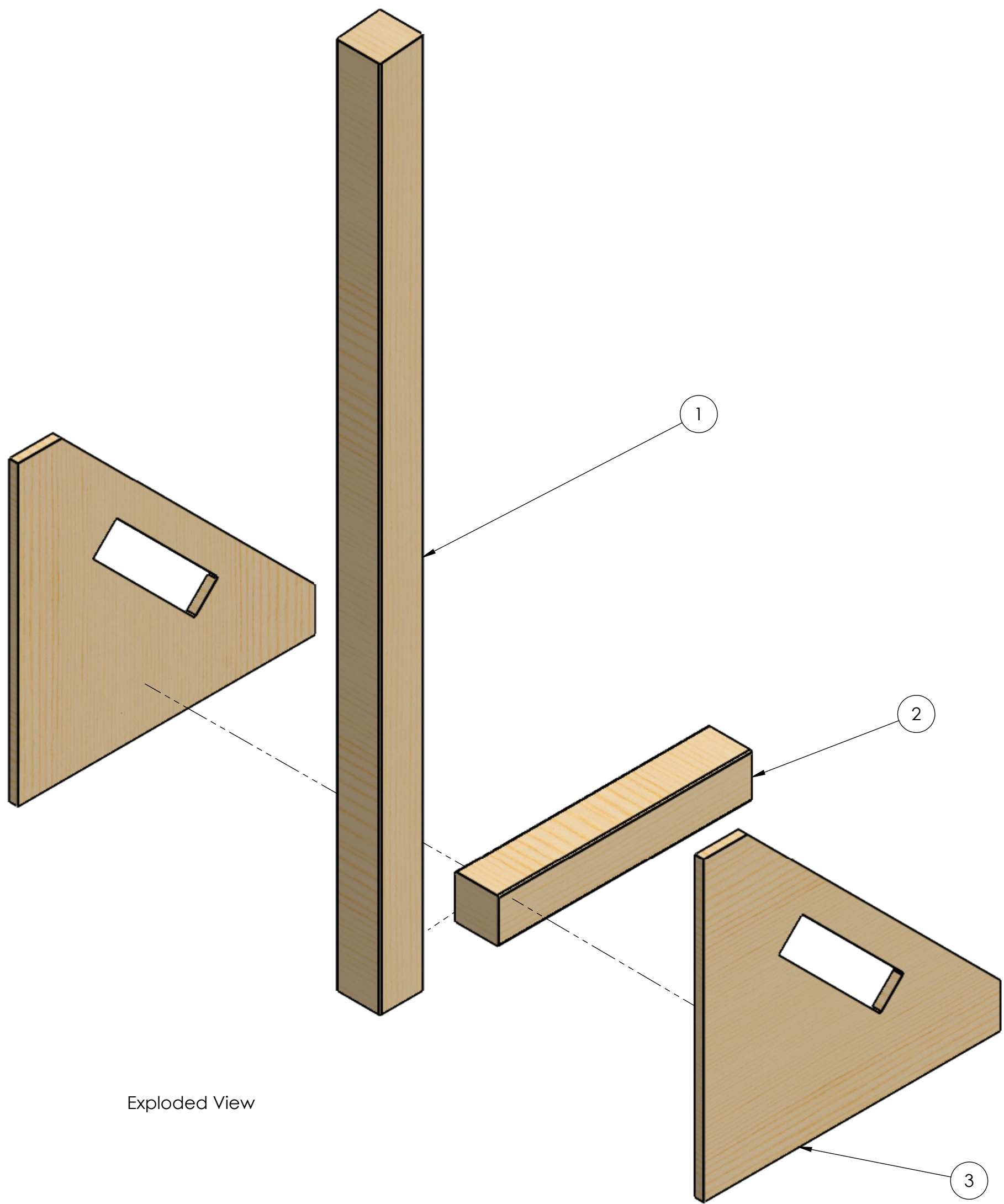
4X R.133
see note
Cut out is strongly
recommended for ease
of assembly

Note:
Radii located at internal corners are provided predominately for teams
making parts with a router. A 90 degree angle is sufficient clearance.

| | | | | | | |
|--|--|------|------------|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE | <div></div> | | |
| | DRAWN | KAMC | 12/21/2021 | | | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.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. | | | TITLE: HUB - Complex Build - Upper Leg Side | | |
| | MATERIAL/FINISH: 3/4" Plywood | | | SIZE | DWG. NO. | REV |
| DO NOT SCALE DRAWING | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22175 | |
| | | | | SCALE: 1:4 | | SHEET 1 OF 1 |





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| 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: 2" x 4" Lumber DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> <div>TITLE: HUB - Complex Build - Upper Leg to Connection Box 2x4</div> | | |
| | DRAWN | KAMC | 12/21/2021 | | | |
| | 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. COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE | DWG. NO. | REV |
| SCALE: 1:2 | | SHEET 1 OF 1 | | | | |



Hardware Needed:
#8 x 2" Long Screw - Qty 20

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|-------------|--|------|
| 1 | TE-22171 | HUB - Complex Build - Lower Leg Vertical 4x4 | 1 |
| 2 | TE-22172 | HUB - Complex Build - Lower Leg Base 4x4 | 1 |
| 3 | TE-22173 | HUB - Complex Build - Lower Leg Base Side | 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: DO NOT SCALE DRAWING | TEAM DRAWN | NAME KAMC | DATE 12/21/2021 |   | |
| | 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. | | | TITLE: HUB - Complex Build - Lower Leg Assembly | |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE C | DWG. NO. TE-22177 |
| | | | | SCALE: 1:6 | REV SHEET 1 OF 3 |

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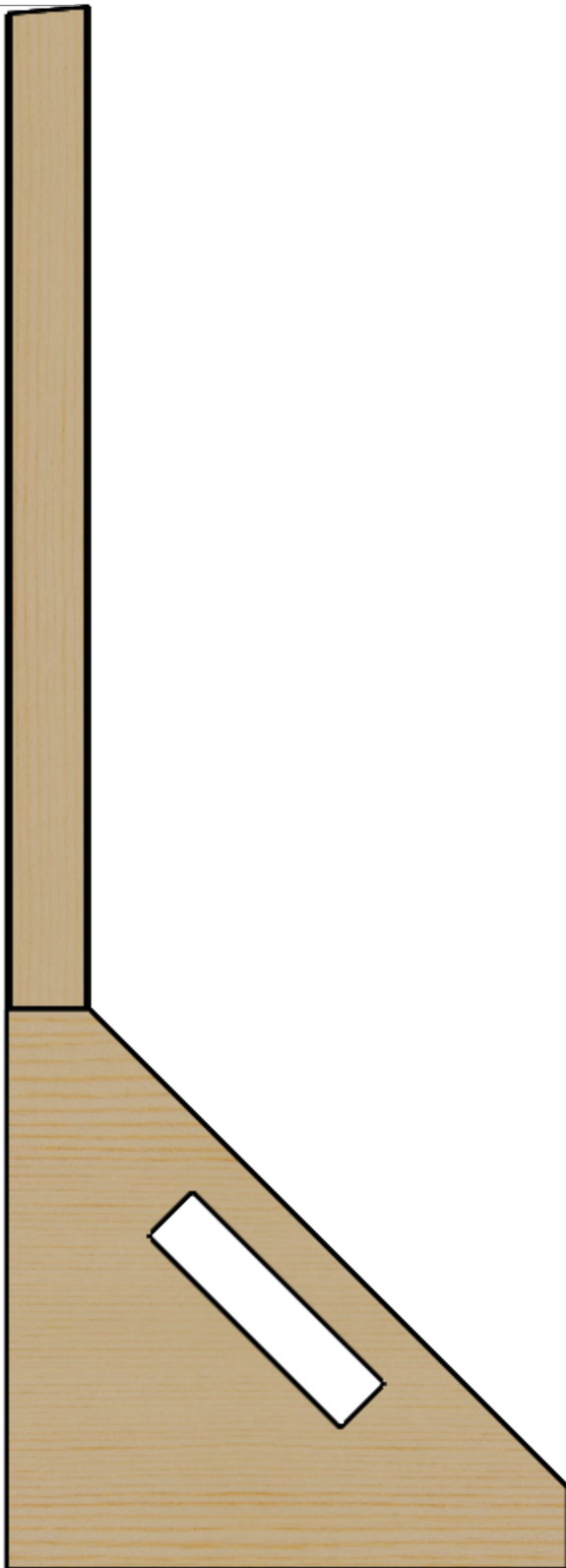
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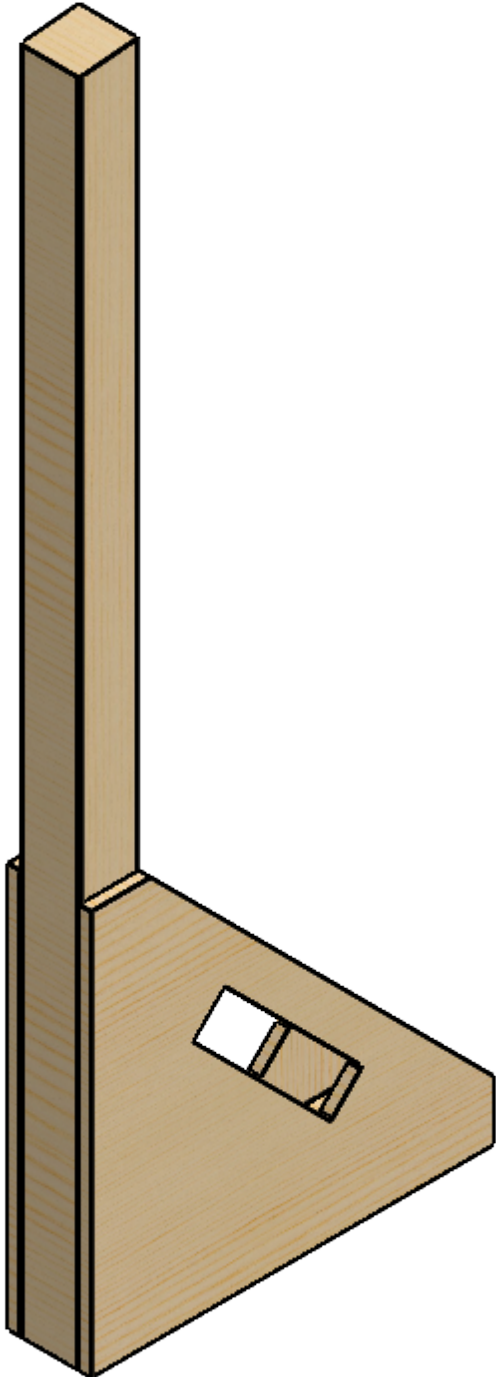




