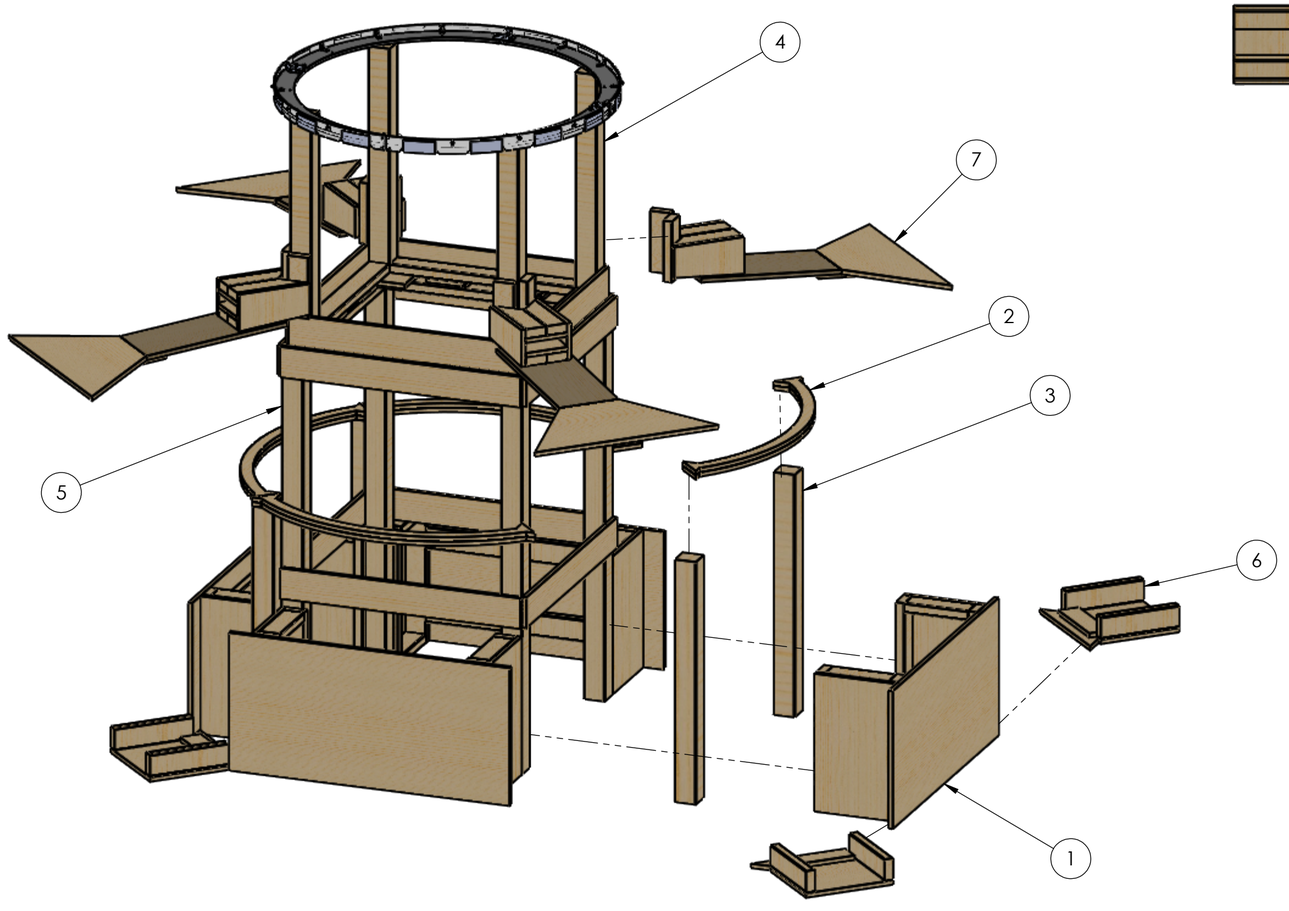
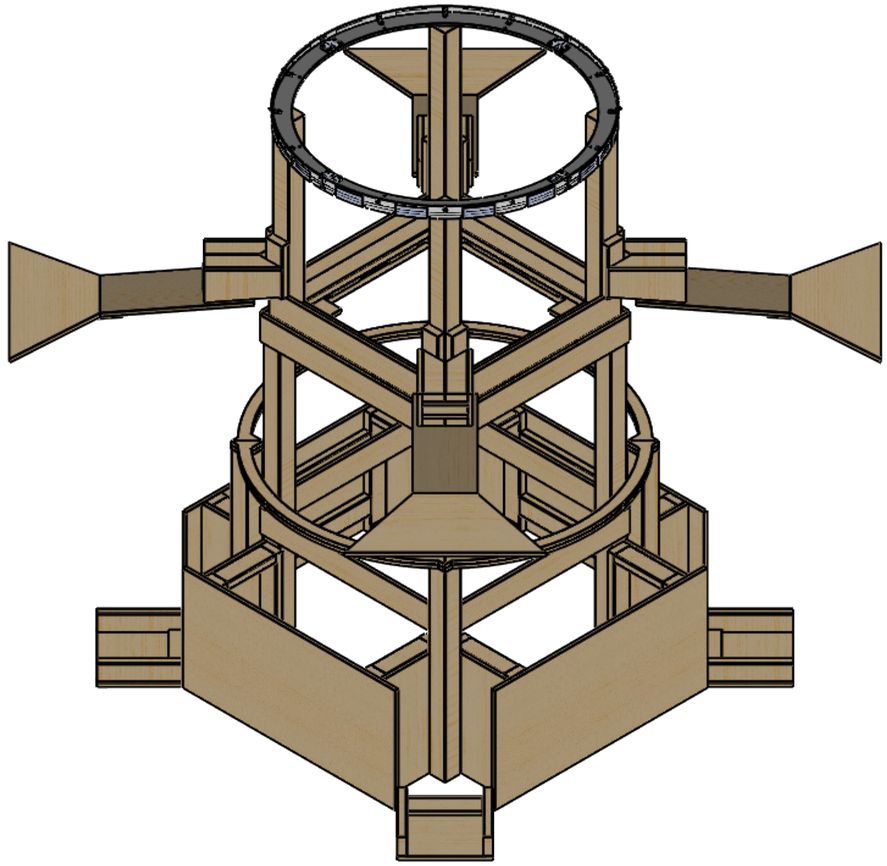


Hardware Needed:
- #8 x 1.25" Long Screw - Qty 16
- #8 x 2" Long Screw - Qty 32
- #8 x 2.5" Long Screw - Qty 20
- #8 x 3" Long Screw - Qty 16
- #10 x 3.5" Long Screw - Qty 64
- Optional, but encouraged: Safety Edging

| ITEM NO. | PART NUMBER | DESCRIPTION | |
|---|---|---|---|
| 1 | TE-22010 | Hub - Simple Build - Fender Assembly | 4 |
| 2 | TE-22023-Multiple | Hub - Simple Build - Lower Hub Ring Assembly - Multiple | 4 |
| 3 | TE-22025 | HUB - Simple Build - Vertical for Lower Hub Ring 4x4 | 4 |
| 4 | TE-22030-AM | Hub - Simple Build - Upper Hub Goal Assembly for AM Ring AM-4672 | 1 |
| 5 | TE-22040 | Hub - Simple Build - Upper Hub Base Assembly | 1 |
| 6 | TE-22050 | Hub - Simple Build - Lower Exit Assembly | 4 |
| 7 | TE-22060 | Hub - Simple Build - Upper Exit Assembly | 4 |

Note:
1. Use TE-22000 if NOT pairing with AndyMark Ring AM-4672.
2. 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.

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 |



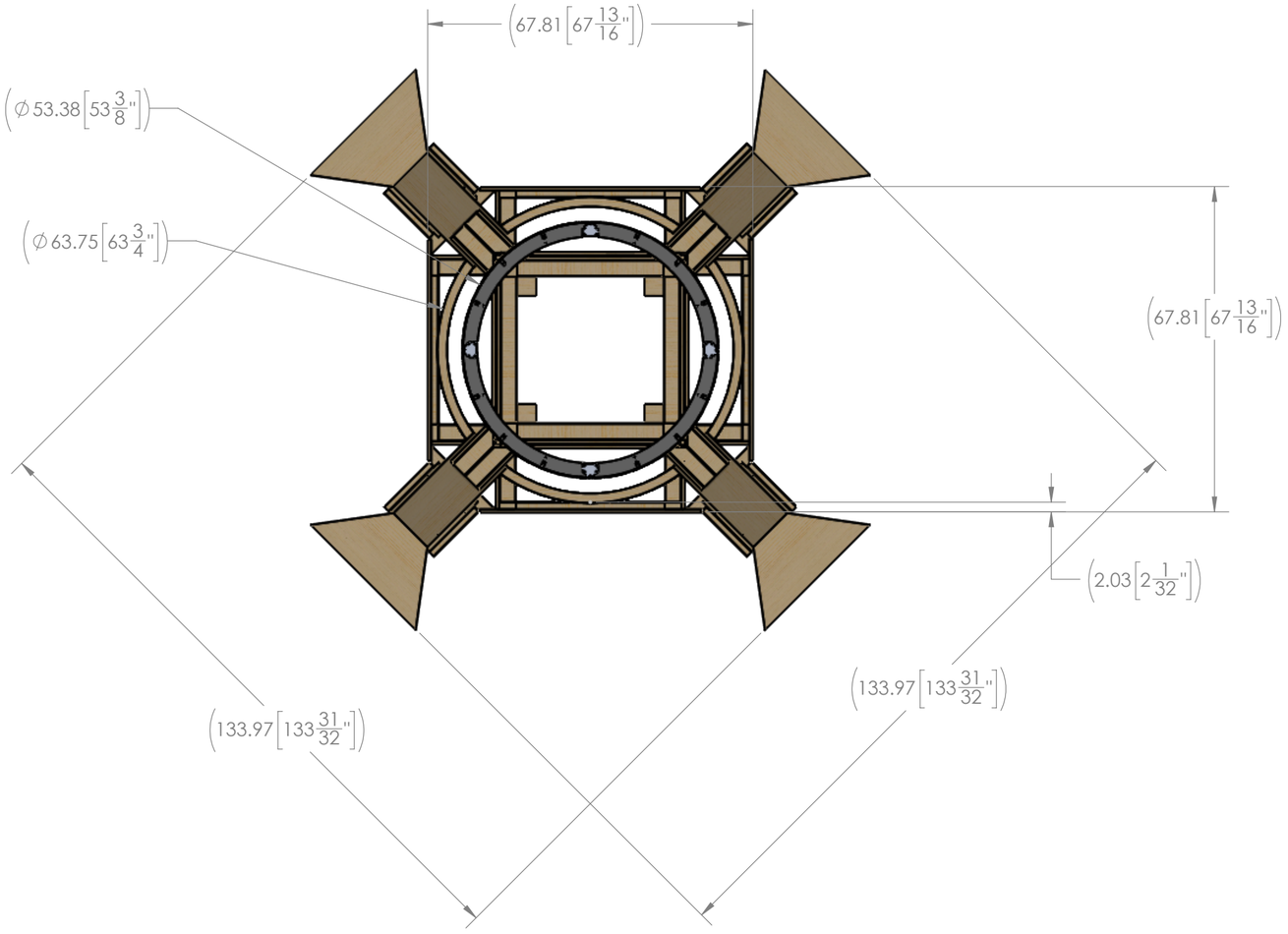
**COMMENTS:**
REMOVE ALL BURRS AND SHARP EDGES.

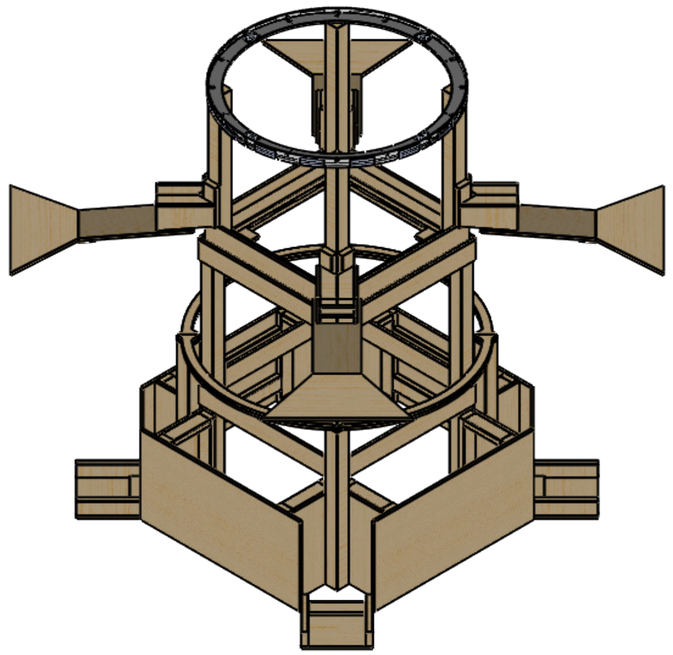
FIRST ROBOTICS COMPETITION
SOLIDWORKS Modeling Solutions Partner

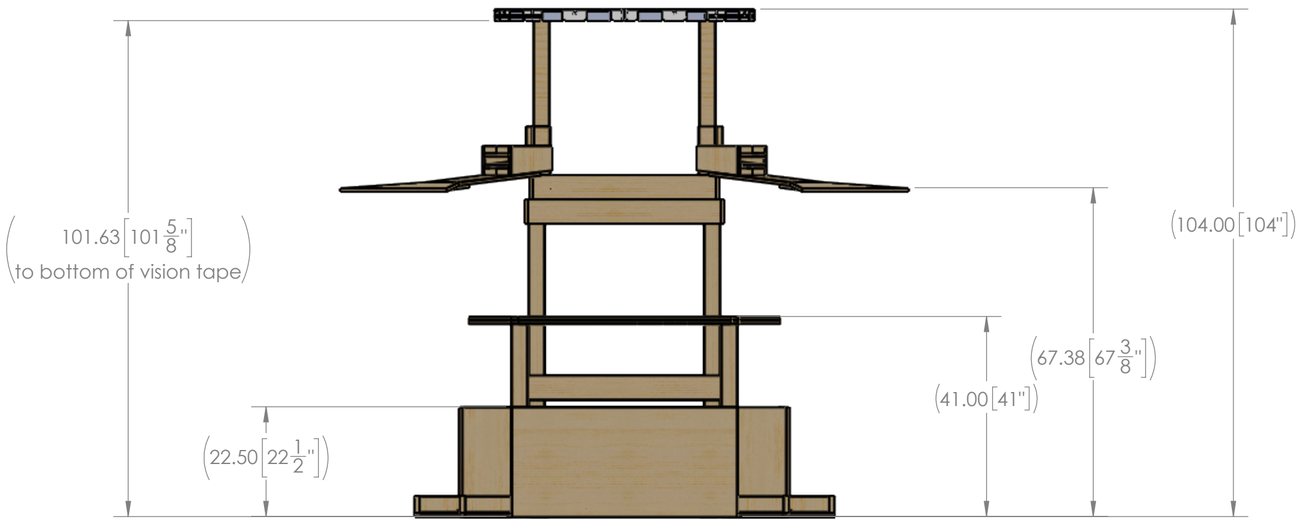
TITLE:
# Hub - Simple Build - Full Hub Assembly with AndyMark Ring AM-4672

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22000-AM | |

SCALE: 1:18 SHEET 1 OF 5






| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
| | DRAWN | KAMC | 1/4/2022 |

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



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

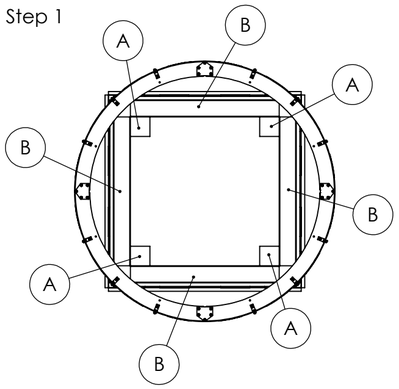
TITLE:

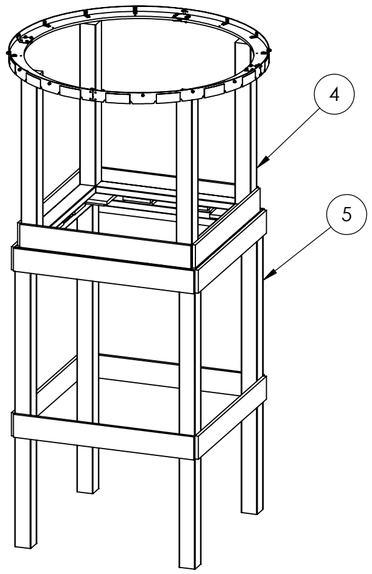
# Hub - Simple Build - Full Hub Assembly with AndyMark Ring AM-4672

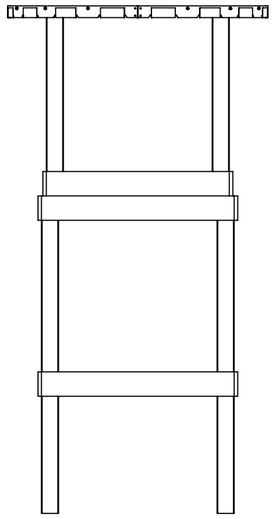
| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22000-AM | |