$(4.94 [4 \frac{15}{16}"])$

$(66.19 [66 \frac{3}{16}"])$



$(23.75 [23 \frac{3}{4}"])$



| | | | | | | |
|--|---|------|------------|---|----------|--------------|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE | <div></div> | | |
| | DRAWN | KAMC | 12/21/2021 | | | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 | PROPRIETARY AND CONFIDENTIAL | | | TITLE: HUB - Complex Build - Lower Leg 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. | | | | | |
| MATERIAL/FINISH: | COMMENTS: | | | SIZE | DWG. NO. | REV |
| | REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22177 | |
| DO NOT SCALE DRAWING | | | | SCALE: 1:8 | | SHEET 2 OF 3 |

4

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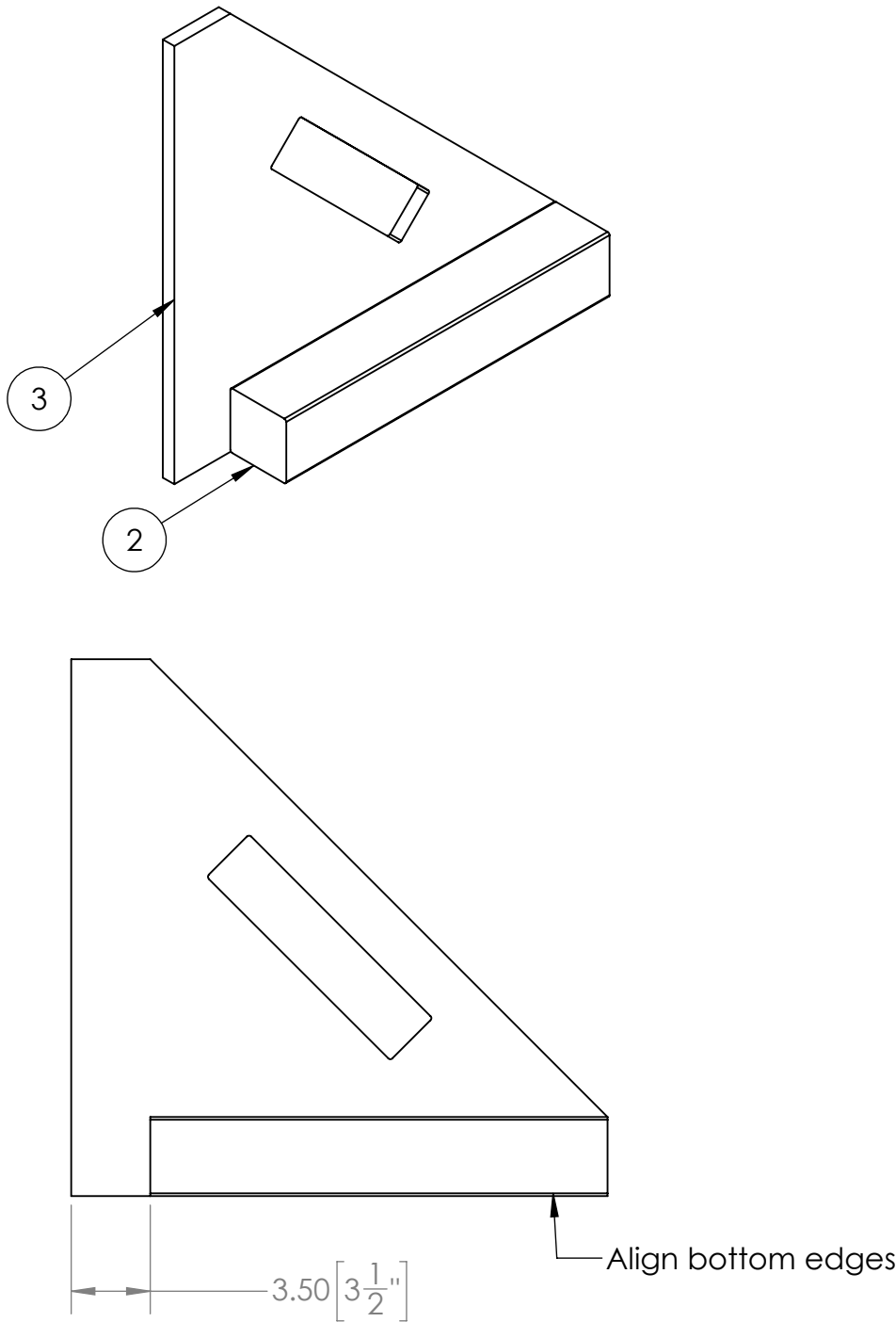
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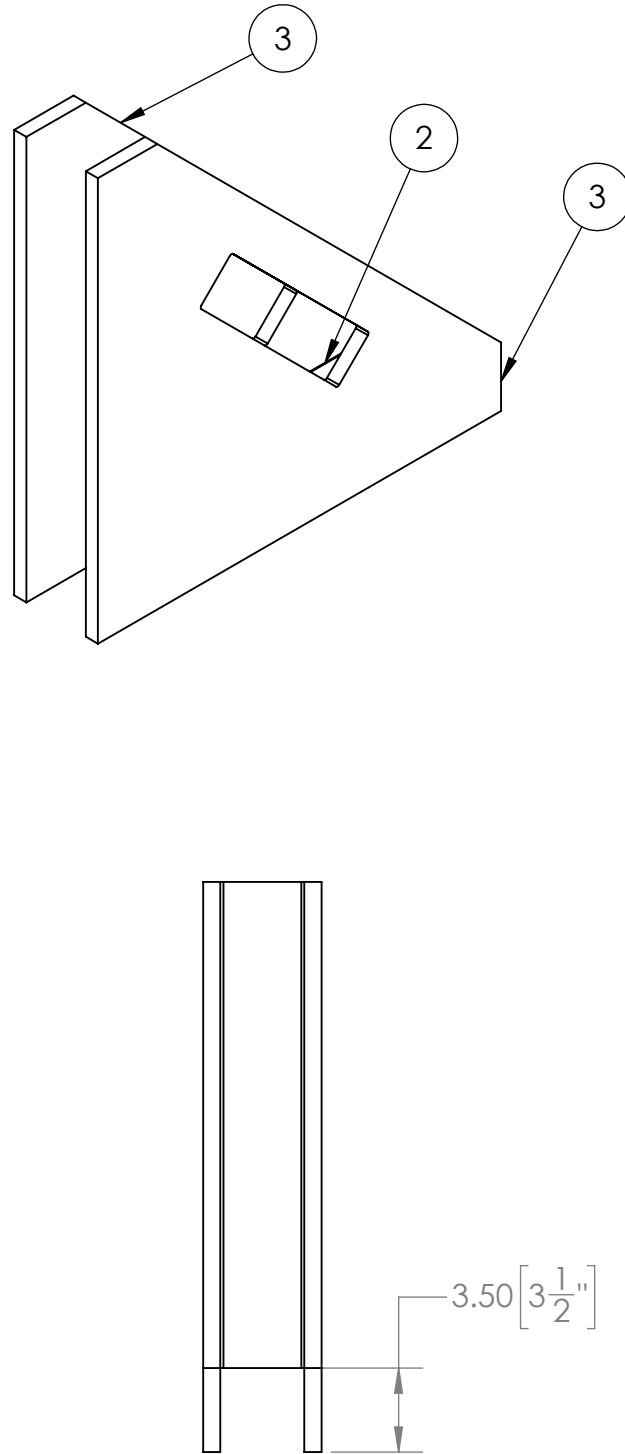
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Step 1