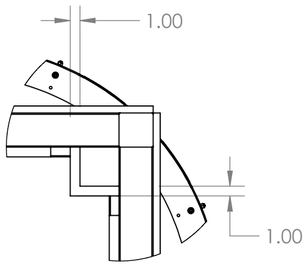
SCALE: 1:24 SHEET 2 OF 5

Step 1

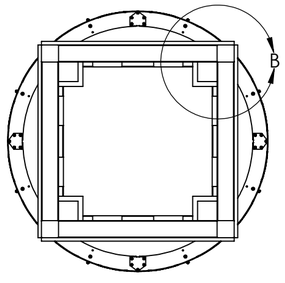




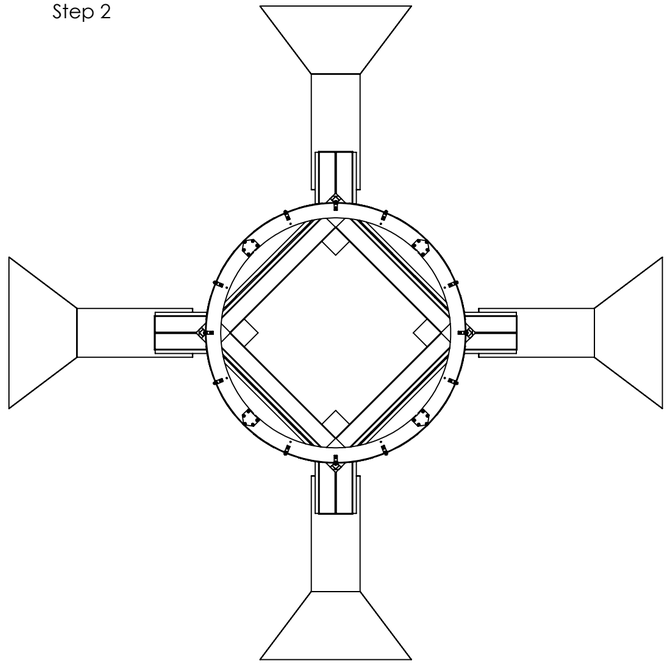

4X
DETAIL B
SCALE 1 : 12

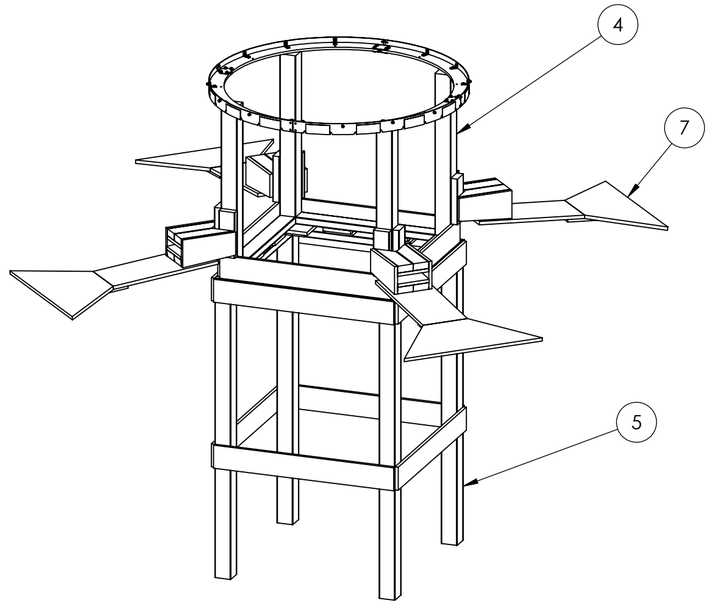


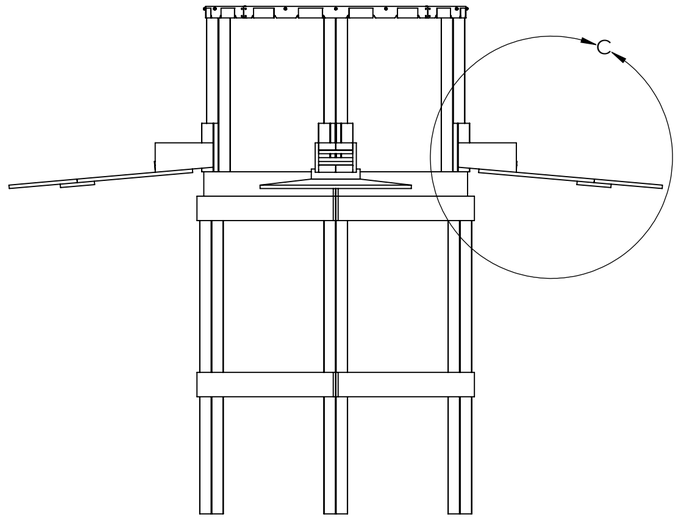

Bottom View

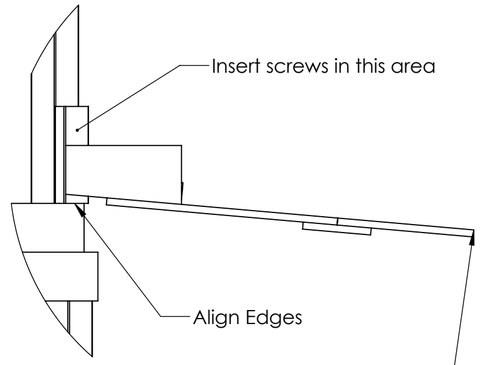
1. Align (4) to (5) as shown. Note the dimensions in Detail B.
2. Connect using 1.25" and 2.5" Long Screws. It is recommended to use 4x 1.25" long screws into each area indicated by (A) . It is recommended to use 5x 2.5" long screws into each area indicated by (B) .

Step 2






DETAIL C
SCALE 1 : 12

It is recommended to install Safety Edging on (7)

1. Align 4x (7) to (4) on the assembly from Step 1 , as shown.
2. Connect using 3.5" long screws. It is recommended to use 8x screws per (7) , 4x screws per 2"x4" lumber on (7) . Note: Be mindful of screw placement into the 4"x4" lumber to ensure two screws do not collide.
3. Optional: It is recommended to install safety edging on (7) at this time. Safety edging could be pool noodles, baby proofing material, etc.

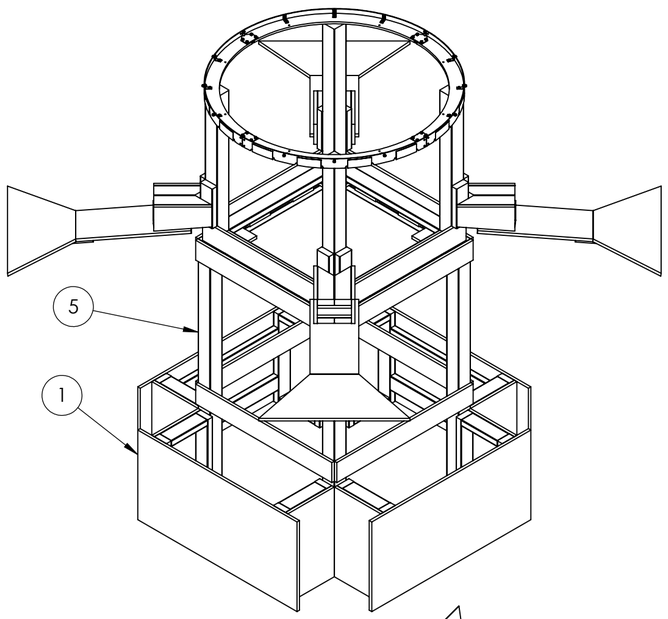
| UNLESS OTHERWISE SPECIFIED: | FIELD | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/2<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.50 | DRAWN | KAMC | 1/4/2022 |
| **MATERIAL/FINISH:** | **PROPRIETARY AND CONFIDENTIAL**<br>THE INFORMATION CONTAINED 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. | | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | | |

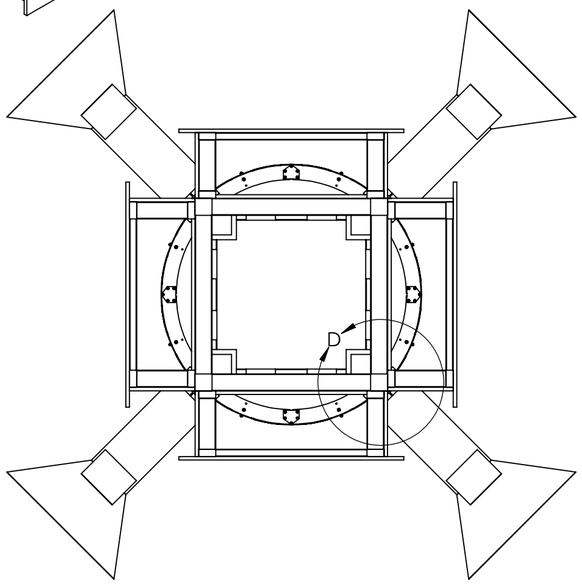
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

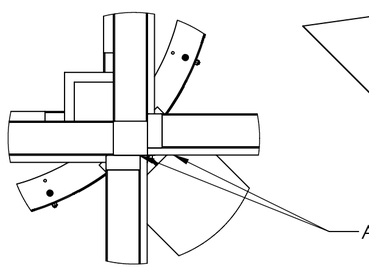
TITLE:
Hub - Simple Build - Full Hub Assembly with AndyMark Ring AM-4672

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22000-AM | |
| SCALE: 1:24 | SHEET 3 OF 5 | |

Step 3



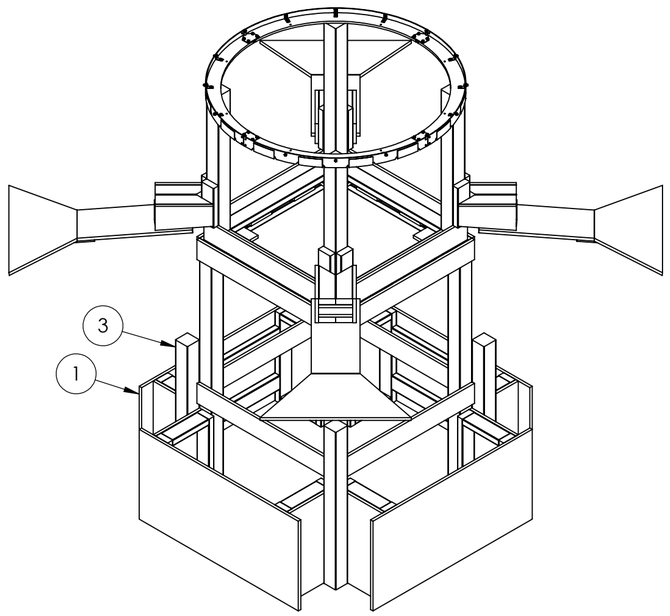



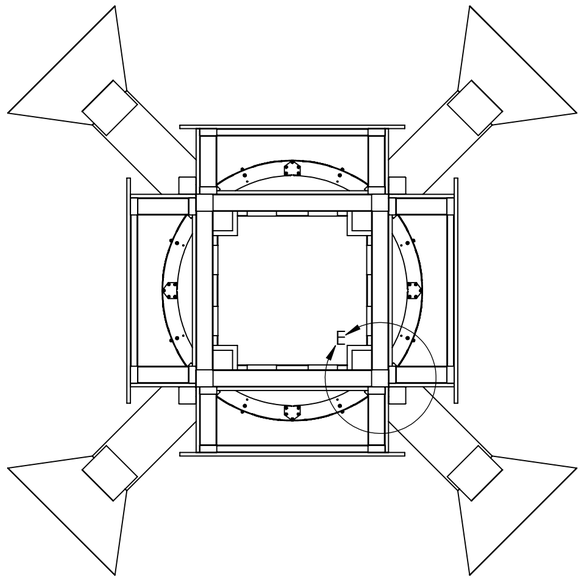



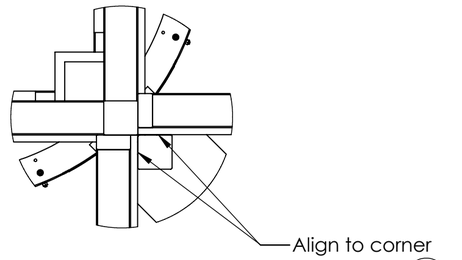

DETAIL D
SCALE 1 : 12

1. Align 4x (1) to (5) from Step 2, as shown.
2. Connect using 3.5" long screws. It is recommended to use 8x screws per (1), 4x into each 2"x4" lumber of (1).

Step 4




DETAIL E
SCALE 1 : 12

1. Align 4x (3) to corners created by (1)'s in Step 3, as shown.
2. Connect (3) to the surrounding 2x (1) using 2" long screws. It is recommended to use 8x screws per (3), 4x screws per (1).

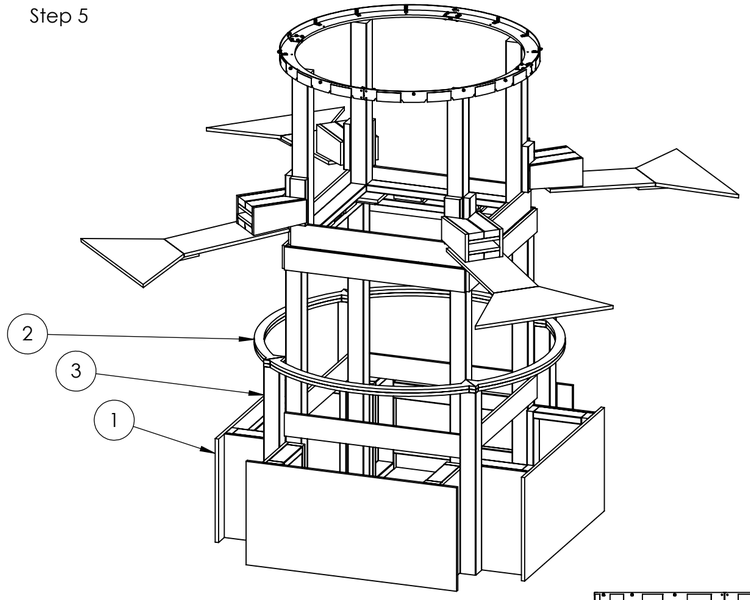
| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | FIELD | NAME | DATE |
| | DRAWN | KAMC | 1/4/2022 |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/2<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.50 | **PROPRIETARY AND CONFIDENTIAL**<br>THE INFORMATION CONTAINED IN THIS 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:**<br>REMOVE ALL BURRS AND SHARP EDGES. | | |
| DO NOT SCALE DRAWING | | | |

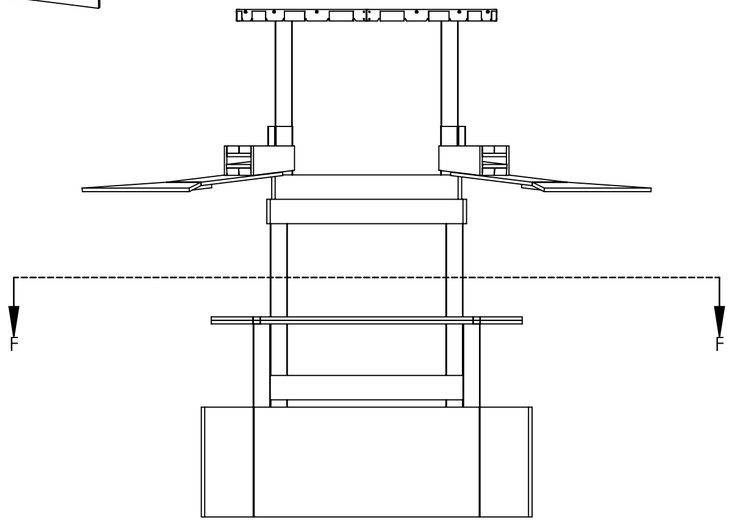
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

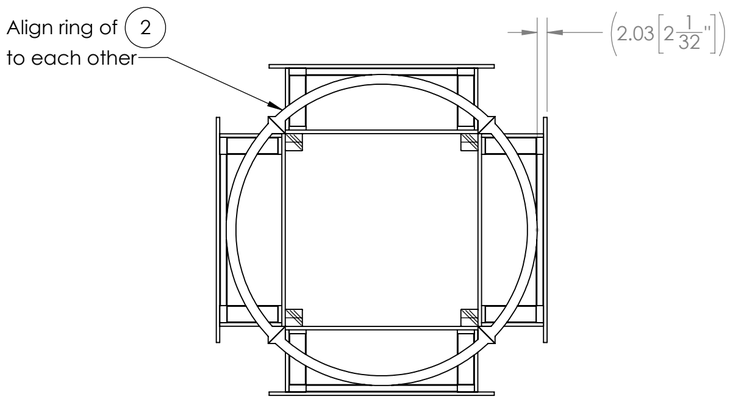
TITLE:
Hub - Simple Build - Full Hub Assembly with AndyMark Ring AM-4672

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22000-AM | |
| SCALE: 1:24 | SHEET 4 OF 5 | |

Step 5



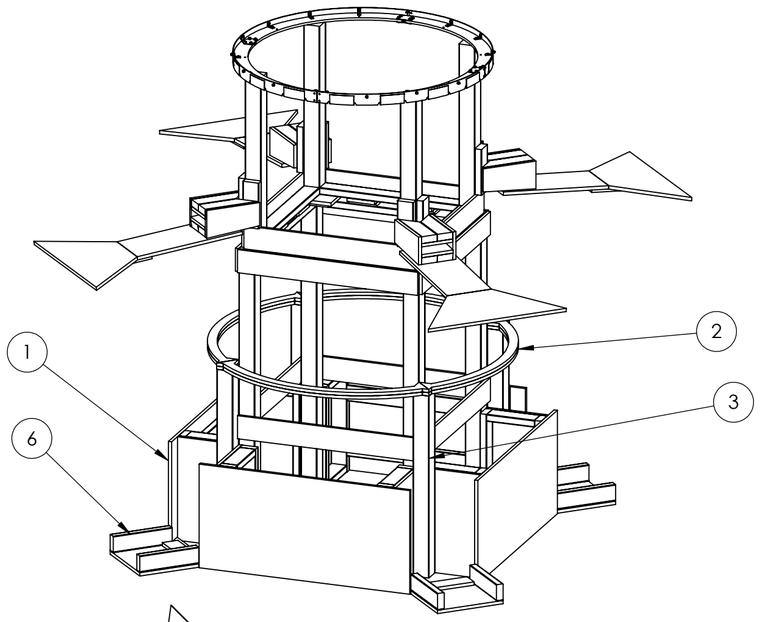



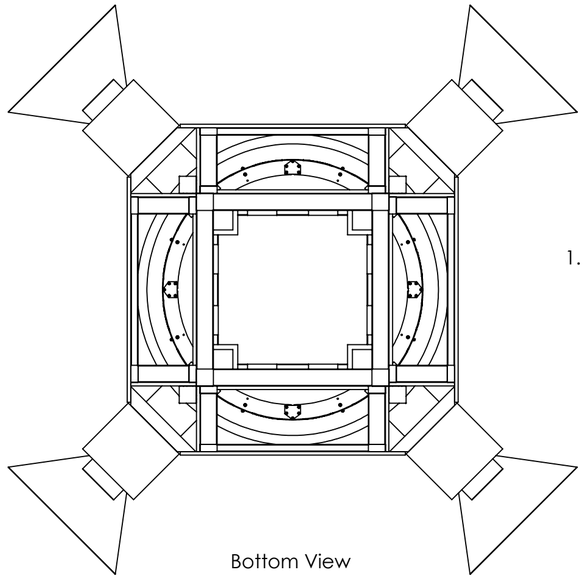




SECTION F-F

1. Align 4x (2) to each other, on top of 4x (3) . Ideally, the triangular edges of (2) align with adjacent (2) . If this does not occur, split the difference evenly amongst all (3) 's.
2. Connect (2) to (3) using 3" long screws. It is recommended to use 4x screws per (2) , 2x per (3) .
   Note: Be careful not to screw too close to the edge of (3) .