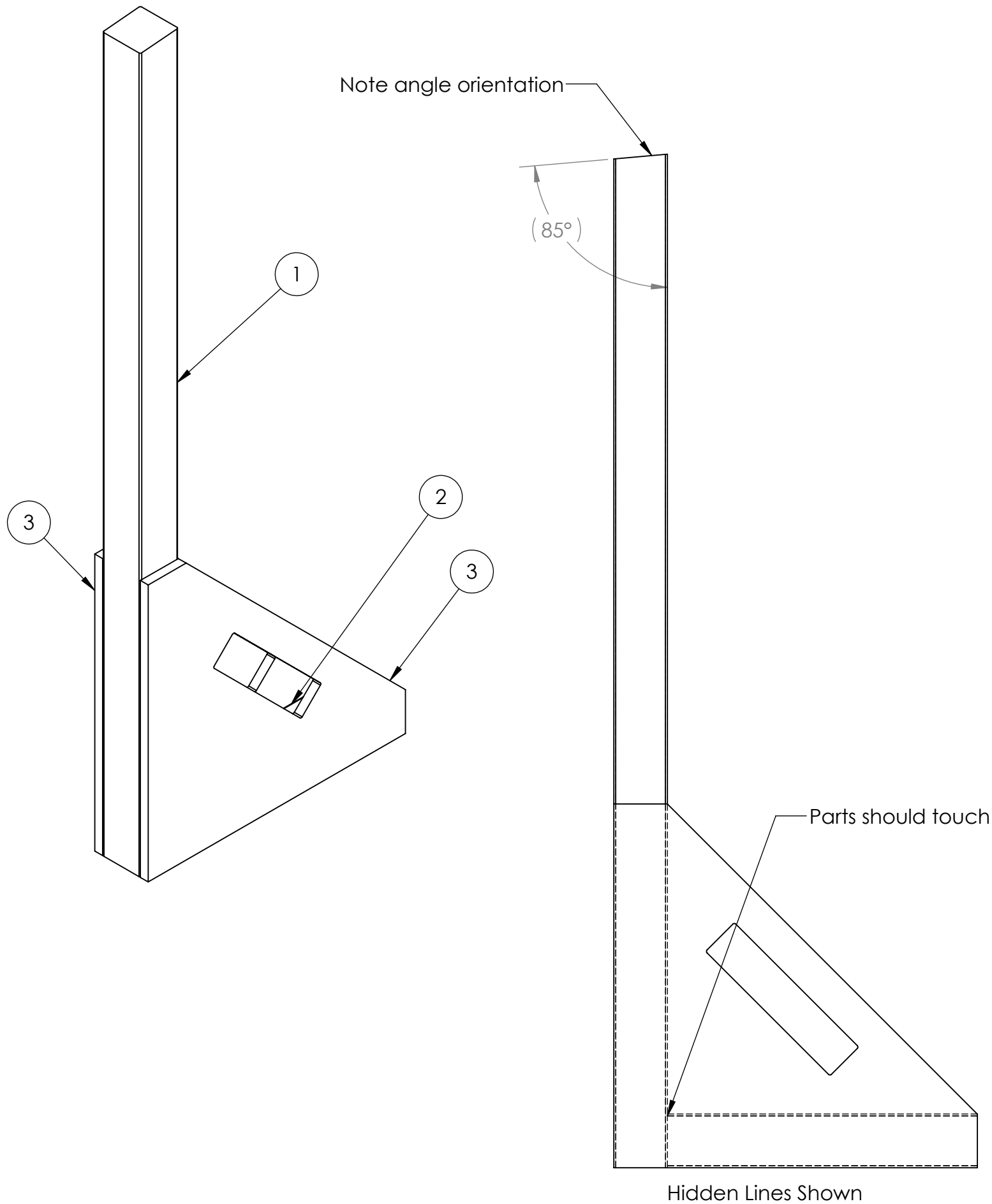
1. Align (2) and (3) , as shown.
2. Connect using 2" long screws. It is recommended to use x5 screws.

Step 2





1. Add an additional (3) to Step 1 , as shown.
2. Connect using 2" long screws. It is recommended to use x5 screws.

Step 3



1. Add (1) to Step 2 by sliding between both (3) . Align as shown, such that (1) and (2) touch, and noting the orientation of the angle on (1) .
2. Connect (1) to both (3) using 2" long screws. It is recommended to use x5 screws per (3) .

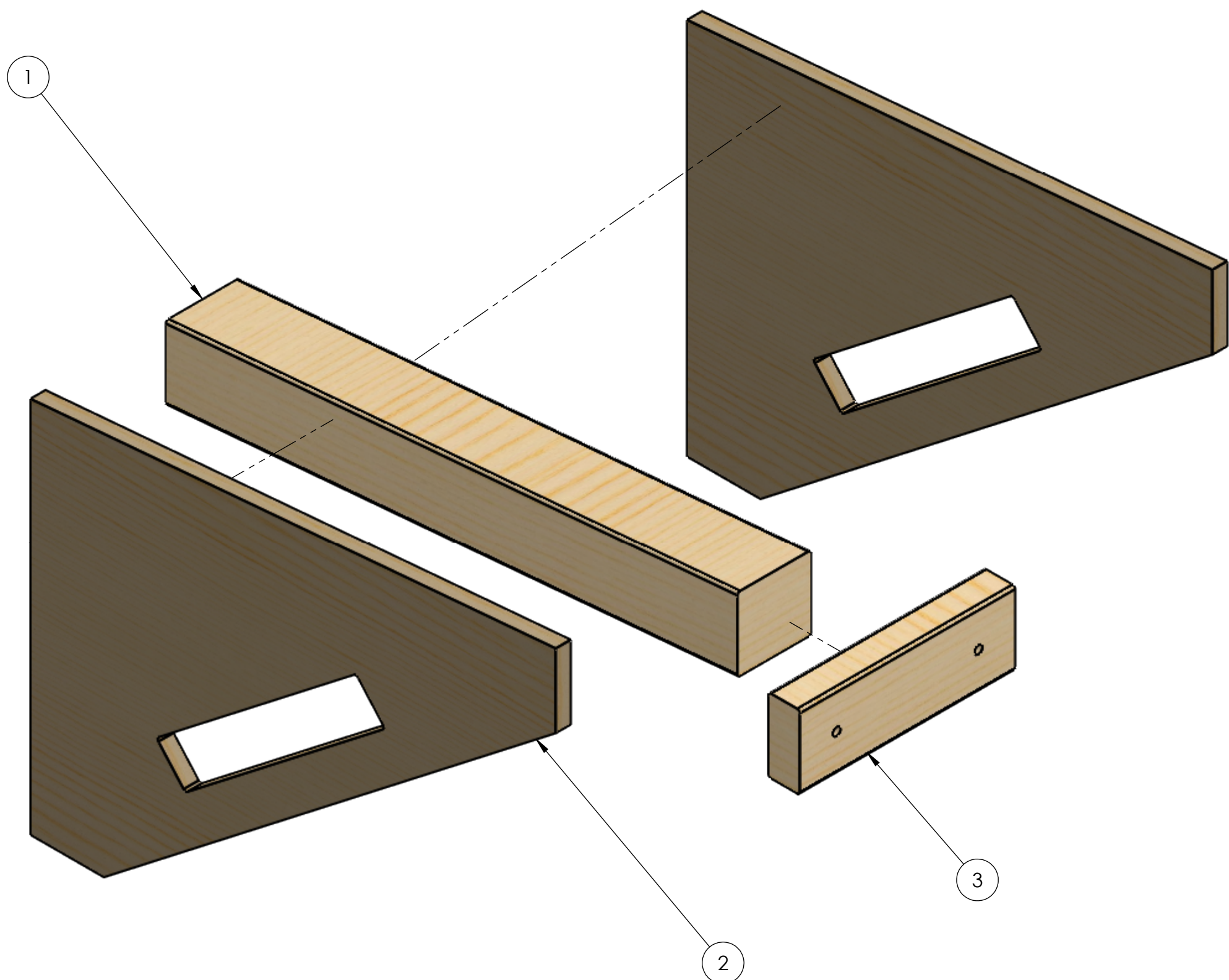
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|--|---|------|------------|---|--------------|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |   | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/21/2021 | TITLE: HUB - Complex Build - Lower Leg Assembly | |
| | 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: | | | SIZE | DWG. NO. |
| | REMOVE ALL BURRS AND SHARP EDGES. | | | C | TE-22177 |
| DO NOT SCALE DRAWING | | | | SCALE: 1:8 | REV |
| | | | | | SHEET 3 OF 3 |