Step 6



Bottom View

1. Add 4x (6) to Step 5 , as shown, by sliding into place.
   (6) does not rigidly attach to assembly.

| UNLESS OTHERWISE SPECIFIED: | FIELD | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/2<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.50 | DRAWN | KAMC | 1/4/2022 |
| **MATERIAL/FINISH:** | | | |
| DO NOT SCALE DRAWING | | | |

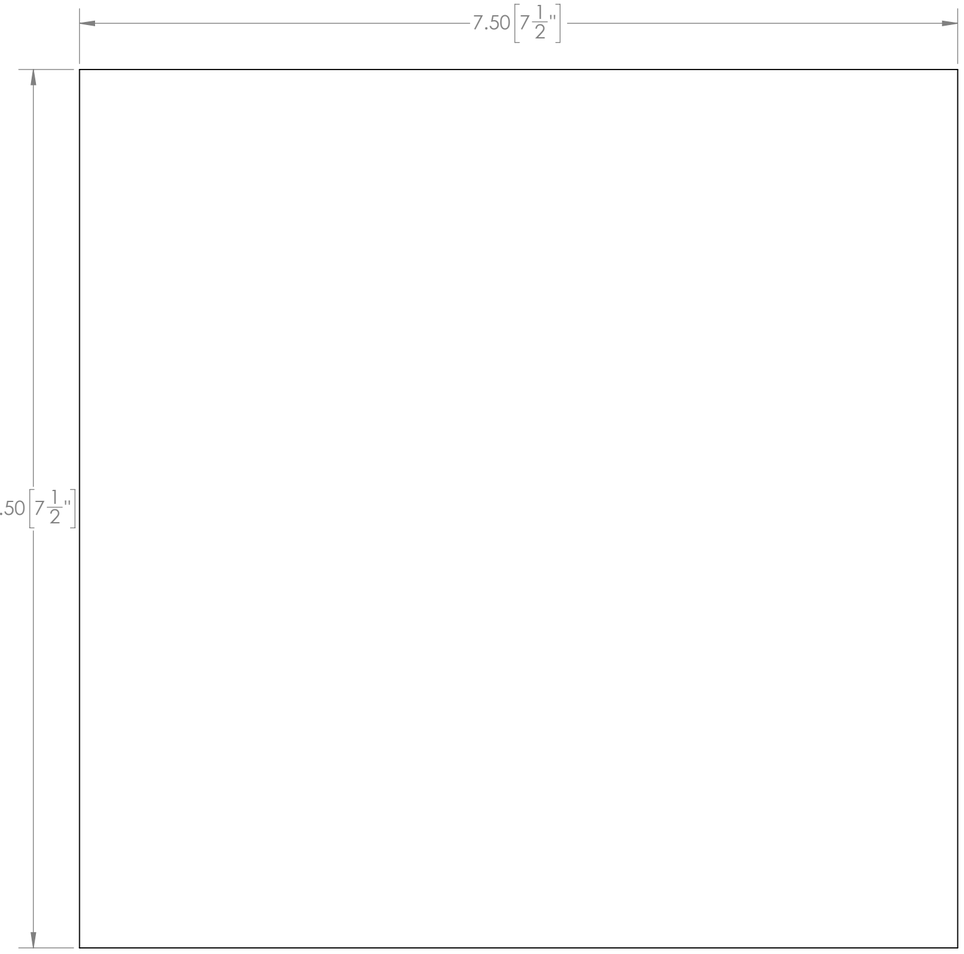


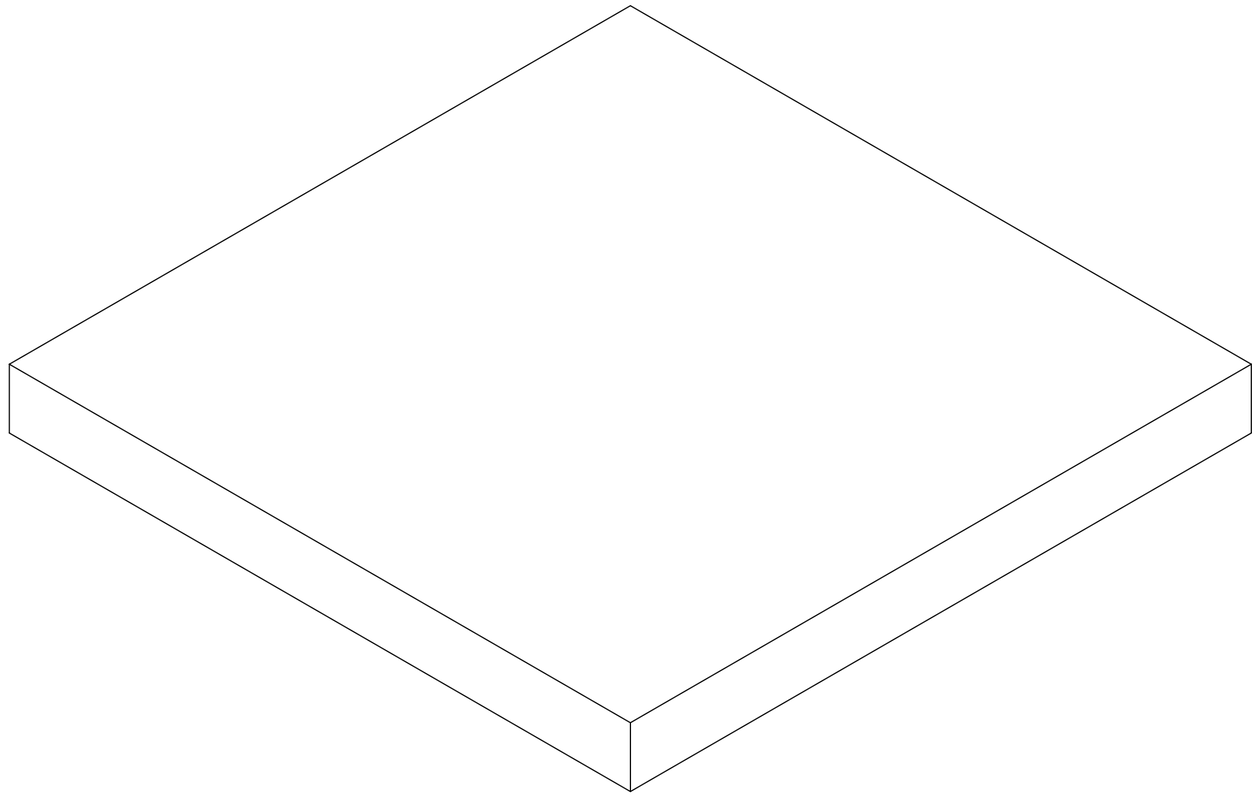
**COMMENTS:**
REMOVE ALL BURRS AND SHARP EDGES.

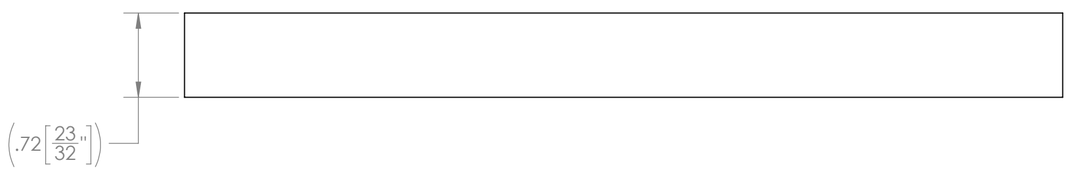
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

TITLE:
# Hub - Simple Build - Full Hub Assembly with AndyMark Ring AM-4672

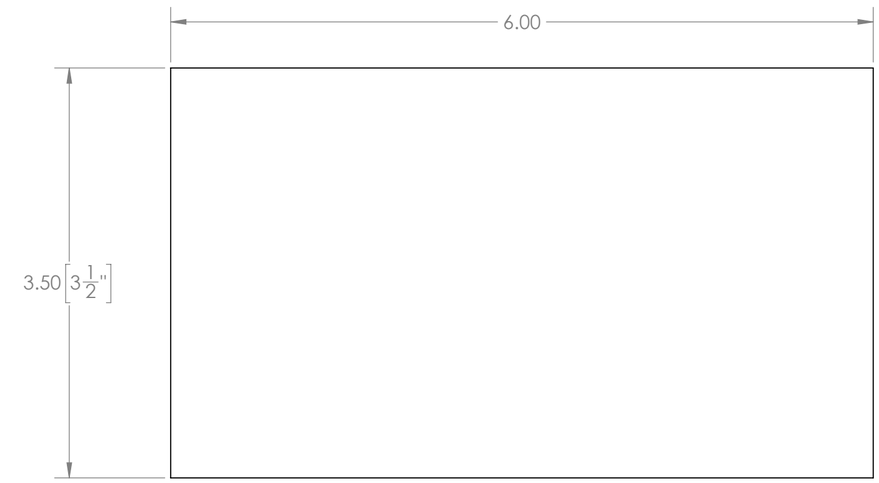
| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22000-AM | |
| SCALE: 1:24 | SHEET 5 OF 5 | |

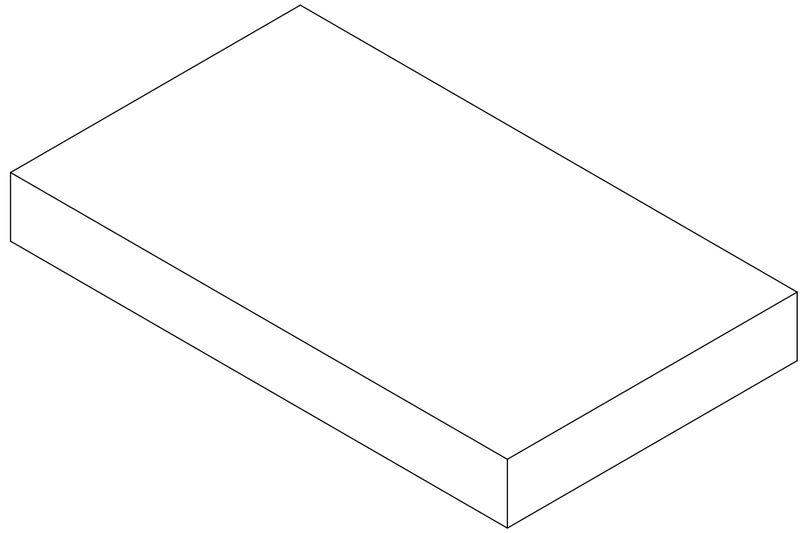


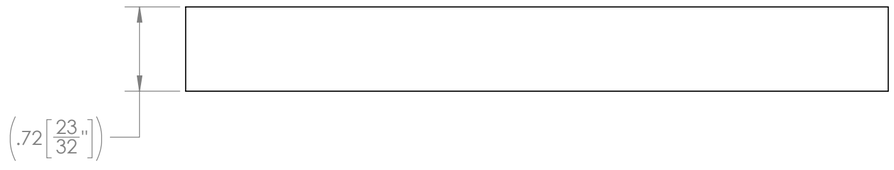






| | | |
|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME / DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC / 12/29/2021 |
| **MATERIAL/FINISH:**<br>3/4" Plywood | **PROPRIETARY AND CONFIDENTIAL**<br>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 - Simple Build - Upper Hub Square Connection Plate |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | SIZE: C / DWG. NO.: TE-22005 / REV:<br>SCALE: 1:1 / SHEET 1 OF 1 |






| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |

**MATERIAL/FINISH:**

3/4" Plywood

DO NOT SCALE DRAWING

**PROPRIETARY AND CONFIDENTIAL**



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

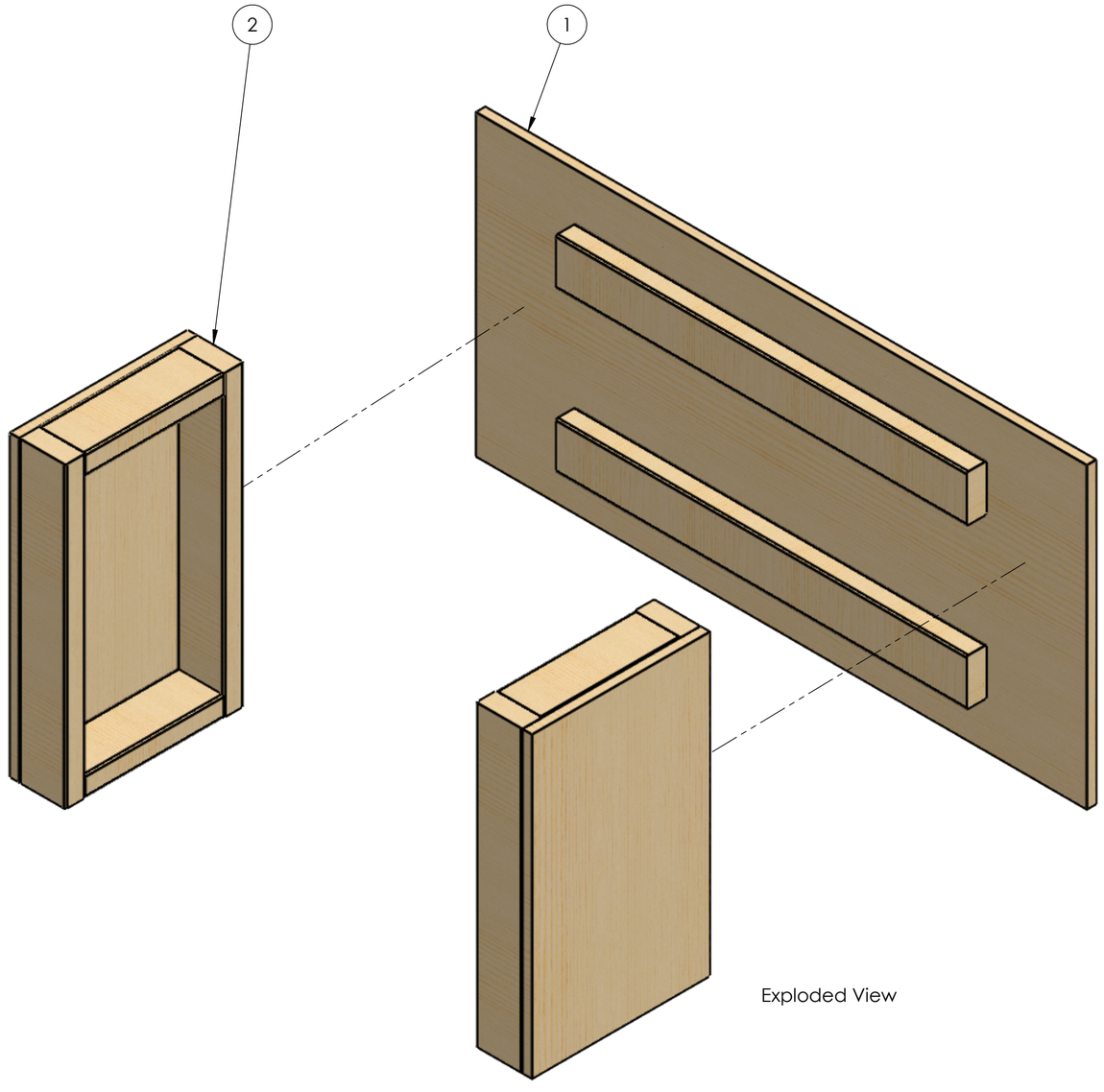
SOLIDWORKS Modeling Solutions Partner

TITLE:

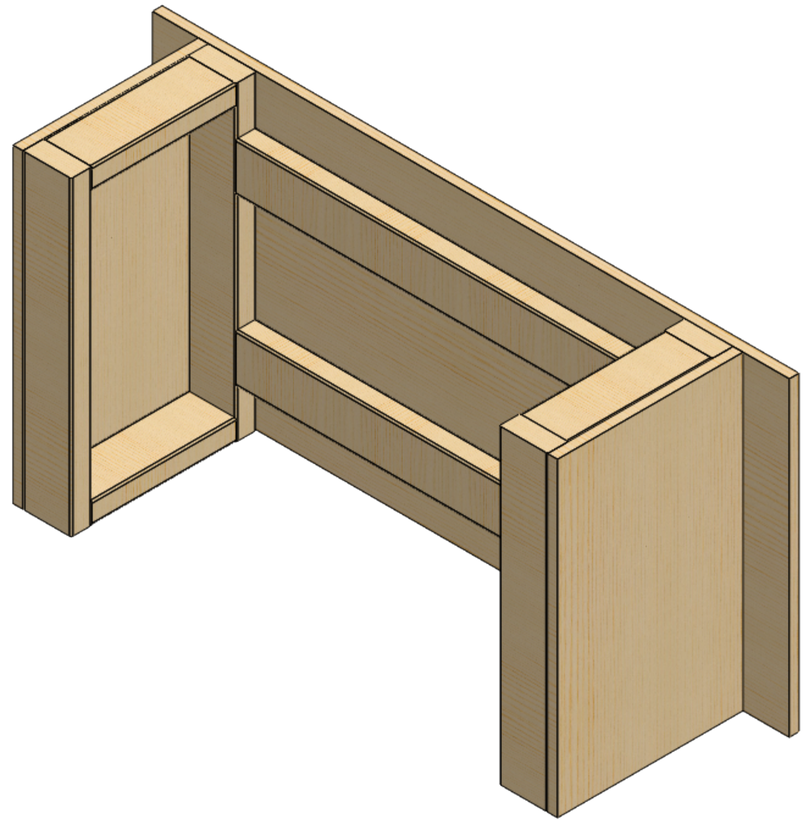
# Hub - Simple Build - Upper Hub 2x4 Connection Plate

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22006 | |

SCALE: 1:1 SHEET 1 OF 1




Exploded View



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 ±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 | 12/30/2021 |



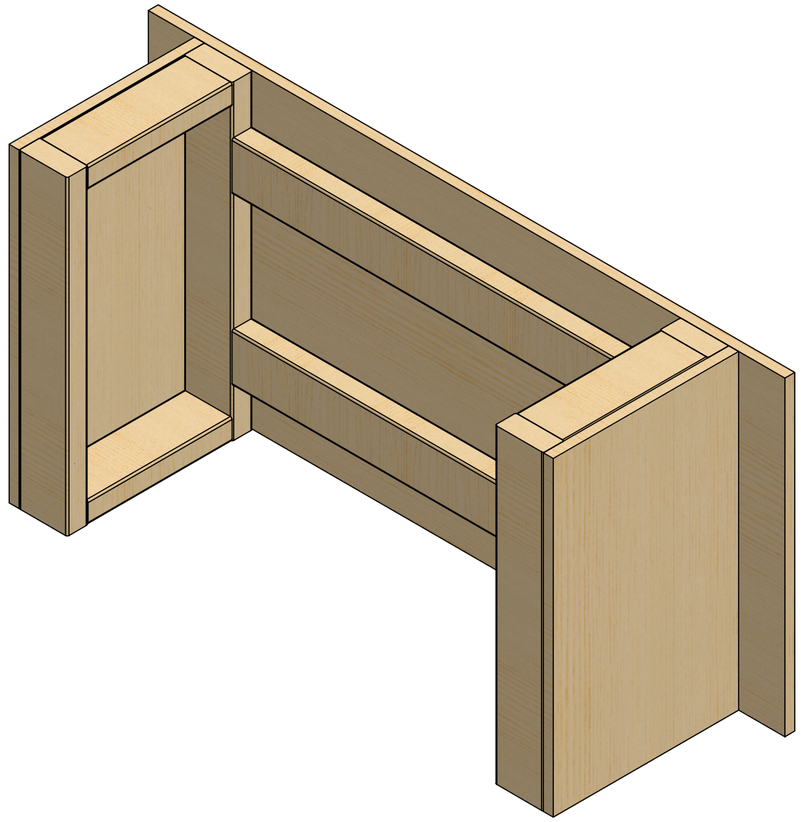
**COMMENTS:**
REMOVE ALL BURRS AND SHARP EDGES.

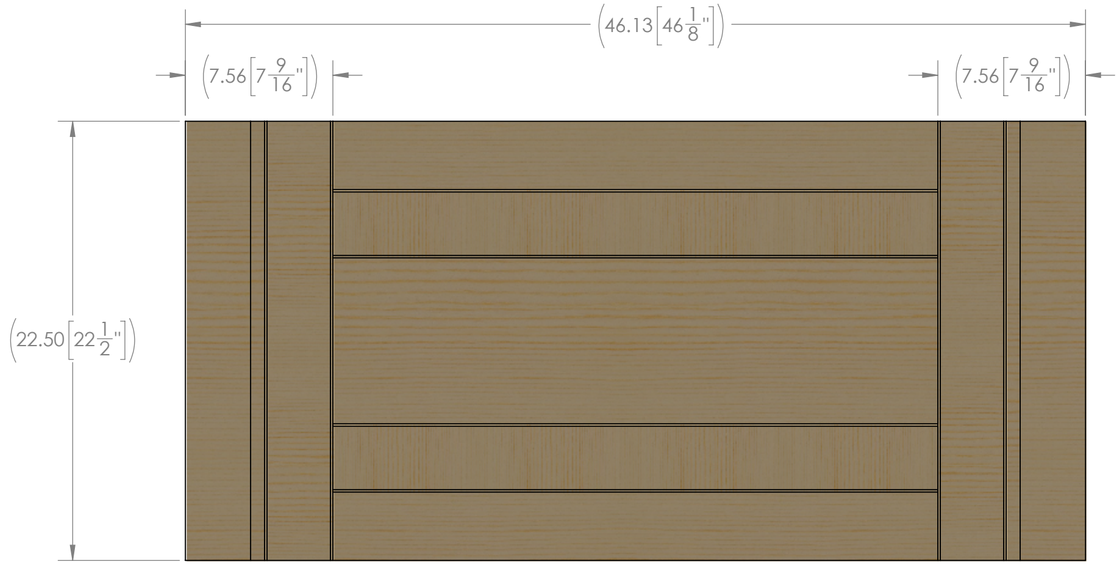
FIRST ROBOTICS COMPETITION
SOLIDWORKS Modeling Solutions Partner

TITLE:
# Hub - Simple Build - Fender Assembly

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

SCALE: 1:6 SHEET 1 OF 3

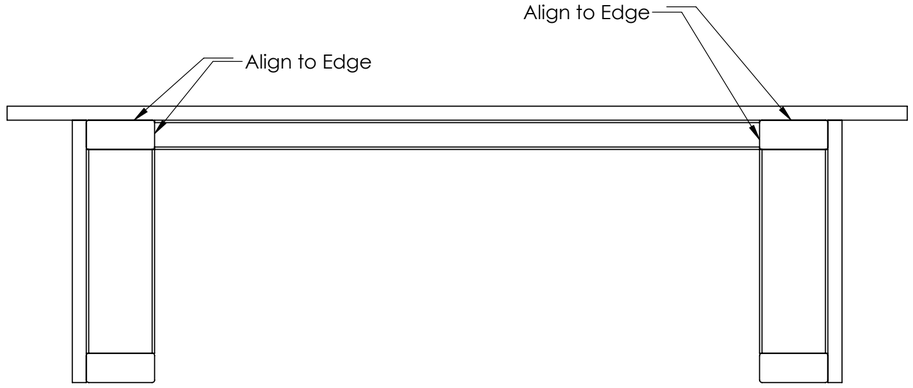


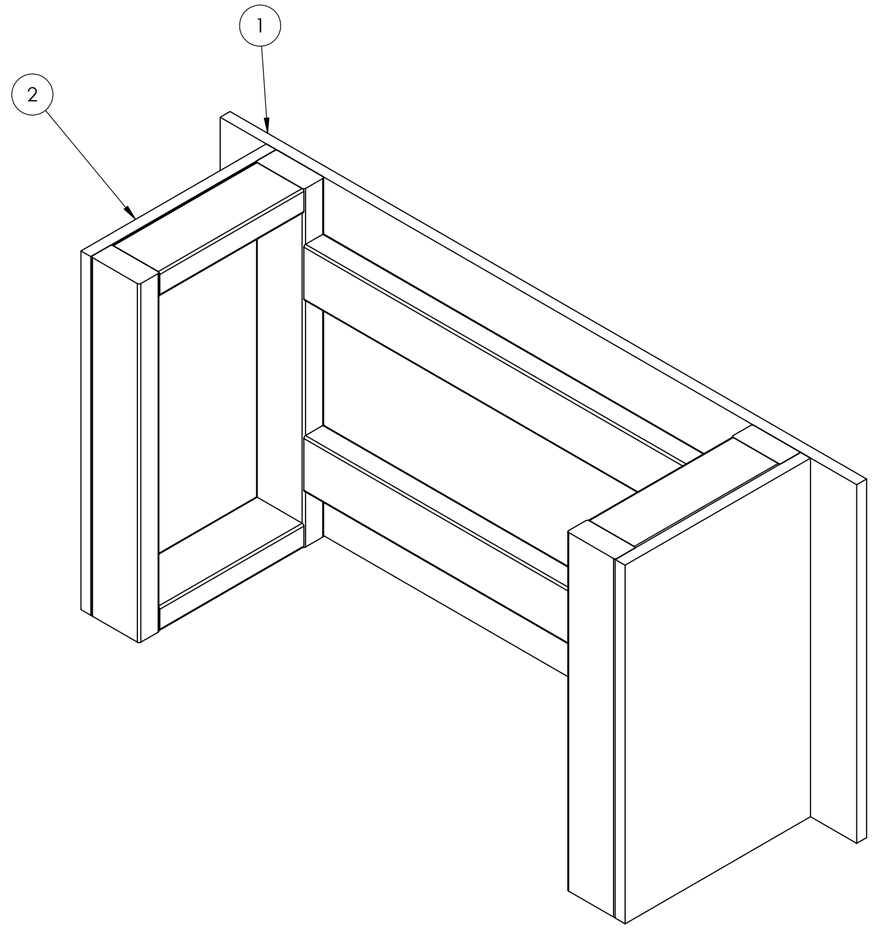




| | | |
|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME / DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC 12/30/2021 |
| **MATERIAL/FINISH:** | **PROPRIETARY AND CONFIDENTIAL**<br>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 - Simple Build - Fender Assembly |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | SIZE C / DWG. NO. TE-22010 / REV |
| | | SCALE: 1:6 / SHEET 2 OF 3 |

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).

| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
| | DRAWN | KAMC | 12/30/2021 |

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



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

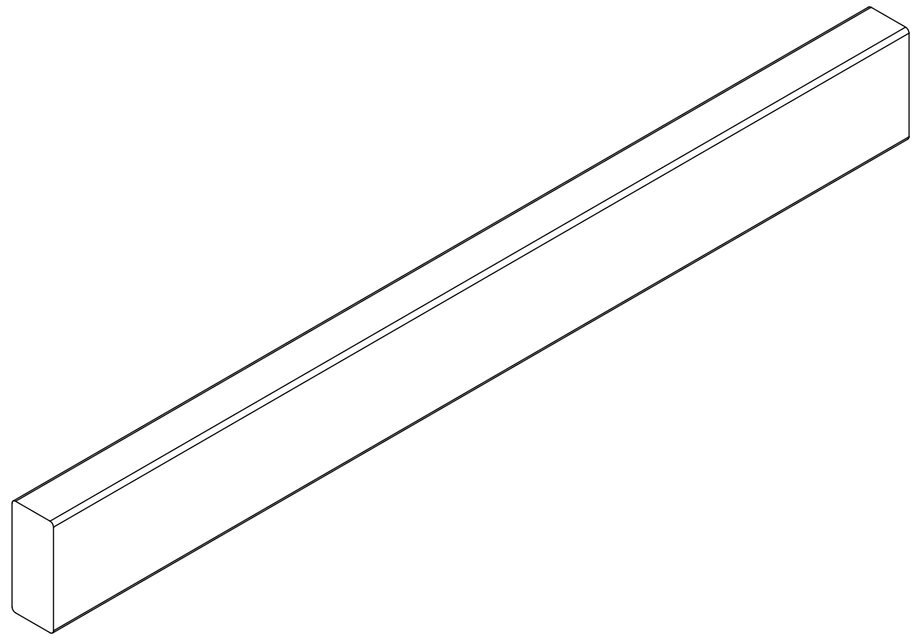
FIRST ROBOTICS COMPETITION

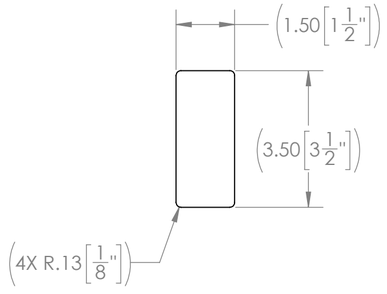
SOLIDWORKS Modeling Solutions Partner

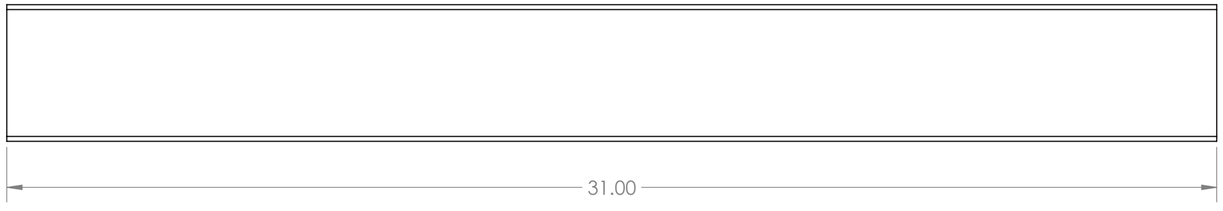
TITLE:

# Hub - Simple Build - Fender Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22010 | |
| SCALE: 1:6 | SHEET 3 OF 3 | |






| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |

**MATERIAL/FINISH:**

2"x4" Lumber

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

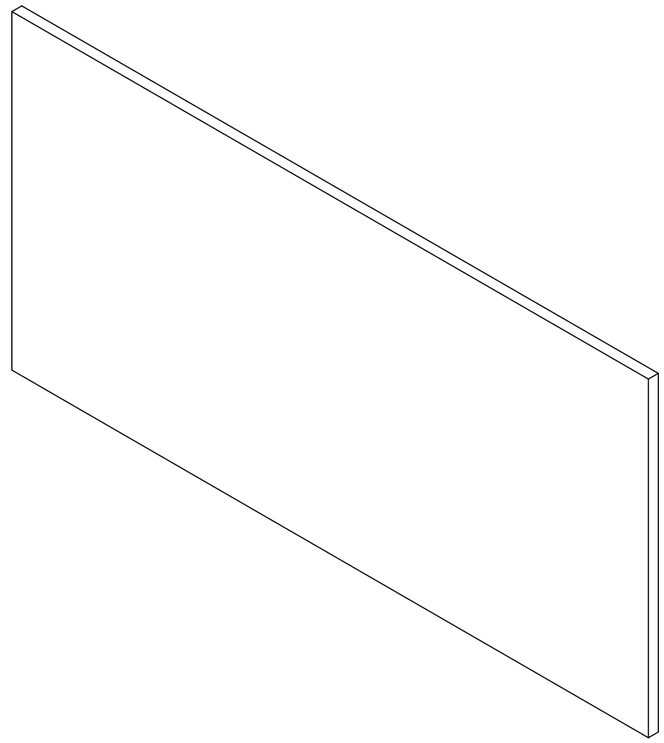
SOLIDWORKS Modeling Solutions Partner

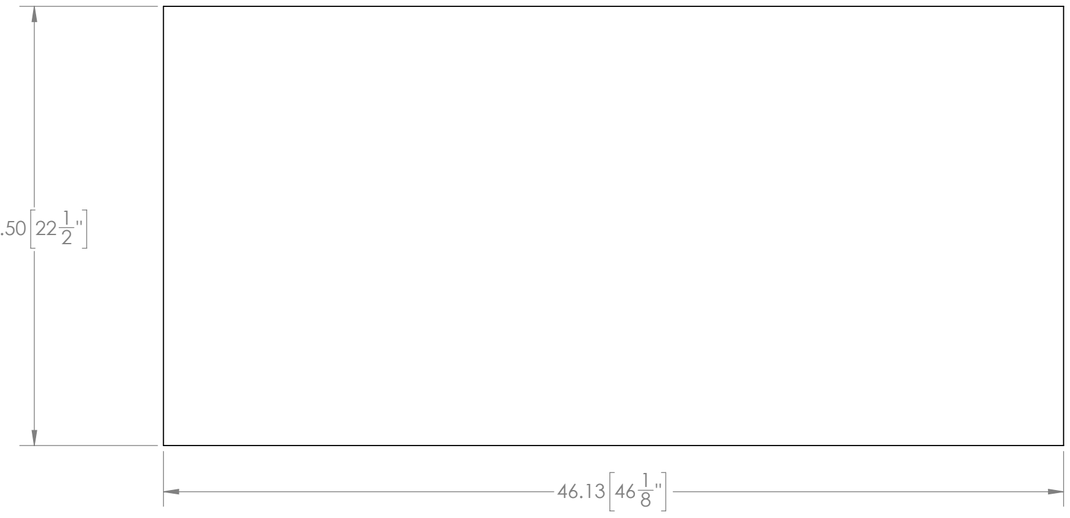
TITLE:

# HUB - Simple Build - Fender Front Horizontal 2x4

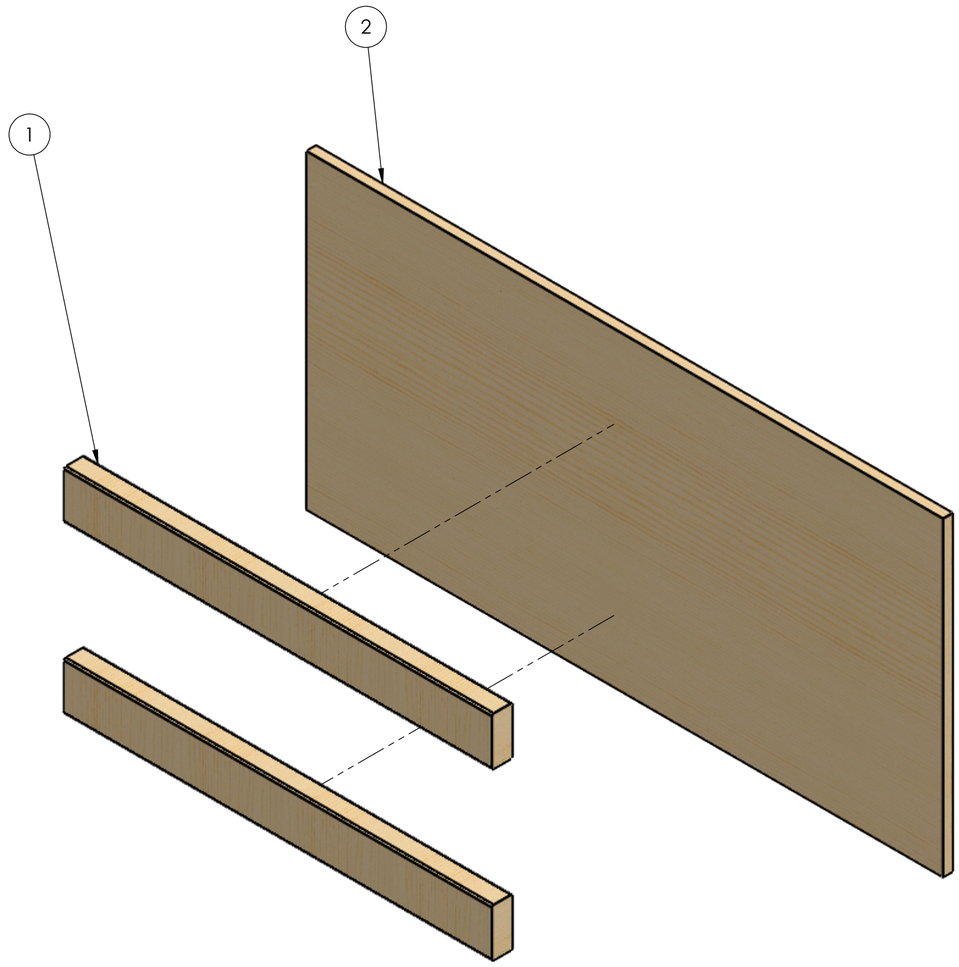
| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22011 | |

SCALE: 1:3 | SHEET 1 OF 1

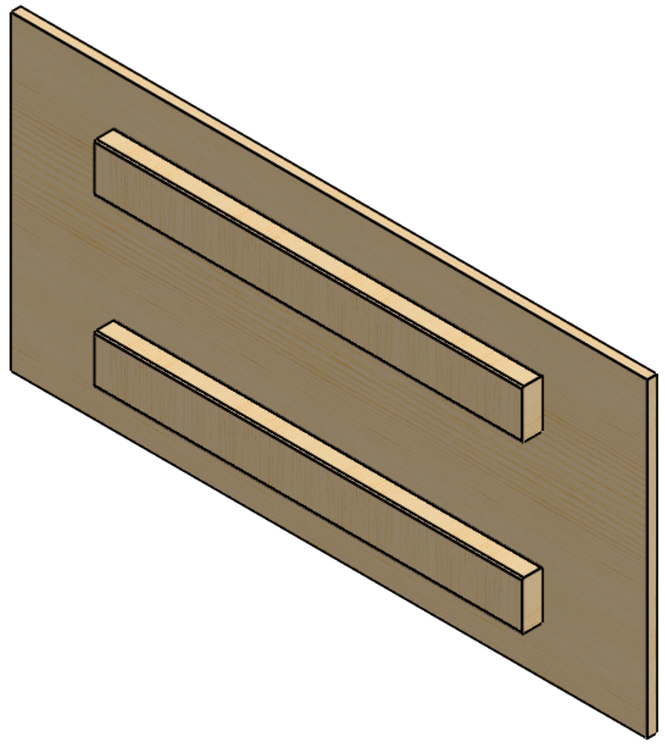






| | | |
|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME / DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC 12/29/2021 |
| **MATERIAL/FINISH:**<br>3/4" Plywood | **PROPRIETARY AND CONFIDENTIAL**<br>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. | FIRST ROBOTICS COMPETITION<br>SOLIDWORKS Modeling Solutions Partner |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | TITLE:<br>HUB - Simple Build - Fender Front |
| | | SIZE: C<br>DWG. NO.: TE-22012<br>REV: |
| | | SCALE: 1:6<br>SHEET 1 OF 1 |




Exploded View



Hardware Needed:
#8 x 2" Long Screws - Qty 14

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | TE-22011 | HUB - Simple Build - Fender Front Horizontal 2x4 | 2 |
| 2 | TE-22012 | HUB - Simple Build - Fender Front | 1 |

Step 1:

1. Align 2x (1) to (2) as shown, using dimensions provided on Sheet 2.
2. Connect using 2" long screws. It is recommended to 7x screws into each (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 | 12/30/2021 |



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

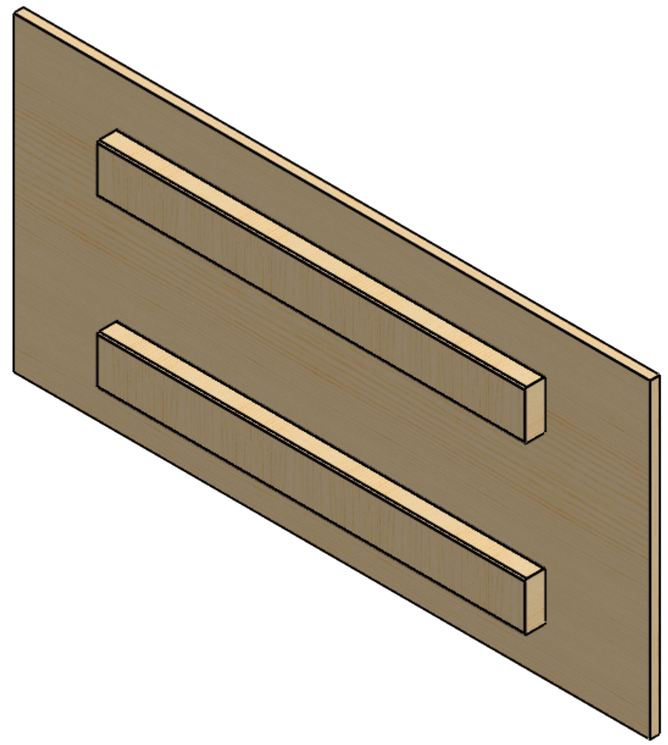
SOLIDWORKS Modeling Solutions Partner

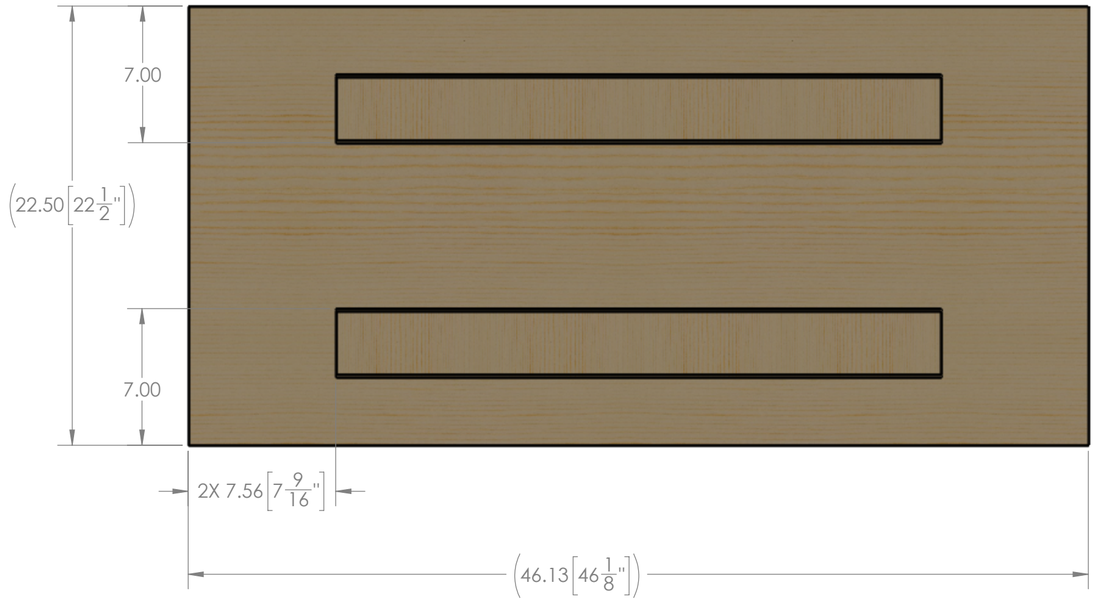
TITLE:

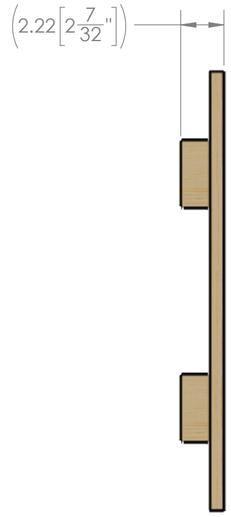
# HUB - Basic Build - Fender Front Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22013 | |

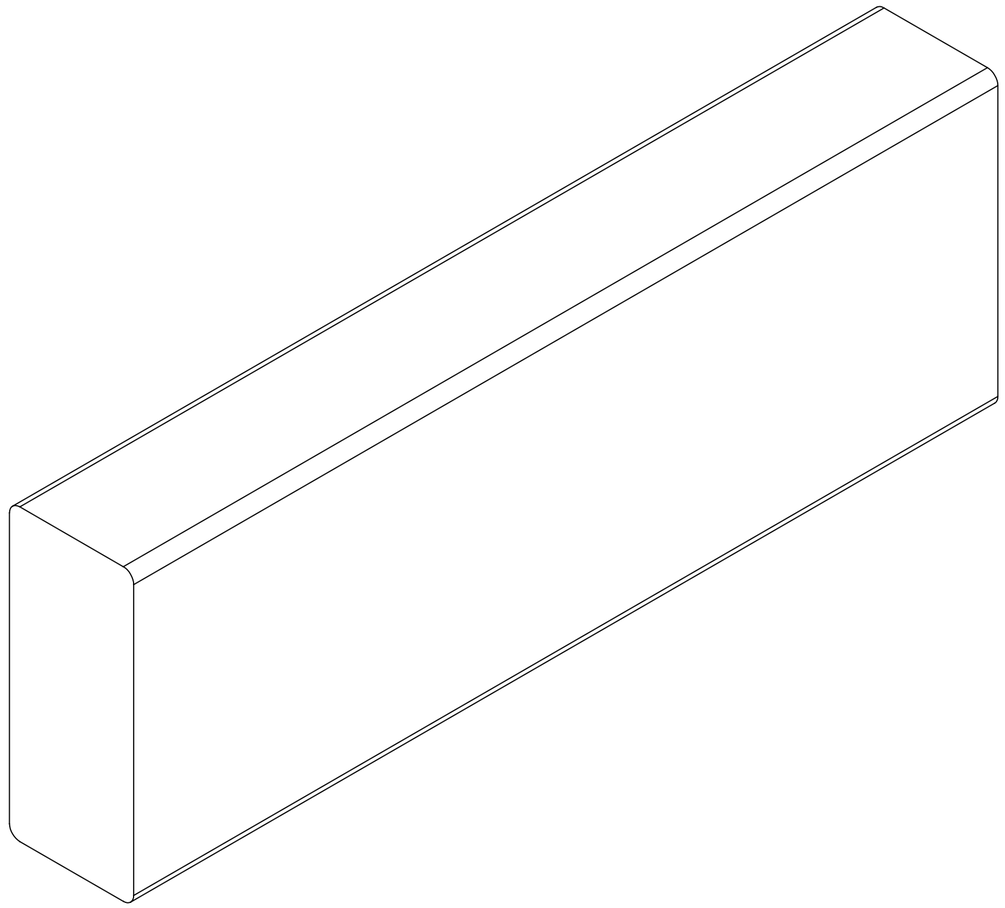
SCALE: 1:6 SHEET 1 OF 2

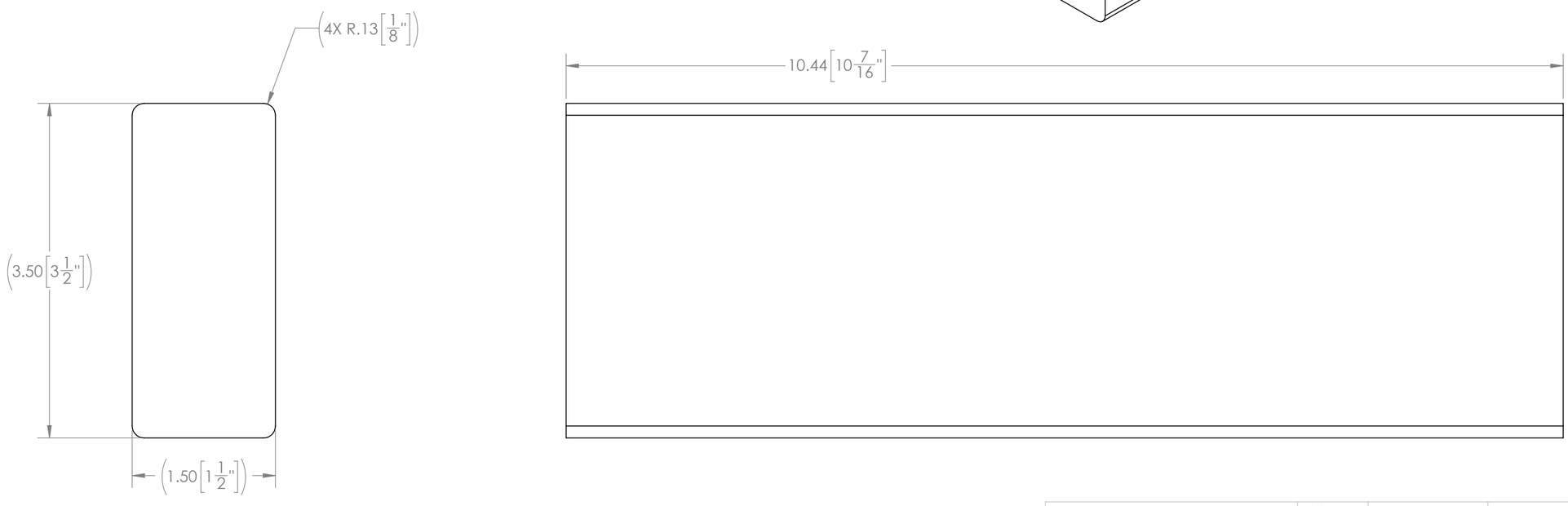





| | | |
|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME / DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC 12/30/2021 |
| **MATERIAL/FINISH:** | **PROPRIETARY AND CONFIDENTIAL**<br>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 - Basic Build - Fender Front Assembly |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | SIZE: C · DWG. NO.: TE-22013 · REV:<br>SCALE: 1:6 · SHEET 2 OF 2 |






| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| | DRAWN | KAMC | 12/29/2021 |

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

**MATERIAL/FINISH:**

2"x4" Lumber

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

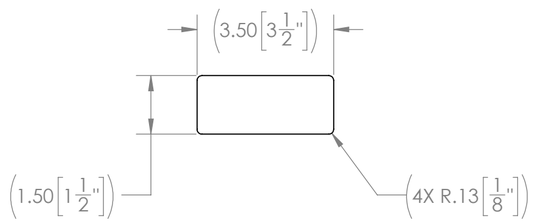
SOLIDWORKS Modeling Solutions Partner

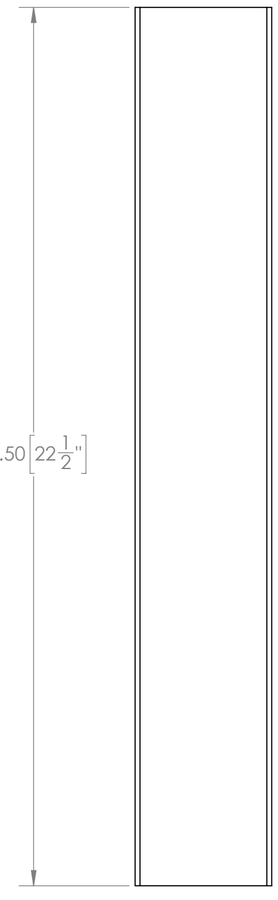
TITLE:

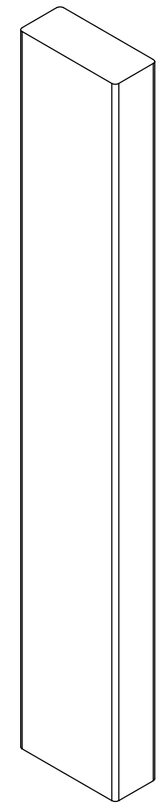
# HUB - Simple Build - Fender Side Horizontal 2x4