D

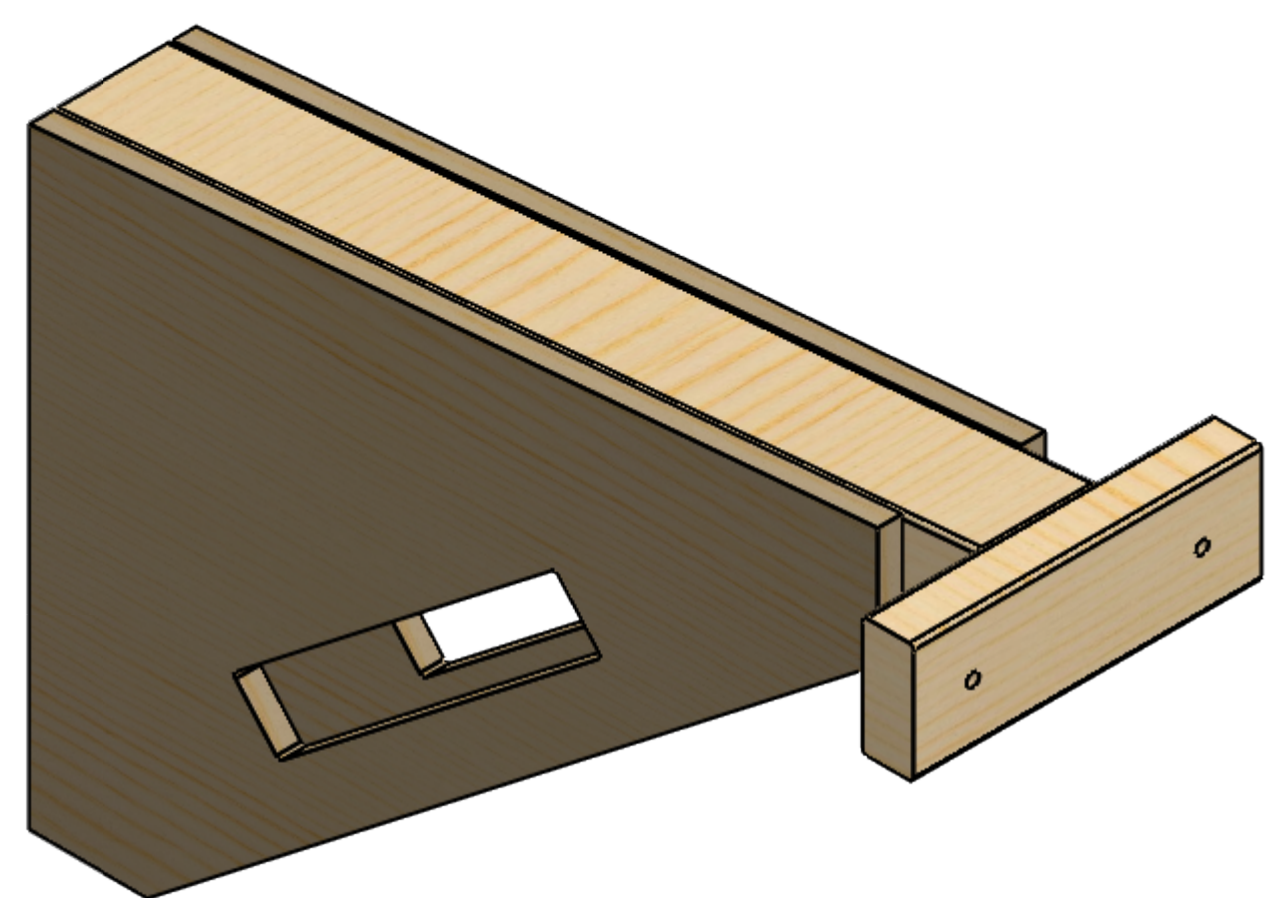
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Exploded View



Hardware Needed:
#8 x 2" Long Screw - Qty 10
#8 x 2.5" Long Screw - Qty 5

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|----------|-------------|---|------|
| 1 | TE-22174 | HUB - Complex Build - Upper Leg 4x4 | 1 |
| 2 | TE-22175 | HUB - Complex Build - Upper Leg Side | 2 |
| 3 | TE-22176 | HUB - Complex Build - Upper Leg to Connection Box 2x4 | 1 |

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL ±1/16
ANGULAR: MACH ±1° BEND ±1°
TWO PLACE DECIMAL ±.13
THREE PLACE DECIMAL ±.125

MATERIAL/FINISH:

DO NOT SCALE DRAWING

TEAM
DRAWN



NAME
KAMC

DATE
12/21/2021

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.

COMMENTS:
REMOVE ALL BURRS AND SHARP EDGES.



TITLE:
HUB - Complex Build - Upper Leg Assembly

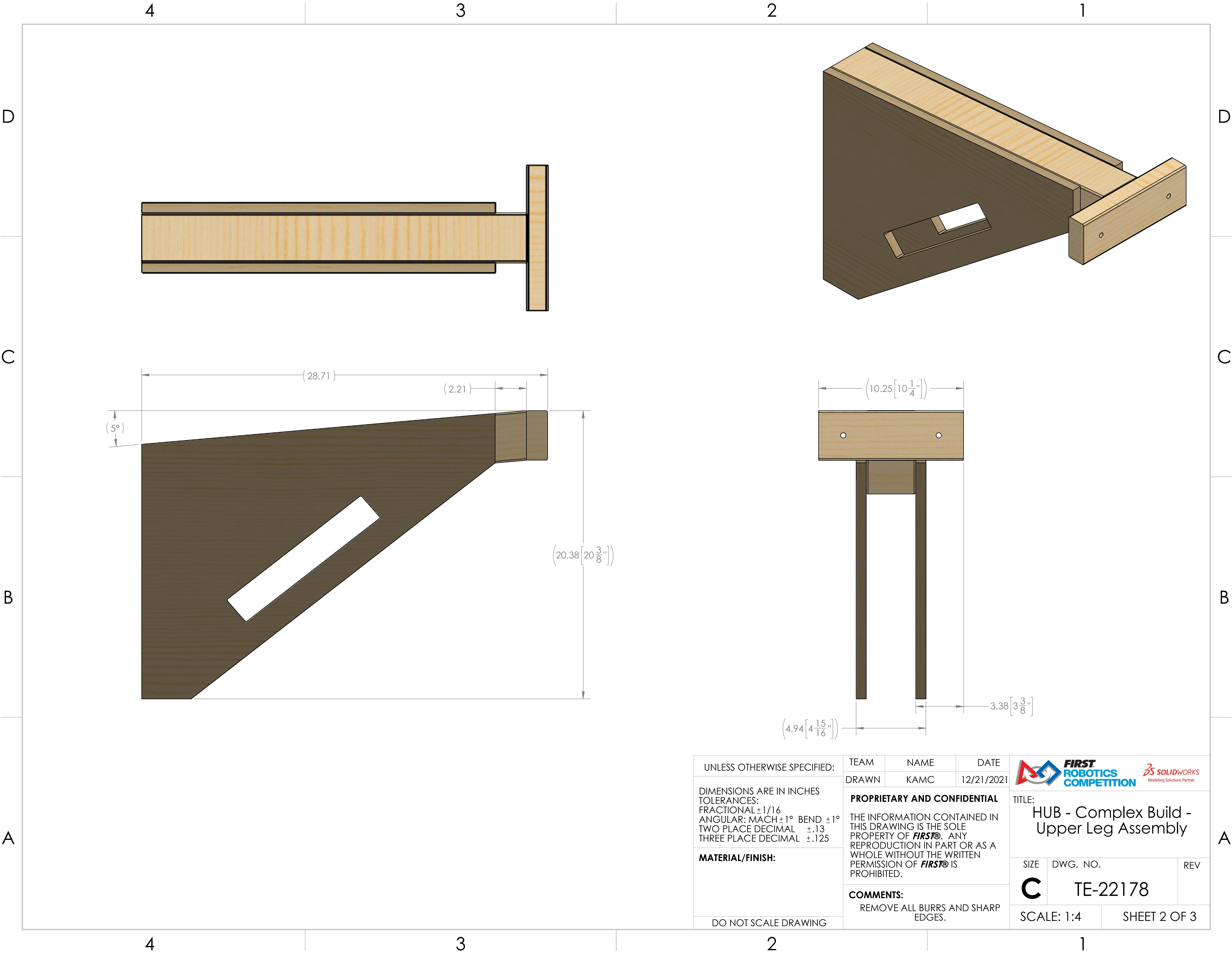
SIZE
C



DWG. NO.
TE-22178

REV

SCALE: 1:4

SHEET 1 OF 3

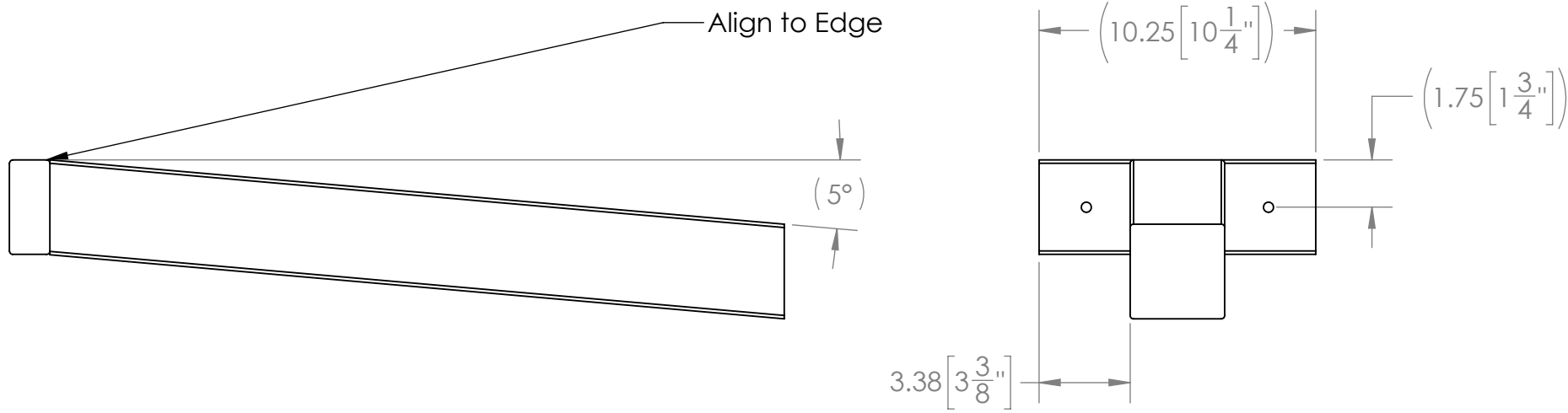


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| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> | |
| | DRAWN | KAMC | 12/21/2021 | | |
| | 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. COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | TITLE: HUB - Complex Build - Upper Leg Assembly | |
| SIZE C | | DWG. NO. TE-22178 | | REV | |
| SCALE: 1:4 | | SHEET 2 OF 3 | | | |

D

Step 1

- 1. Align (3) on (1), as shown.
- 2. Connect using 2.5" long screws. It is recommended to use 5x screws.

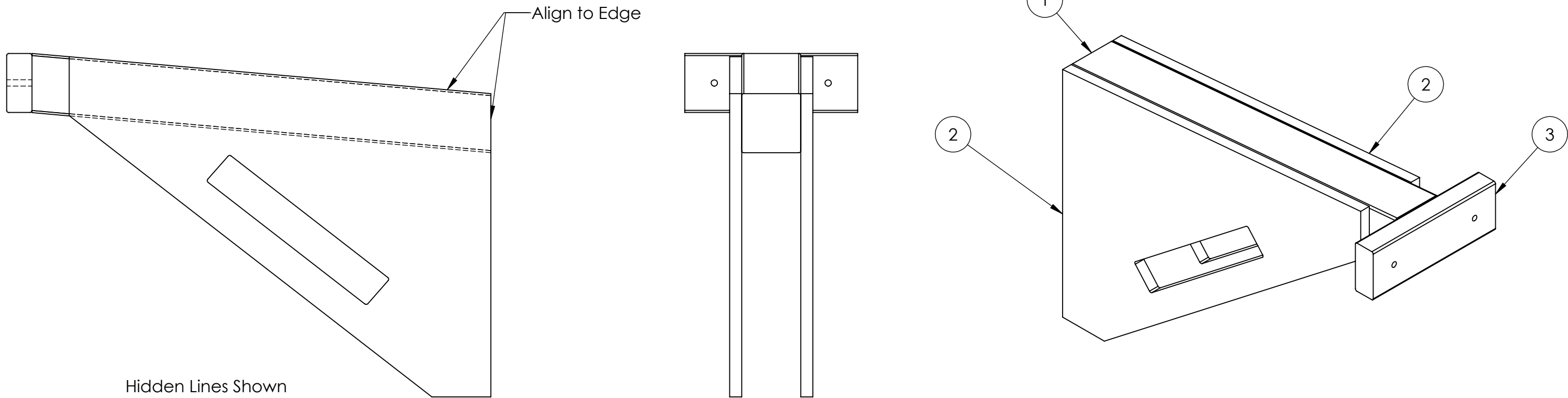


D

C

Step 2

- 1. Add x1 (2) to each side of (1), as shown.
- 2. Connect using 2" long screws. It is recommended to use 5x screws per (2).





C

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|--|--|------|------------|---|--------------------------|--------------|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |   | | |
| | DRAWN | KAMC | 12/21/2021 | | | |
| DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.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. | | | TITLE: HUB - Complex Build - Upper Leg Assembly | | |
| | MATERIAL/FINISH: | | | SIZE C | DWG. NO. TE-22178 | REV |
| DO NOT SCALE DRAWING | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SCALE: 1:6 | | SHEET 3 OF 3 |