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22014 | |

SCALE: 1:1 SHEET 1 OF 1



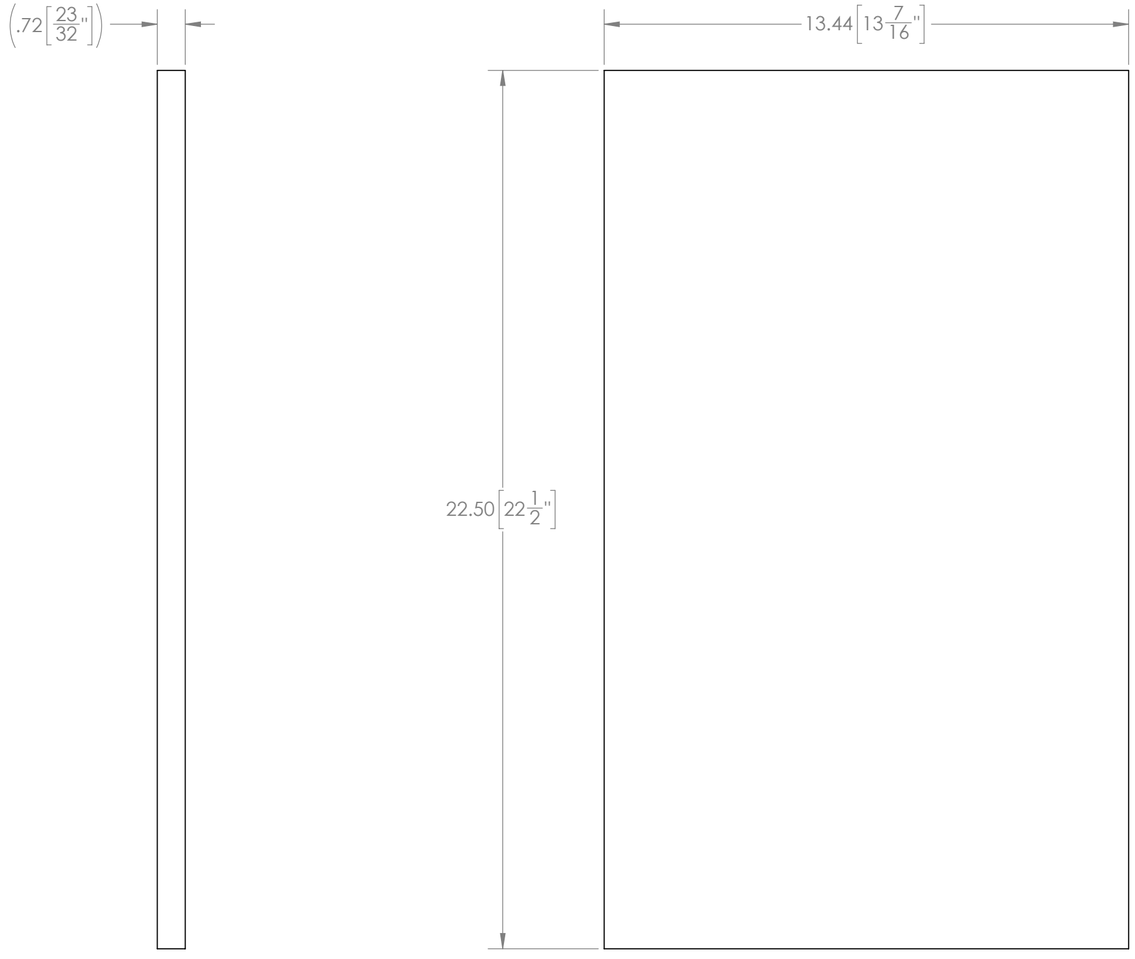



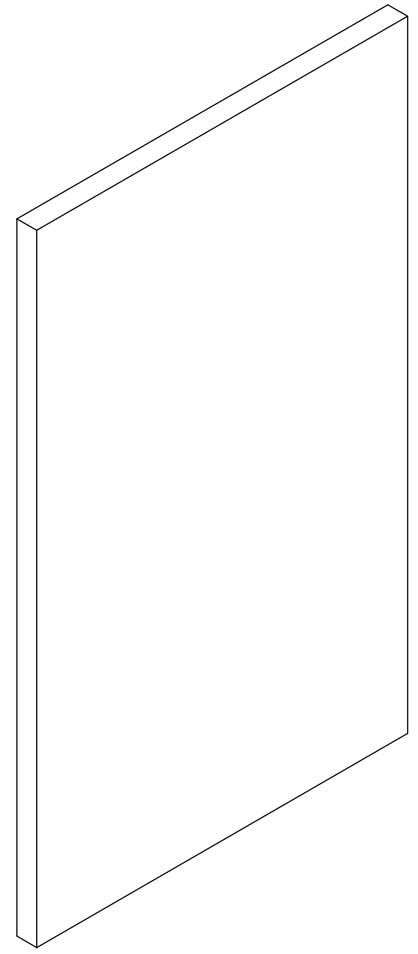
| | | |
|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME / DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC 12/29/2021 |
| **MATERIAL/FINISH:**<br>2"x4" Lumber | **PROPRIETARY AND CONFIDENTIAL**<br>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. | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | |

FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

TITLE:
# HUB - Simple Build - Fender Vertical 2x4

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22015 | |
| SCALE: 1:3 | SHEET 1 OF 1 | |



| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| | DRAWN | KAMC | 12/29/2021 |

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



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

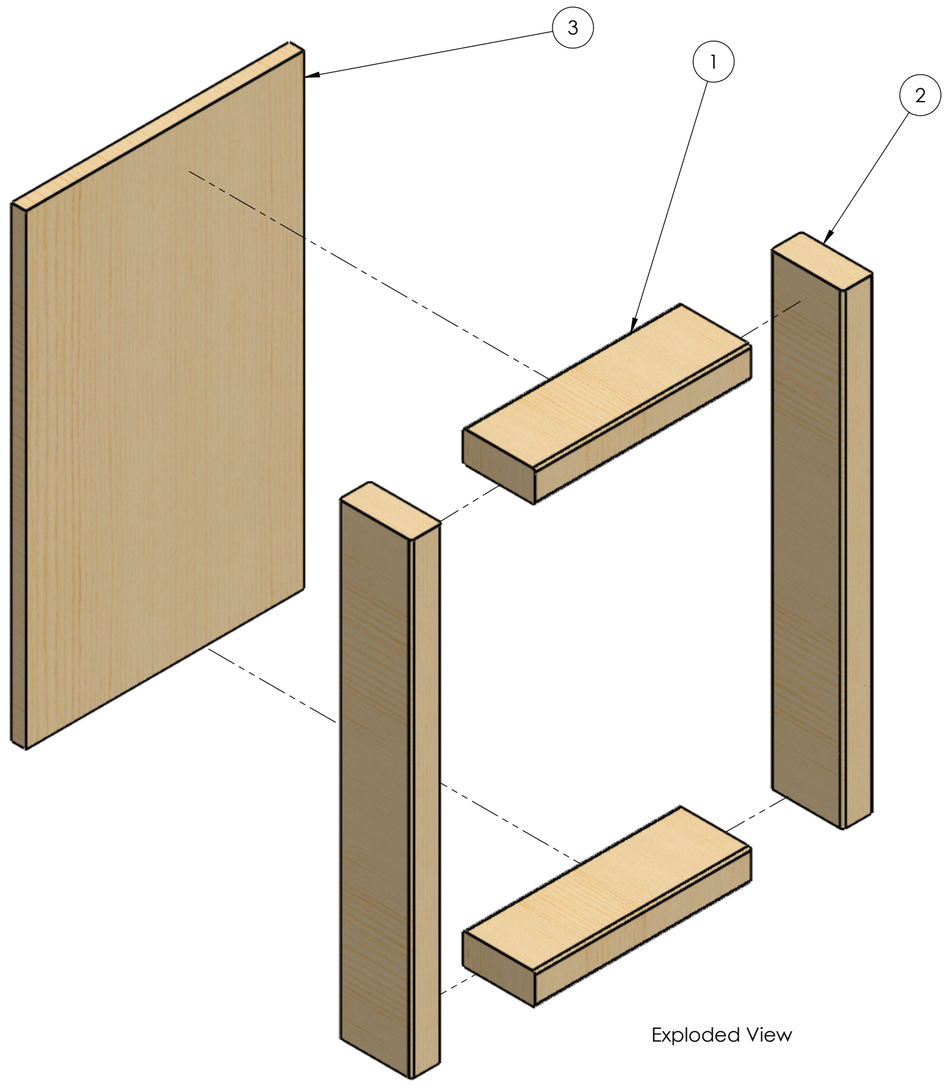
SOLIDWORKS Modeling Solutions Partner

TITLE:

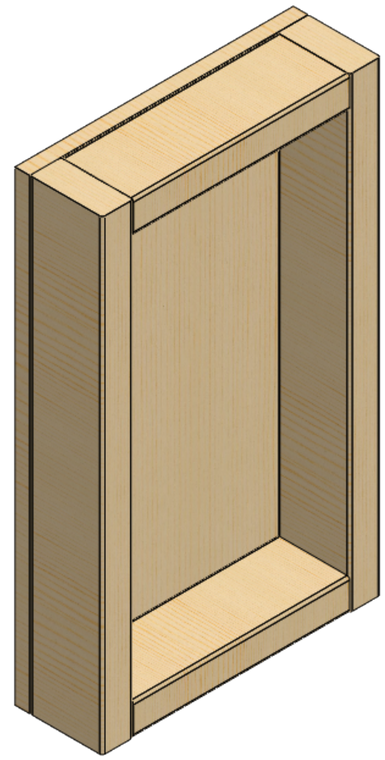
# HUB - Simple Build - Fender Side

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22016 | |

SCALE: 1:3 | SHEET 1 OF 1




Exploded View



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 ±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 | 12/30/2021 |



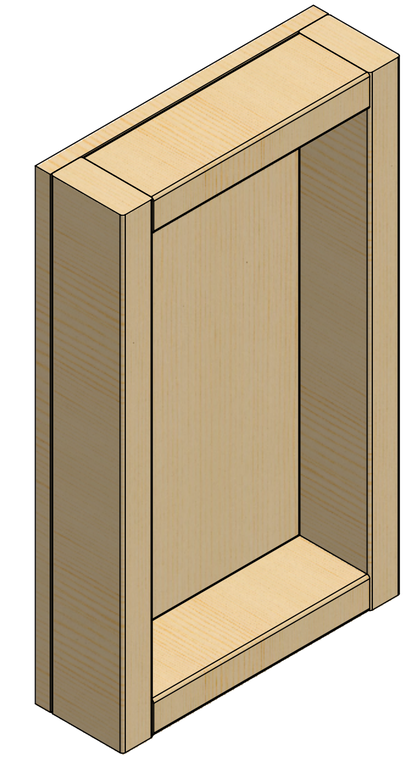
**COMMENTS:**
REMOVE ALL BURRS AND SHARP EDGES.

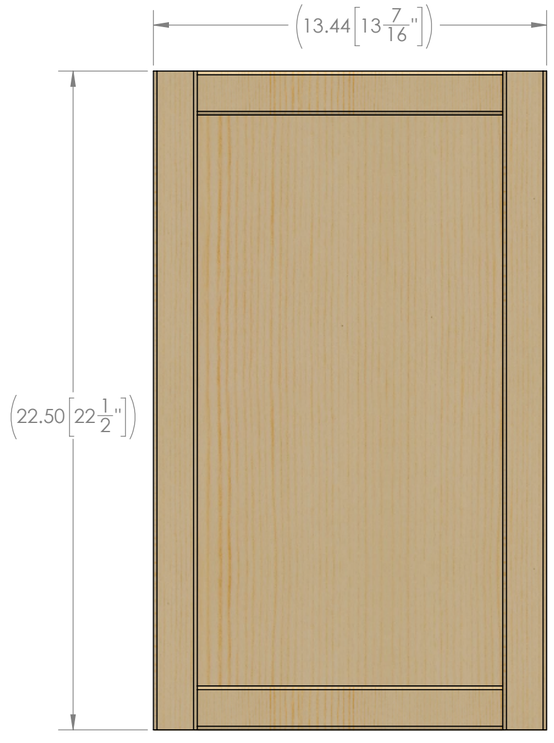
FIRST ROBOTICS COMPETITION
SOLIDWORKS Modeling Solutions Partner

TITLE:
# HUB - Basic Build - Fender Side Assembly

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

SCALE: 1:4 SHEET 1 OF 3




| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/30/2021 |
| **MATERIAL/FINISH:** | **PROPRIETARY AND CONFIDENTIAL**<br>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. | | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | | |

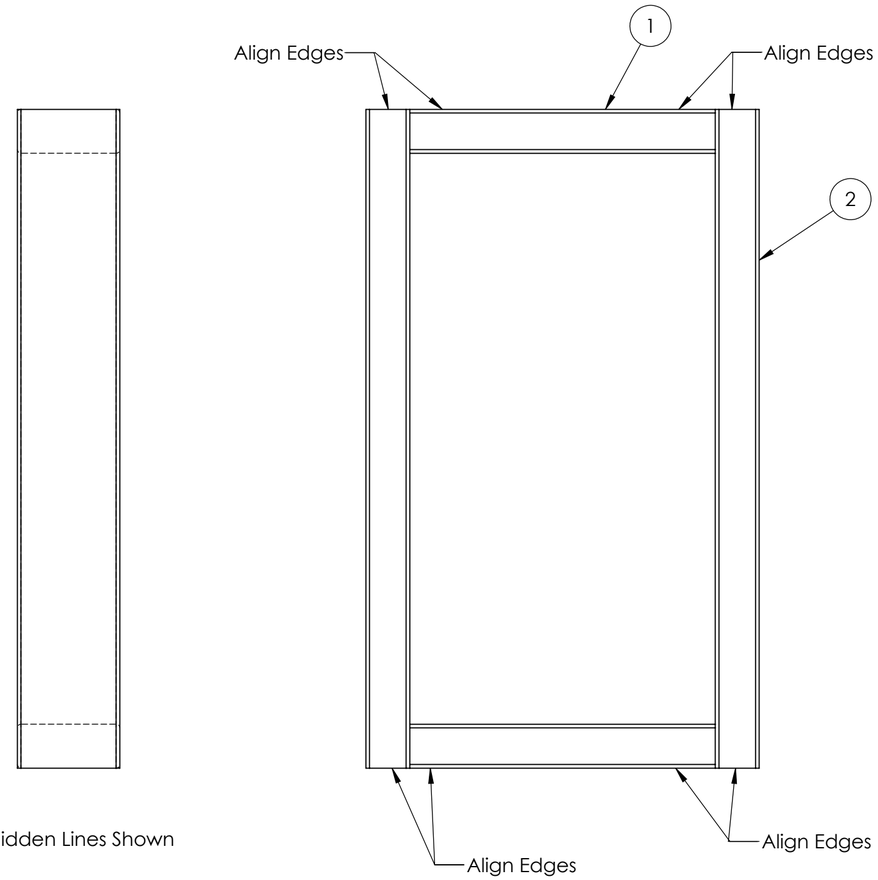
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

TITLE:

# HUB - Basic Build - Fender Side Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22017 | |
| SCALE: 1:4 | SHEET 2 OF 3 | |

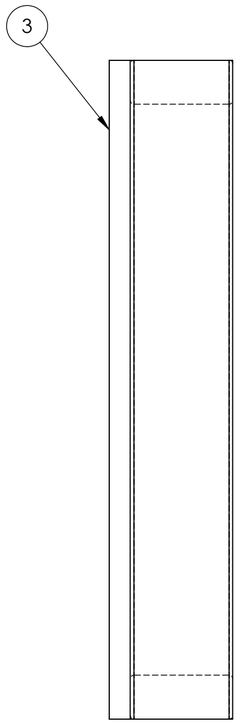
Step 1



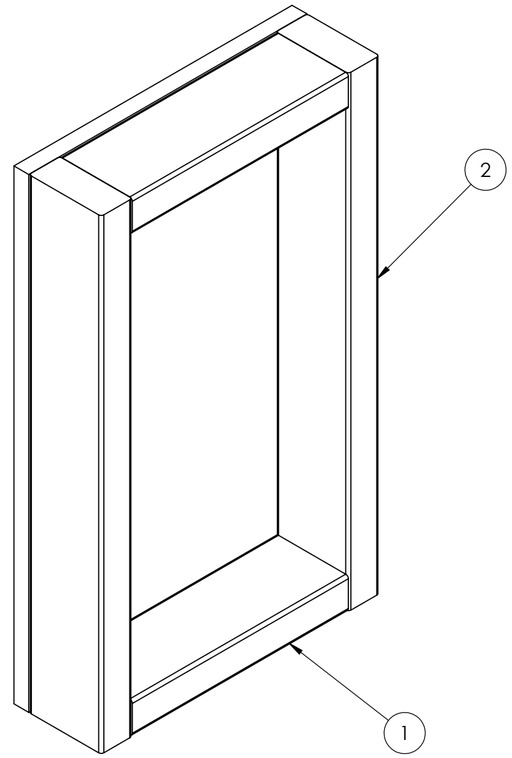

Hidden Lines Shown

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).

| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
| | DRAWN | KAMC | 12/30/2021 |

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



**COMMENTS:**

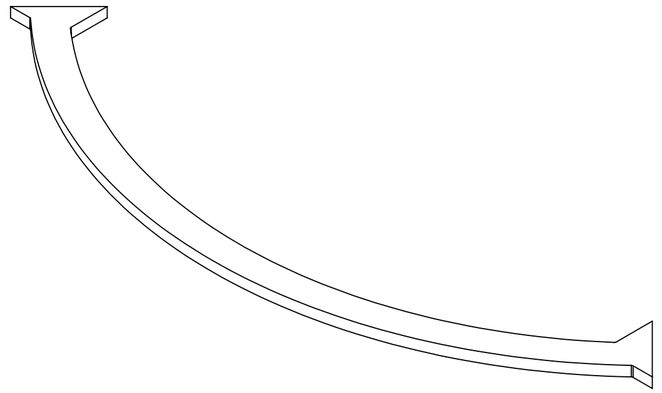
REMOVE ALL BURRS AND SHARP EDGES.