4

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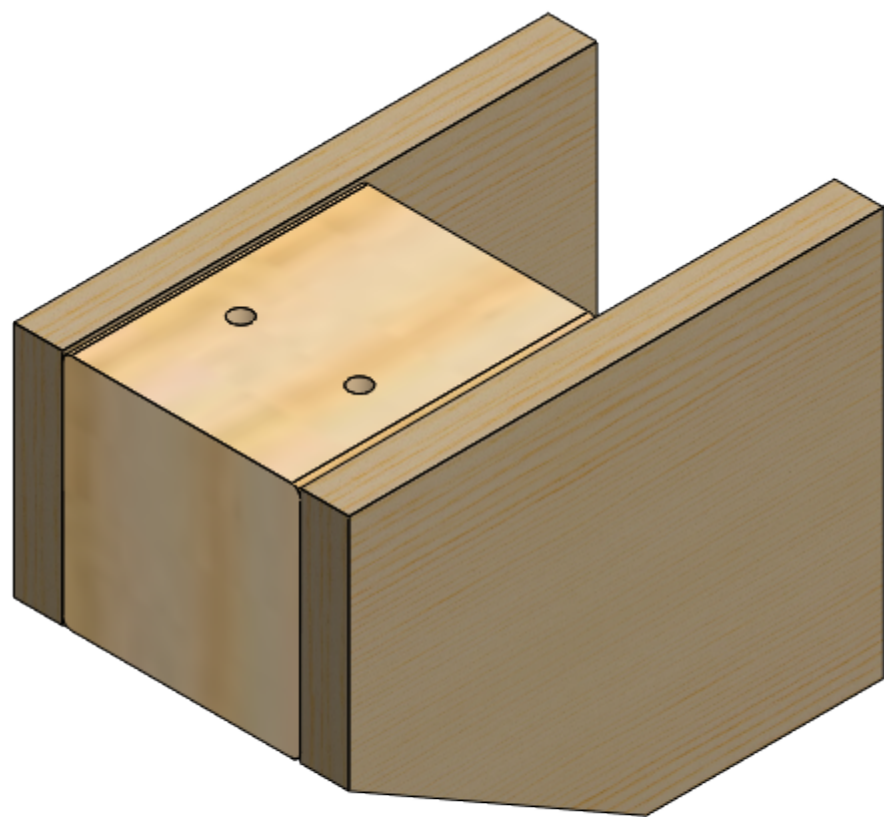
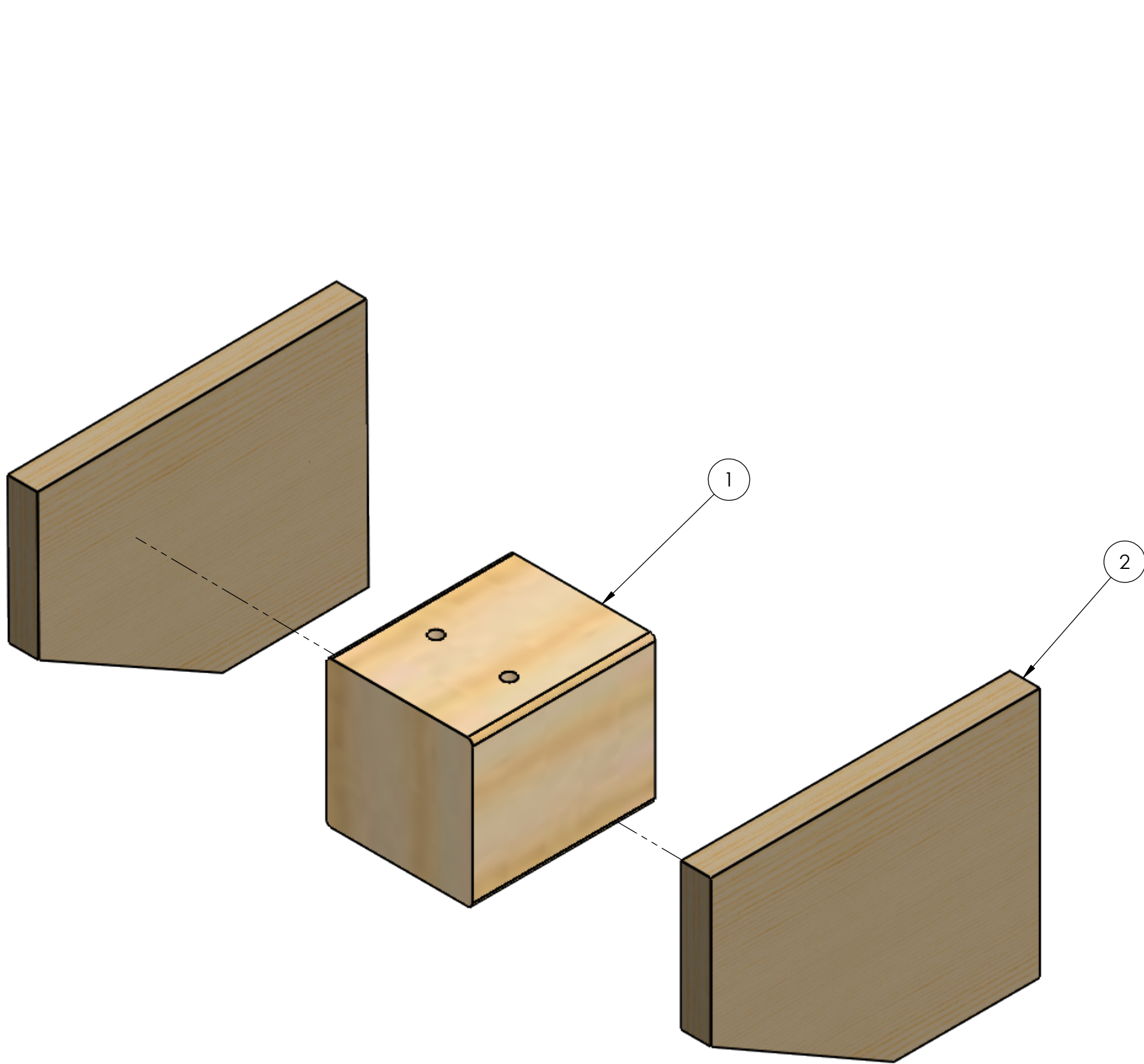
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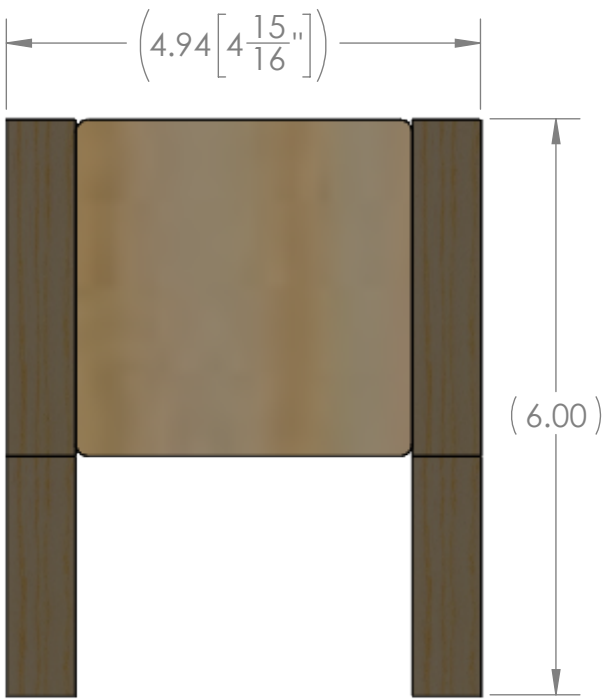
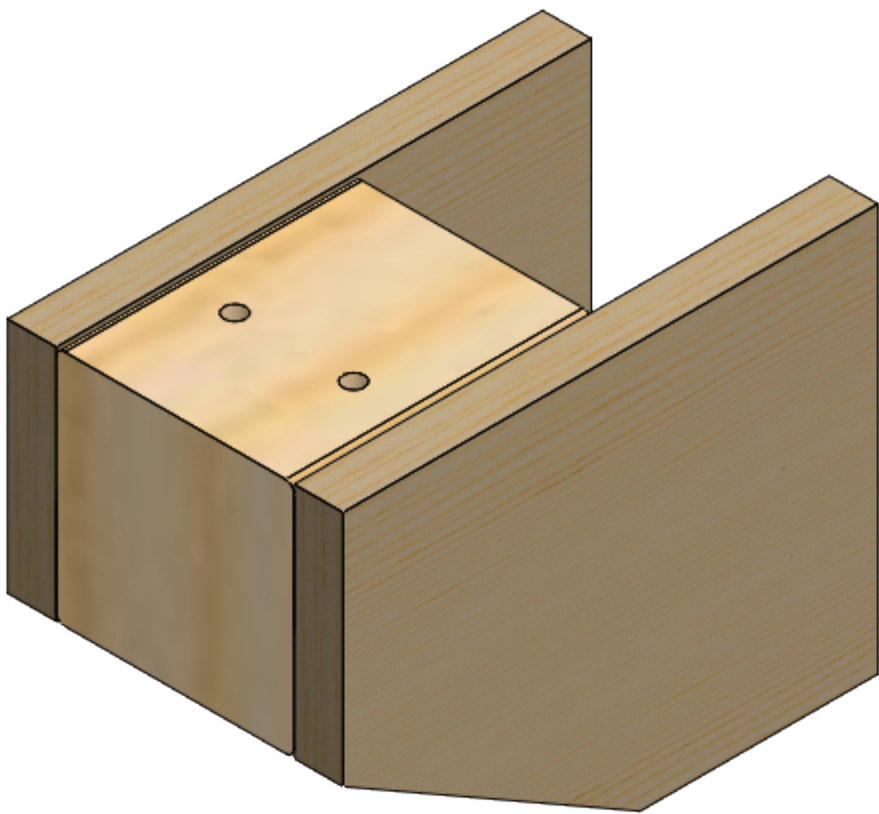
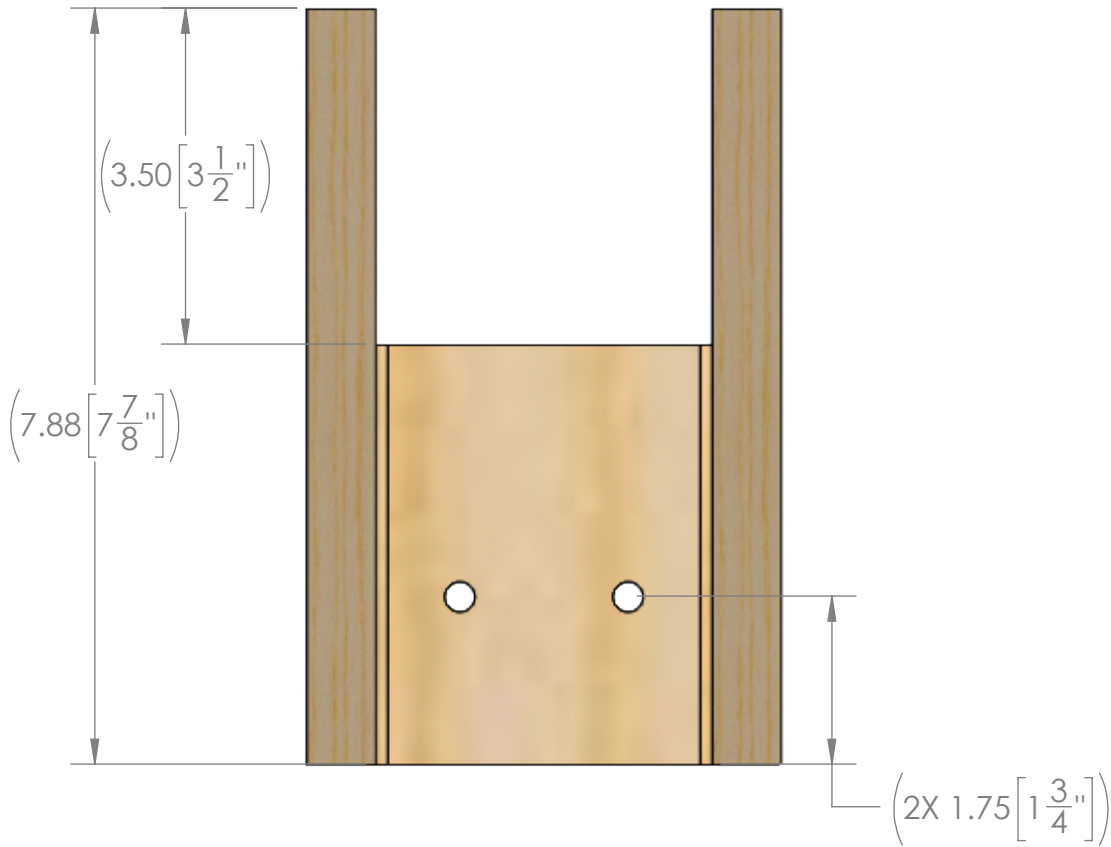
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Hardware Needed:
#8 x 2" Long Screw - Qty 8

| ITEM NO. | PART NUMBER | DESCRIPTION | |
|----------|-------------|--|---|
| 1 | TE-22181 | HUB - Complex Build - Lower Hub Ring to Leg 4x4 | 1 |
| 2 | TE-22182 | HUB - Complex Build - Lower Hub Ring to Leg Side | 2 |

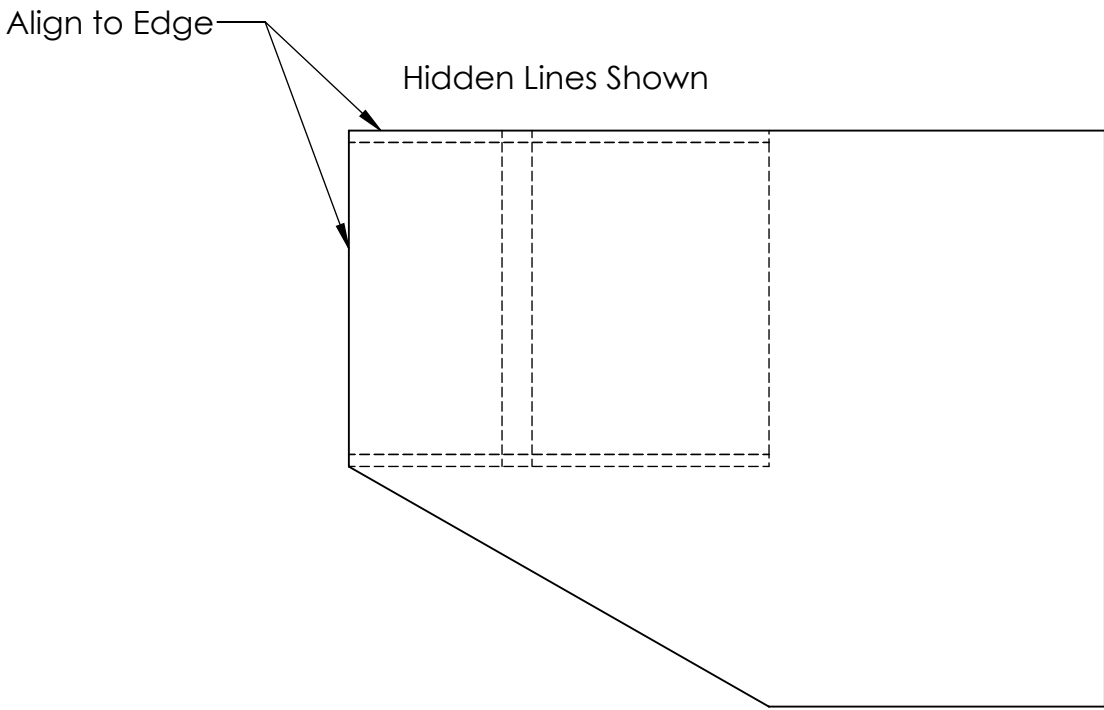
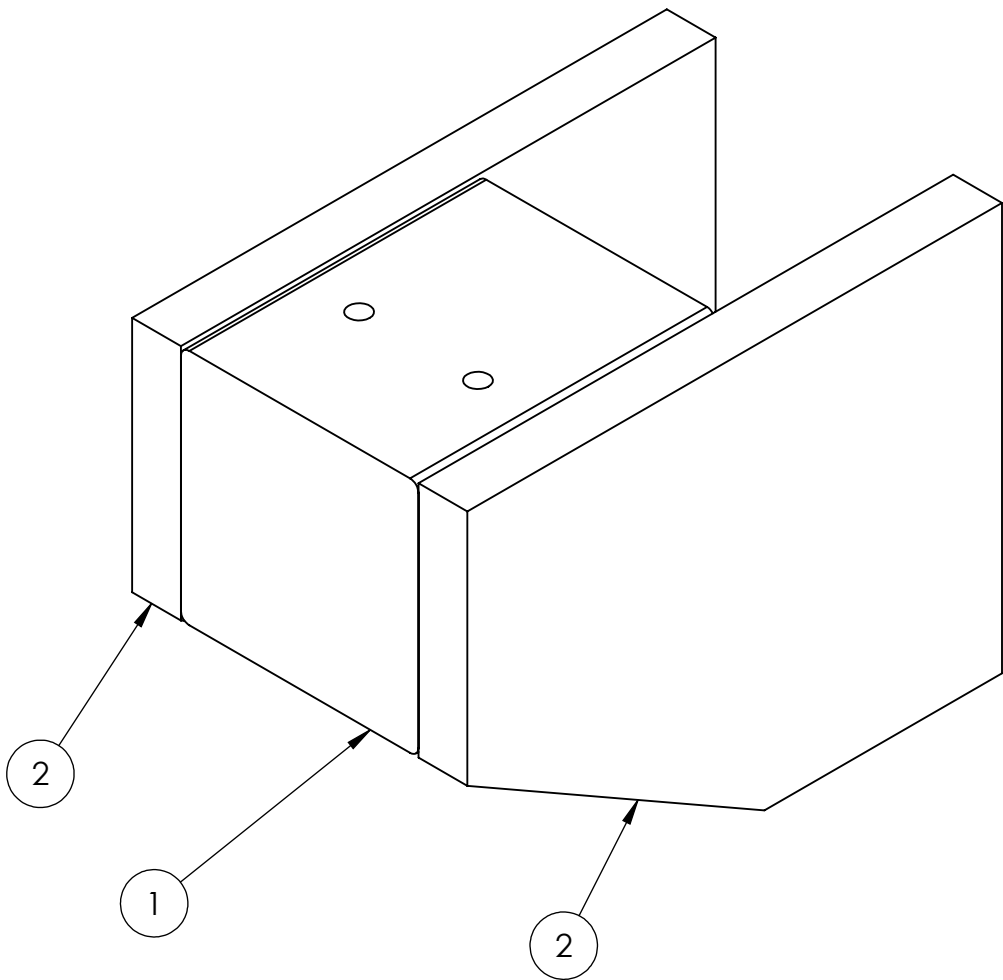
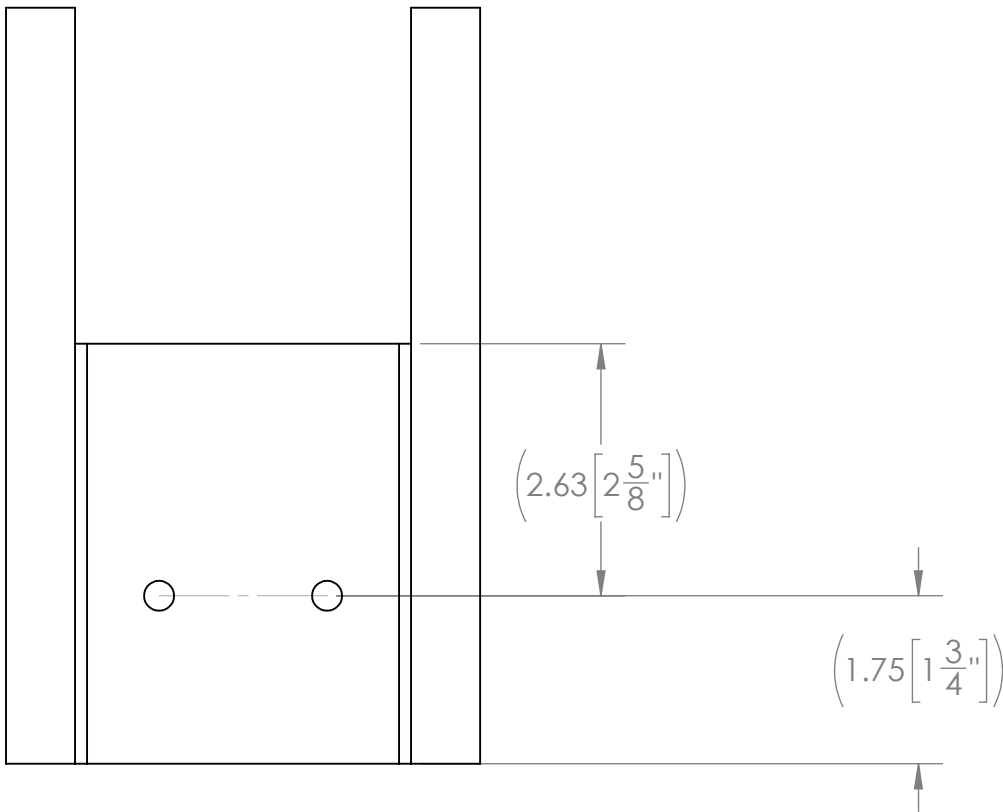
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|---|--|------------|------------|---|----------------------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .13$ THREE PLACE DECIMAL $\pm .125$ MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE |   | |
| | DRAWN | KAMC | 12/21/2021 | | |
| | 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. | | | TITLE: HUB - Complex Build - Lower Hub Ring to Leg Assembly | |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE C | DWG. NO. TE-22180 |
| | | SCALE: 1:2 | | REV | |
| | | | | SHEET 1 OF 3 | |





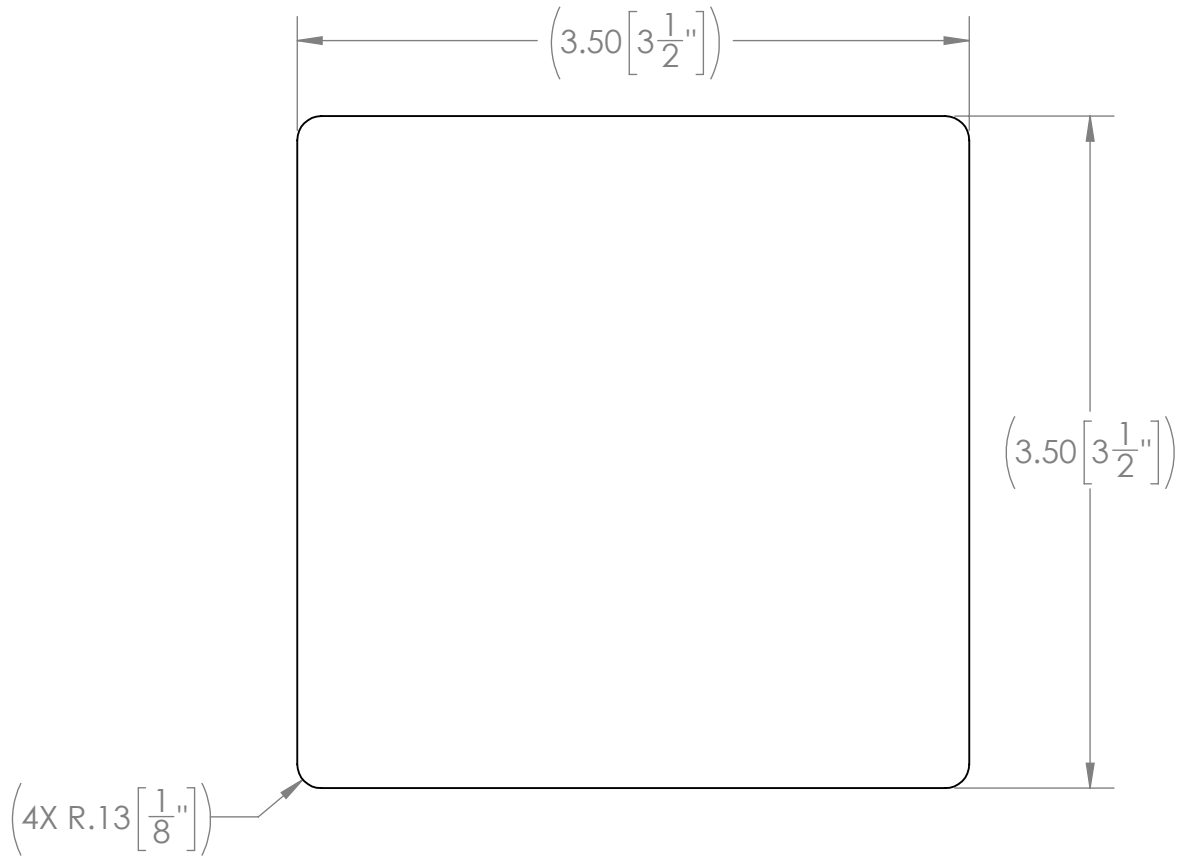
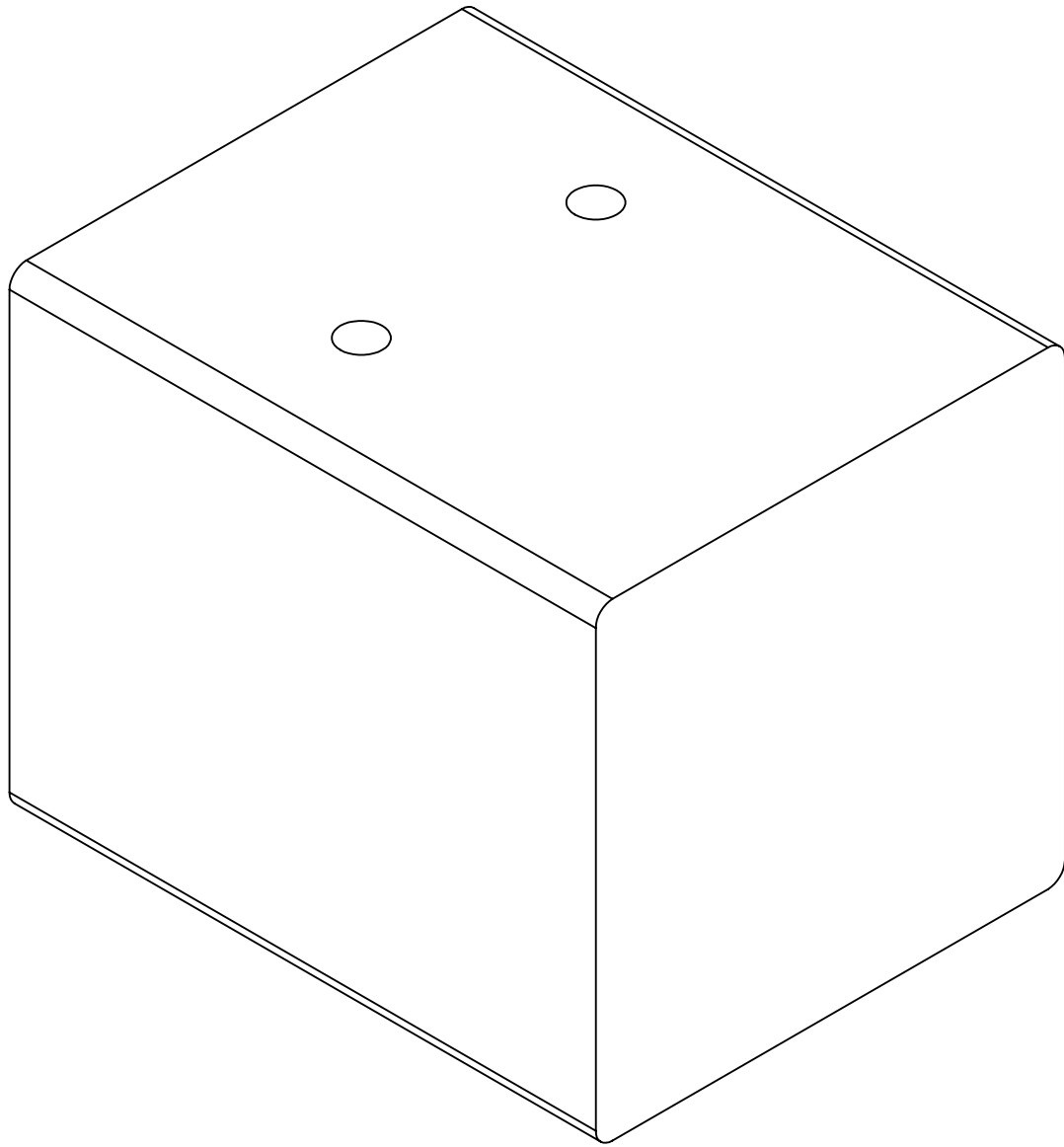
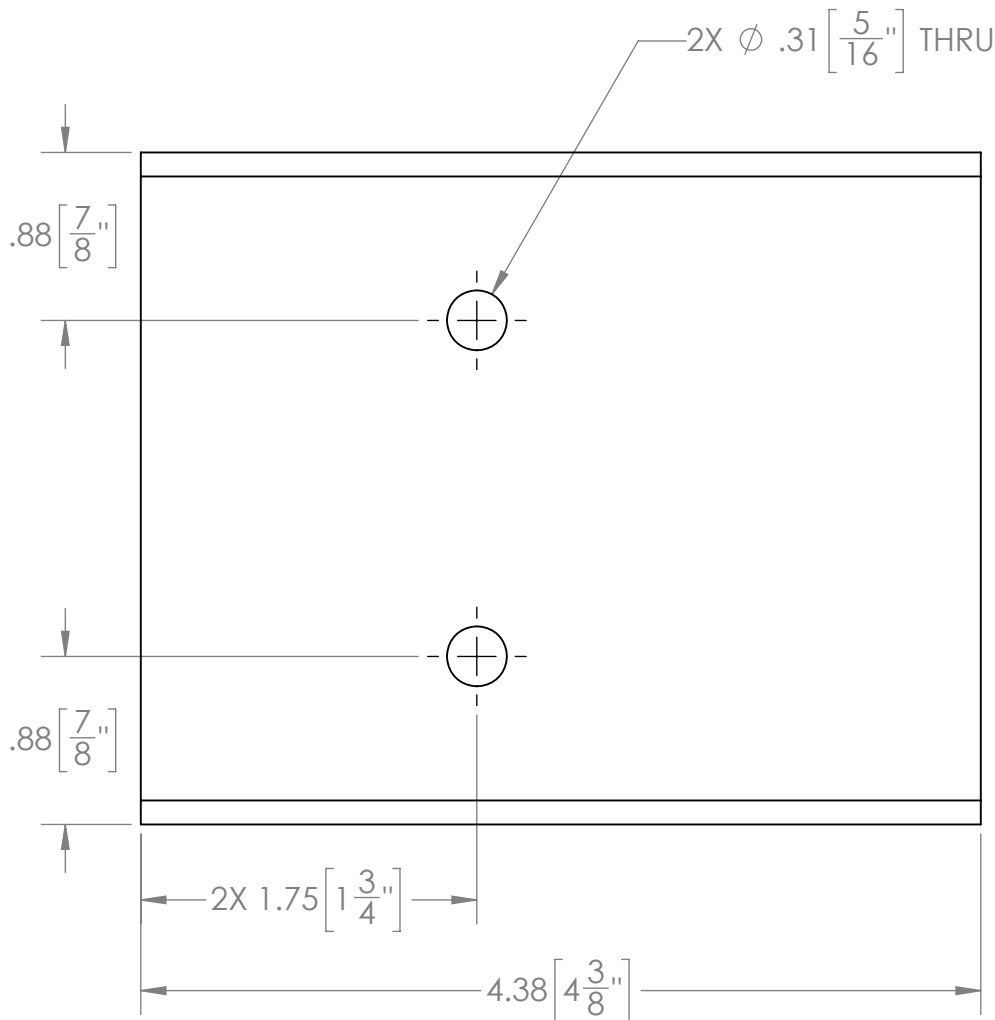
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|--|--|------|------------|---|--------------|-----|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div></div> | | |
| | DRAWN | KAMC | 12/21/2021 | | | |
| | 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. | | | TITLE: HUB - Complex Build - Lower Hub Ring to Leg Assembly | | |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE | DWG. NO. | REV |
| C | | | | TE-22180 | | |
| | | | SCALE: 1:2 | | SHEET 2 OF 3 | |



Step 1

1. Align 2x 2 to 1 , as shown.
2. Connect using 2" long screws. It is recommended to use 4x screws per 2 .



| | | | | | | |
|--|--|------|------------|--|--|--|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div><div></div><div>TITLE: HUB - Complex Build - Lower Hub Ring to Leg Assembly</div><div><div>SIZE</div><div>DWG. NO.</div><div>REV</div></div><div><div>C</div><div>TE-22180</div></div><div><div>SCALE: 1:2</div><div>SHEET 3 OF 3</div></div></div> | | |
| | DRAWN | KAMC | 12/21/2021 | | | |
| | 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. | | | | | |
| | COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | | | |



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|--|---|------|------------|---|--------------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.13 THREE PLACE DECIMAL ±.125 MATERIAL/FINISH: 4" x 4" Lumber DO NOT SCALE DRAWING | TEAM | NAME | DATE | <div><div></div><div>TITLE: HUB - Complex Build - Lower Hub Ring to Leg 4x4</div></div> | |
| | DRAWN | KAMC | 12/21/2021 | | |
| | 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. COMMENTS: REMOVE ALL BURRS AND SHARP EDGES. | | | SIZE | DWG. NO. |
| | | | C | TE-22181 | |
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