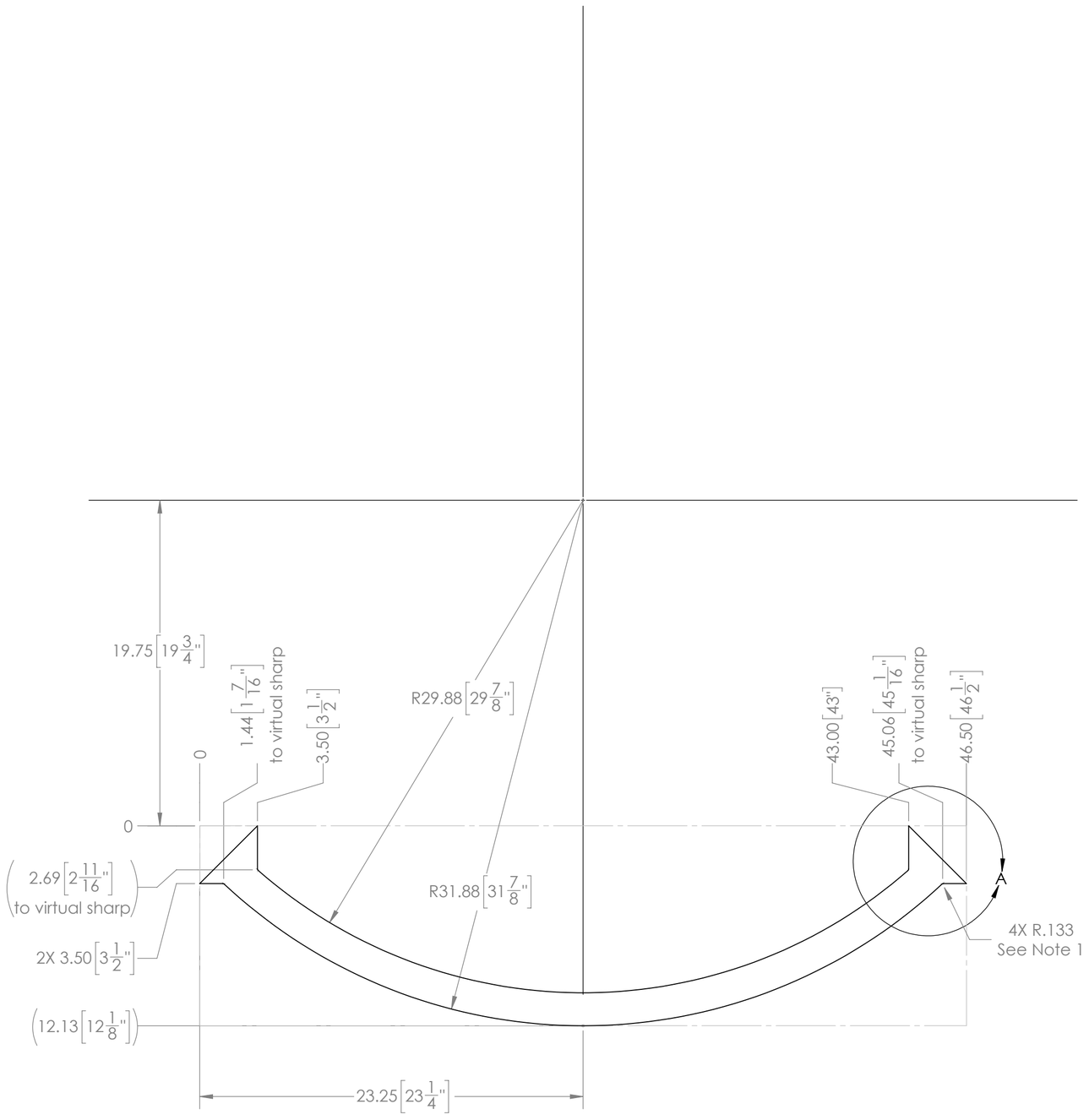
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

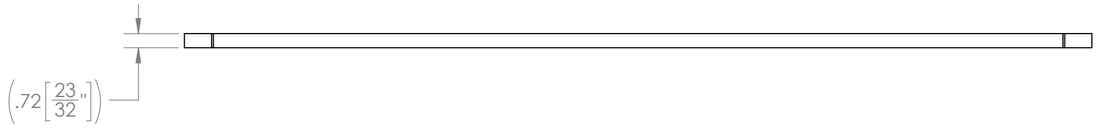
TITLE:

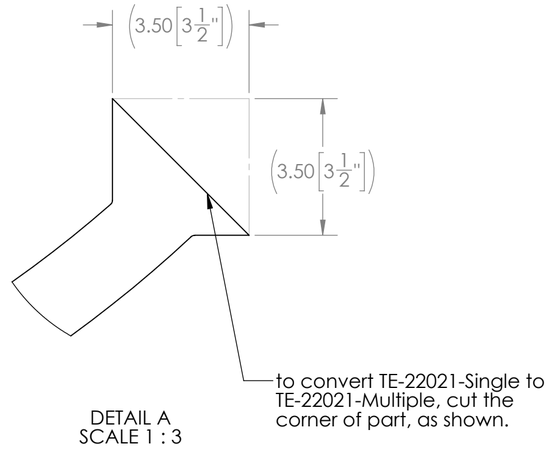
# HUB - Basic Build - Fender Side Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22017 | |
| SCALE: 1:4 | SHEET 3 OF 3 | |






DETAIL A
SCALE 1 : 3

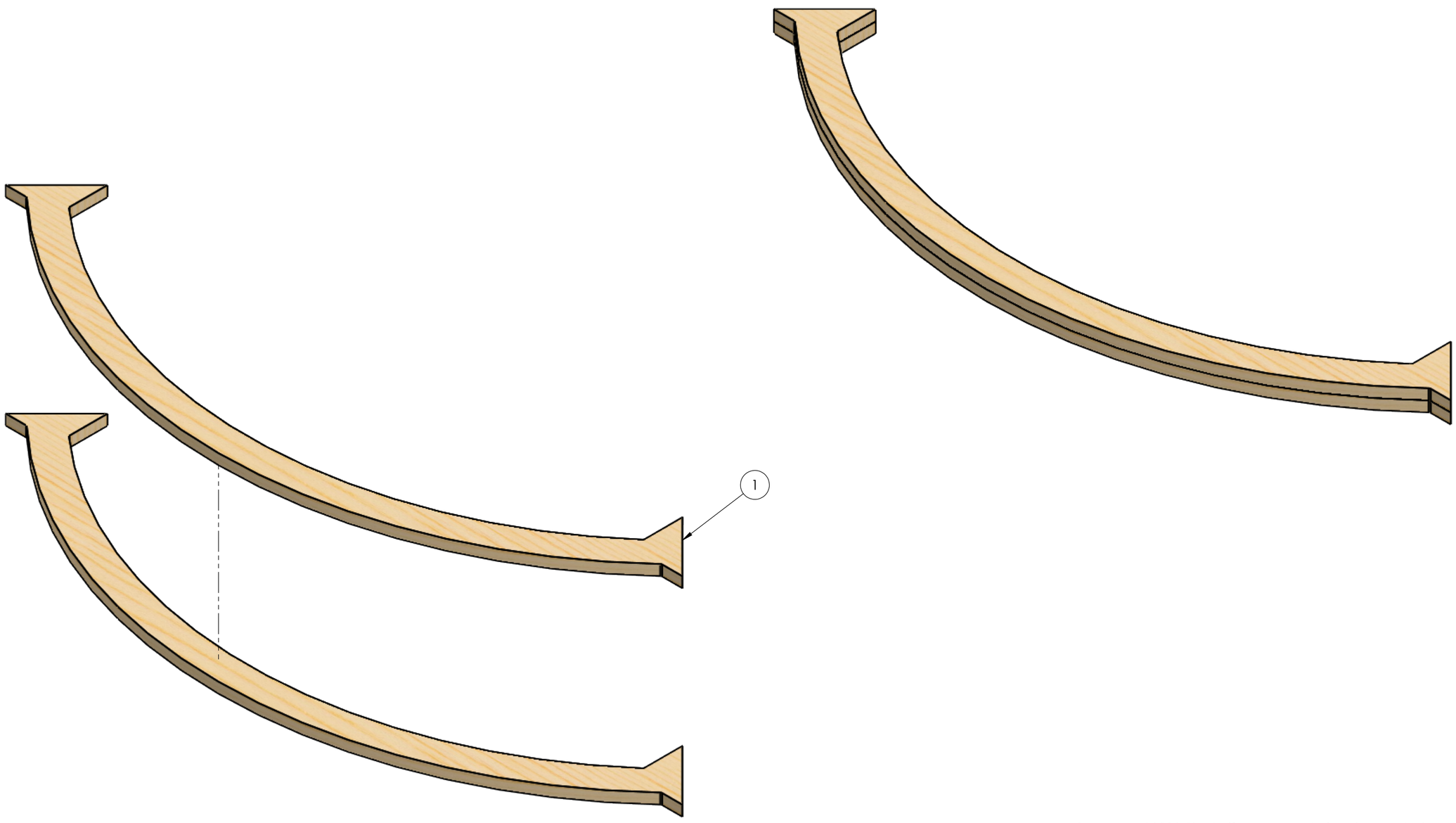
Note:
1. Radii located at internal corners are provided predominately for teams making parts with a router. A 90 degree angle is sufficient clearance.
2. Use TE-22021-Single if you are forming only 1/4 ring.

| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |
| **MATERIAL/FINISH:**<br>3/4" Plywood | **PROPRIETARY AND CONFIDENTIAL**<br>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. | | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | | |

FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

TITLE:
# Hub - Simple Build - Lower Hub Ring - Multiple

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22021-Multiple | |
| SCALE: 1:6 | SHEET 1 OF 1 | |




Step 1:

1. Align 2x (1) as shown.
2. Connect using 1.25" long screws. It is recommended to use 8x screws. Screws should ONLY be placed around the arc. Avoid placing screws on the triangular ends.

Note: Use TE-22023-Single if you are only forming a 1/4 ring.

Hardware:
#8 x 1.25" Long Screw - Qty 8

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | TE-22021-Multiple | Hub - Simple Build - Lower Hub Ring - Multiple | 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 |
|---|---|---|
| DRAWN | KAMC | 12/30/2021 |



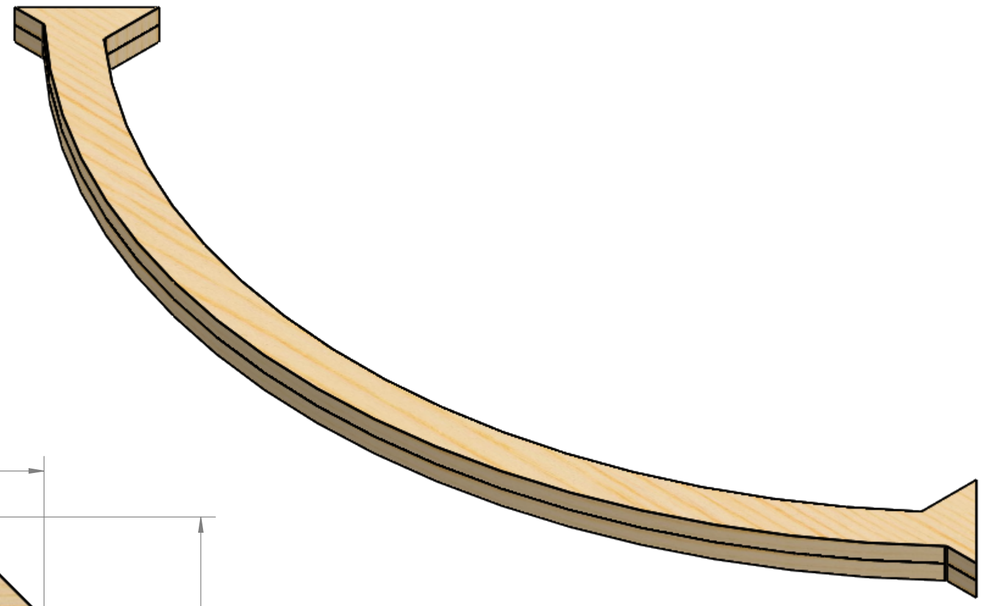
**COMMENTS:**
REMOVE ALL BURRS AND SHARP EDGES.

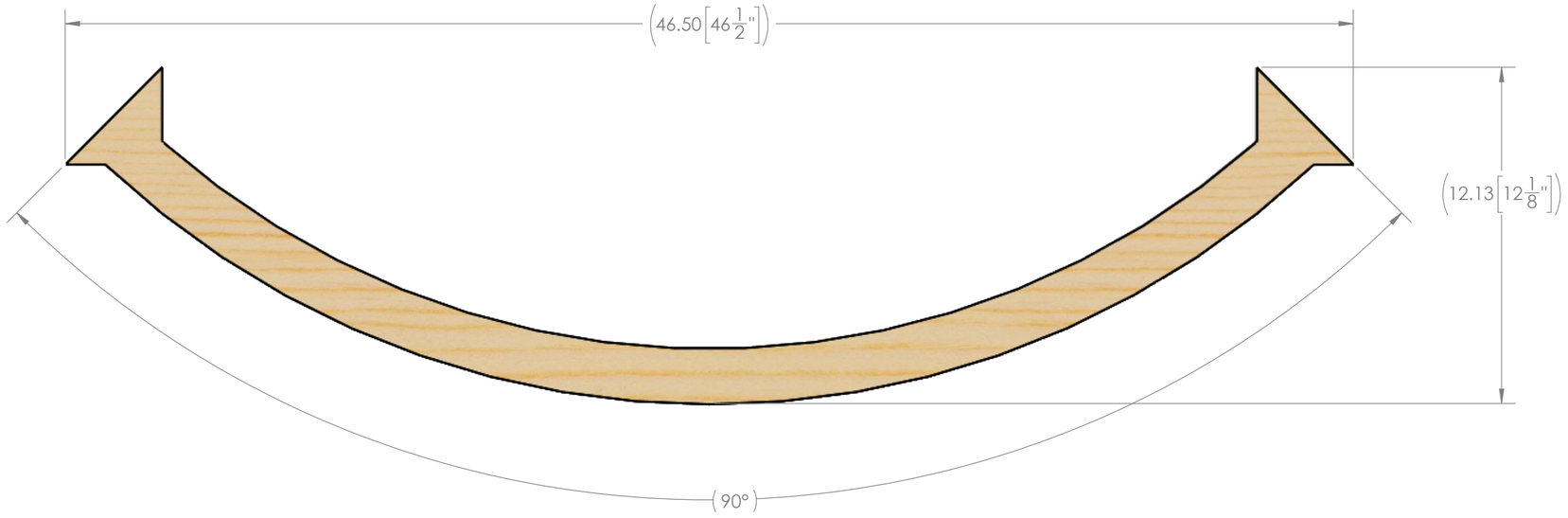
FIRST ROBOTICS COMPETITION
SOLIDWORKS Modeling Solutions Partner

TITLE:
# Hub - Simple Build - Lower Hub Ring Assembly - Multiple

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22023-Multiple | |

SCALE: 1:4 SHEET 1 OF 2







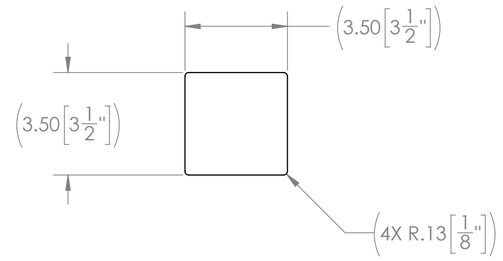
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/30/2021 |
| **MATERIAL/FINISH:** | **PROPRIETARY AND CONFIDENTIAL**<br>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. | | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | | |

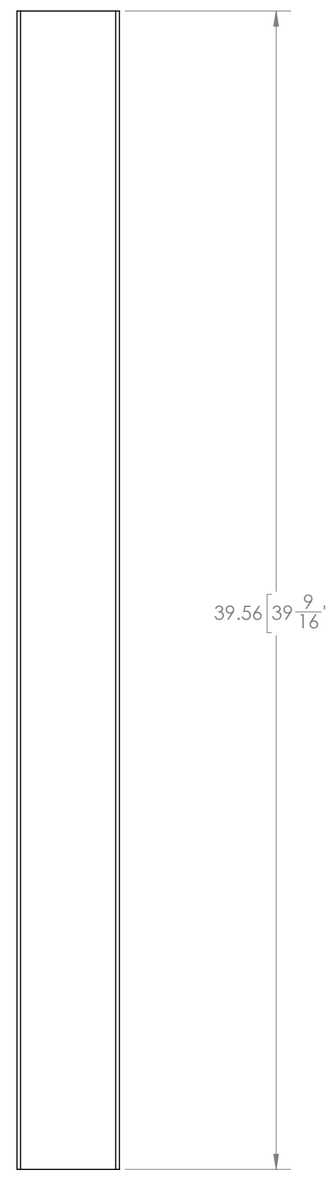
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

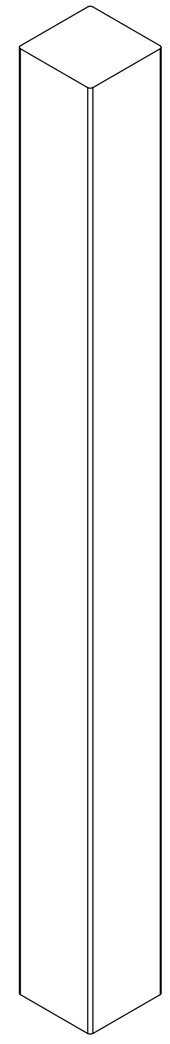
TITLE:

# Hub - Simple Build - Lower Hub Ring Assembly - Multiple

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22023-Multiple | |
| SCALE: 1:4 | SHEET 2 OF 2 | |



| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |

**MATERIAL/FINISH:**

4"x4" Lumber

DO NOT SCALE DRAWING

**PROPRIETARY AND CONFIDENTIAL**



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

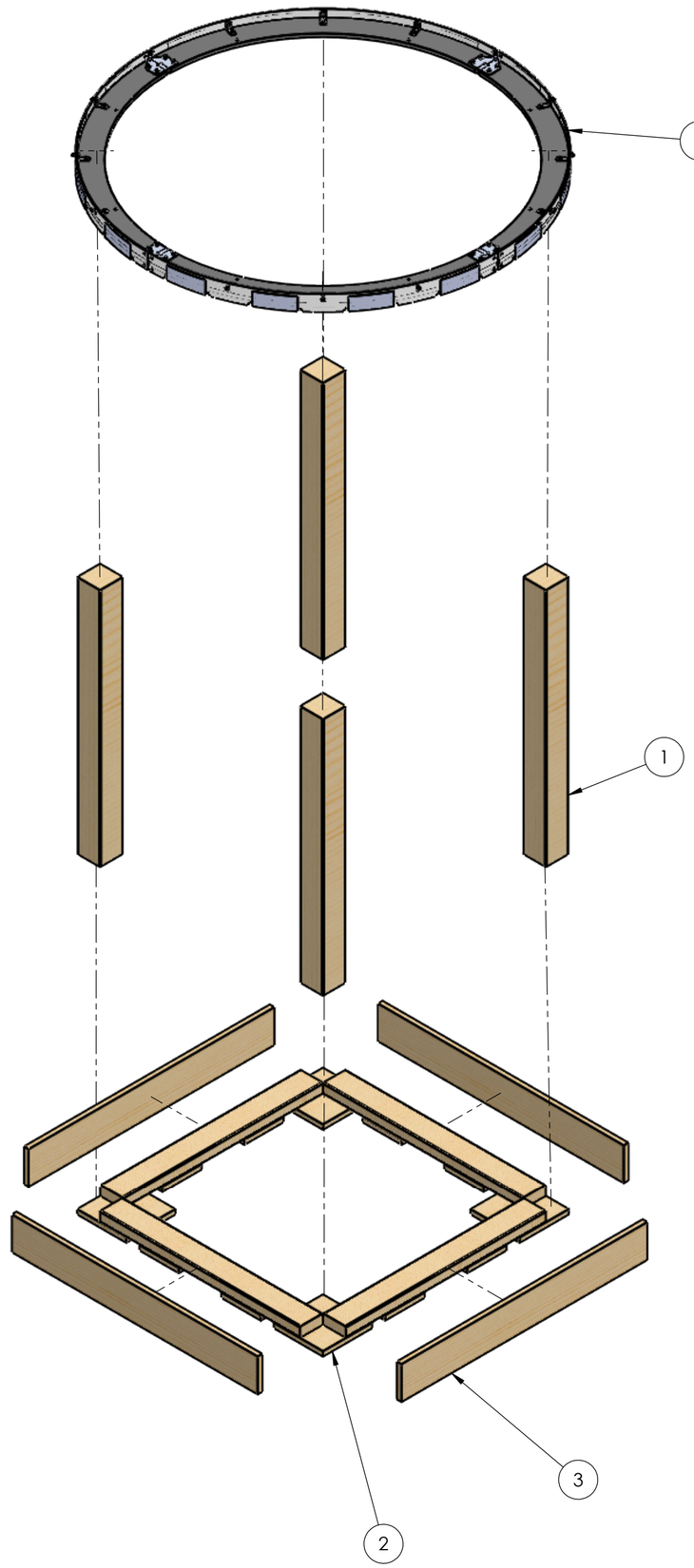
SOLIDWORKS Modeling Solutions Partner

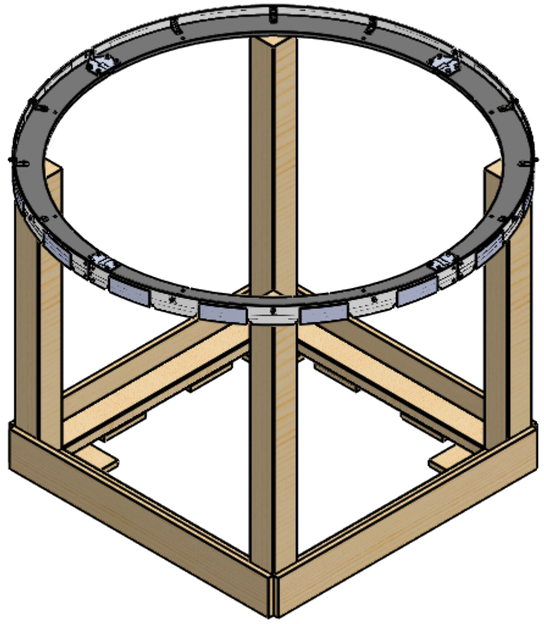
TITLE:

# HUB - Simple Build - Vertical for Lower Hub Ring 4x4

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22025 | |

SCALE: 1:4 SHEET 1 OF 1



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 ±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 | 12/30/2021 |

**PROPRIETARY AND CONFIDENTIAL**



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

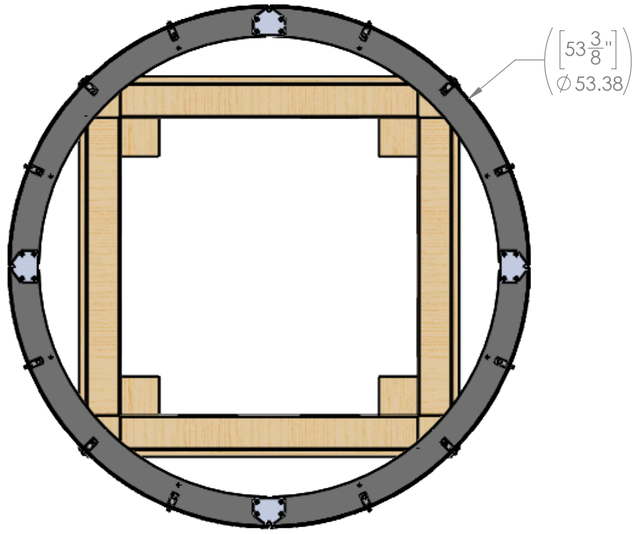
SOLIDWORKS Modeling Solutions Partner

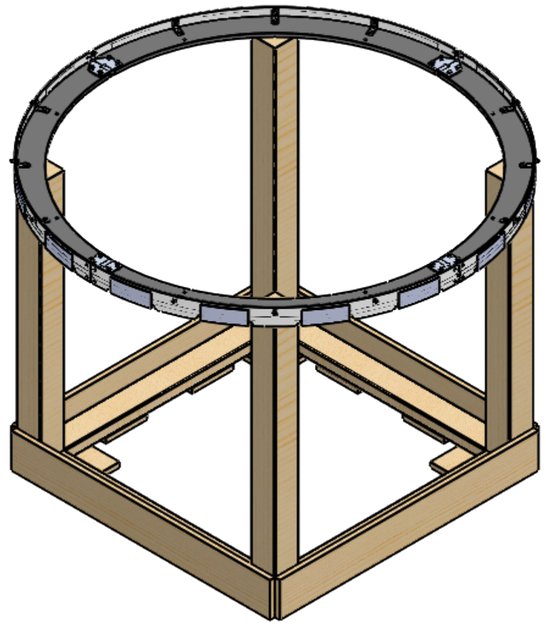
TITLE:

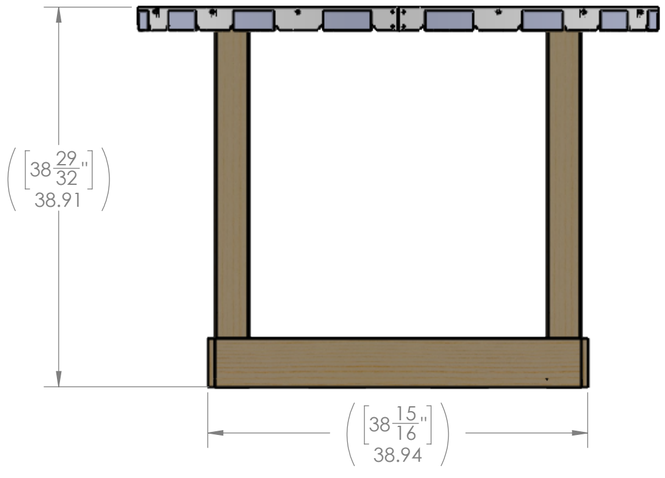
# Hub - Simple Build - Upper Hub Goal Assembly for AM Ring AM-4672

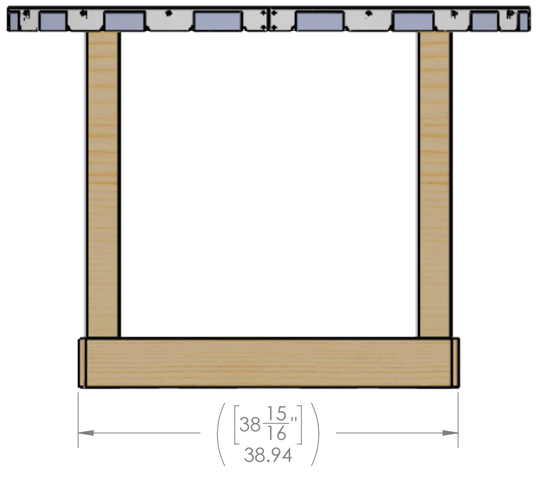
| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22030-AM | |

SCALE: 1:12 SHEET 1 OF 4





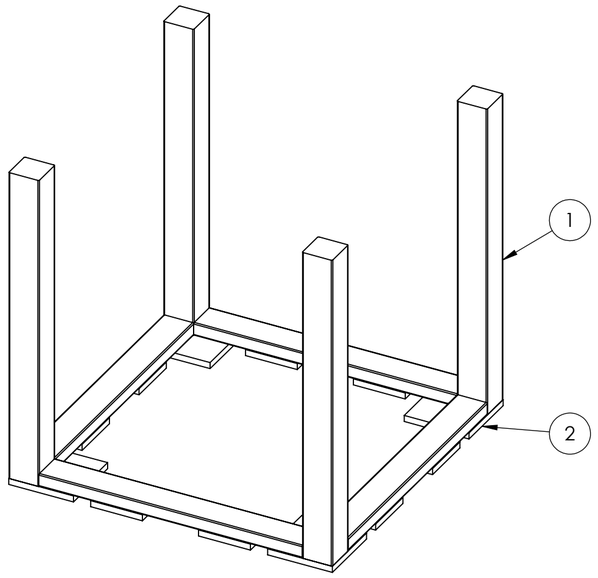

| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/30/2021 |
| **MATERIAL/FINISH:** | **PROPRIETARY AND CONFIDENTIAL**<br>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. | | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | | |

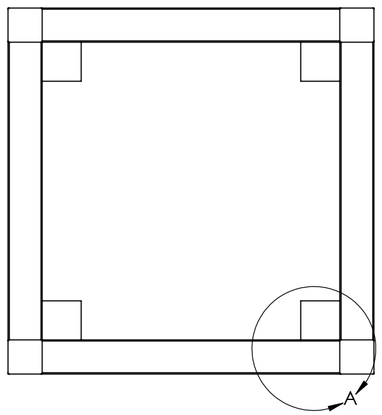
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

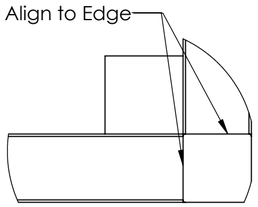
TITLE:
Hub - Simple Build - Upper Hub Goal Assembly for AM Ring AM-4672

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22030-AM | |
| SCALE: 1:12 | SHEET 2 OF 4 | |

Step 1



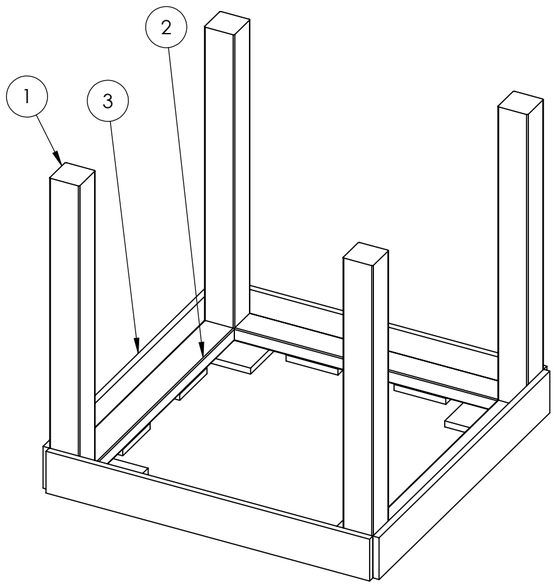



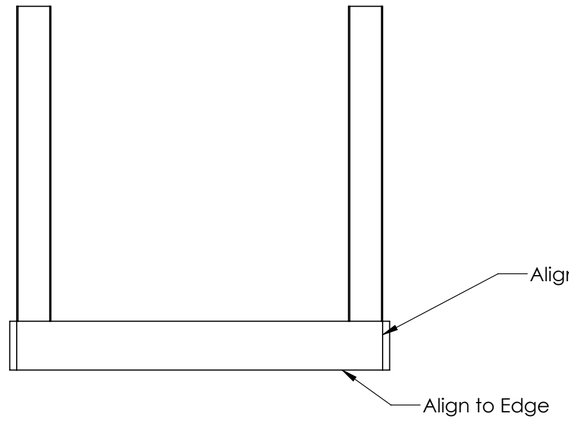




4X
DETAIL A
SCALE 1 : 6

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

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 |
| | DRAWN | KAMC | 12/30/2021 |

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



**COMMENTS:**
REMOVE ALL BURRS AND SHARP EDGES.

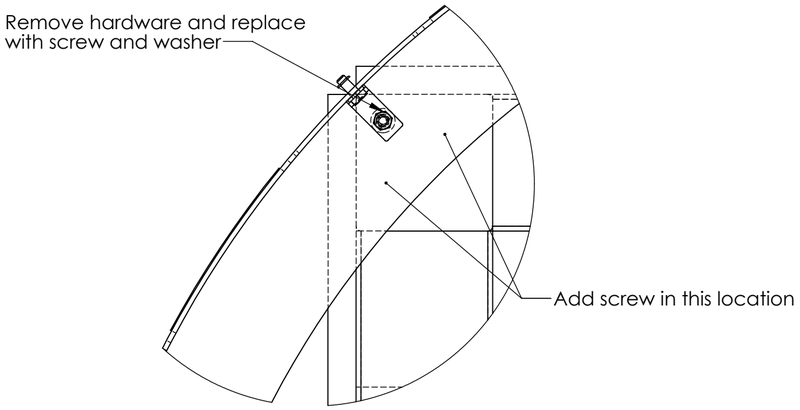
FIRST ROBOTICS COMPETITION
SOLIDWORKS Modeling Solutions Partner

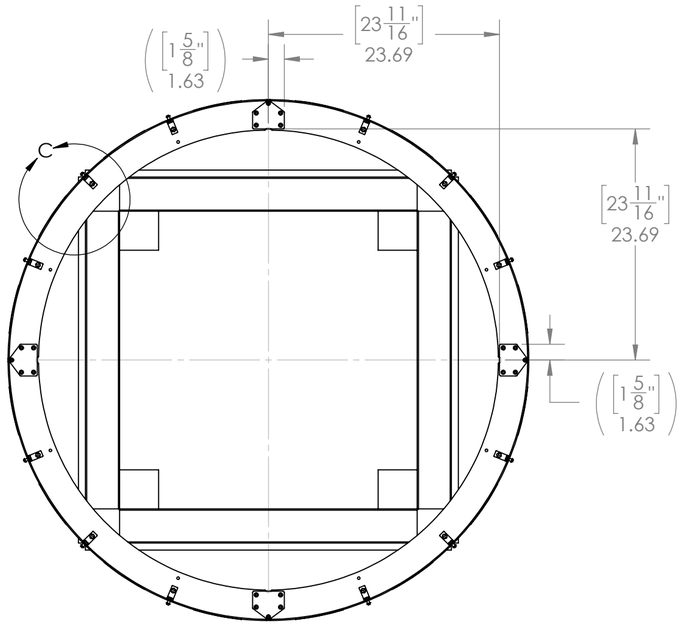
TITLE:
Hub - Simple Build - Upper Hub Goal Assembly for AM Ring AM-4672

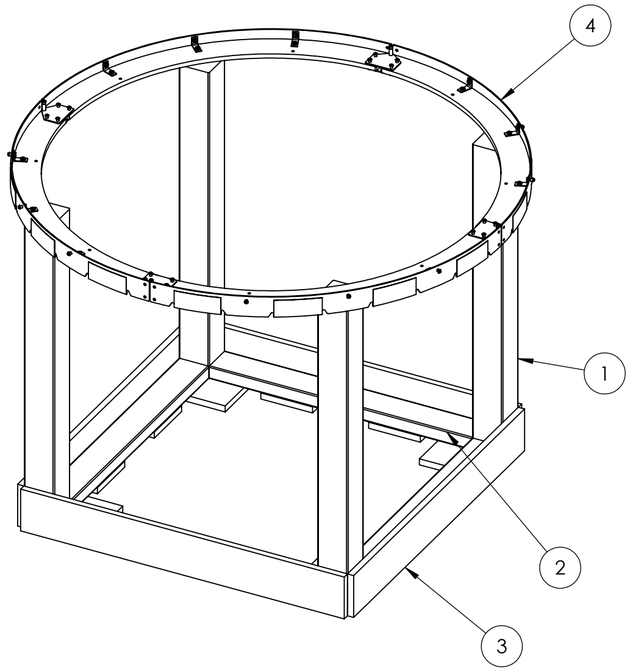
| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22030-AM | |

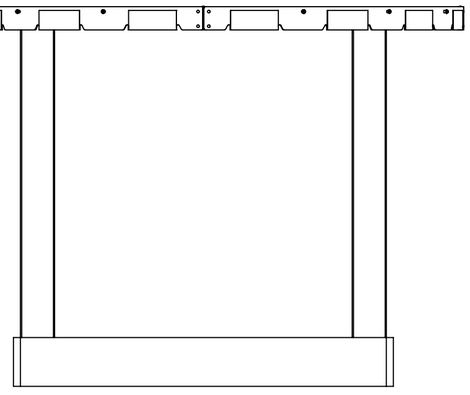
SCALE: 1:12 SHEET 3 OF 4

Step 3



4X
DETAIL C
SCALE 1 : 3
Hidden Lines Shown

1. Remove center bolt stack from (4) as shown in Detail C.
2. Align (4) to Step 2, as shown.

   Note: Warping may be present on (1). If this is the case, evenly split the difference from the dimensions provided to center (4) 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 (4) into each (1). Note: drilling under-sized pilot holes into the HDPE may allow for easier assembly.

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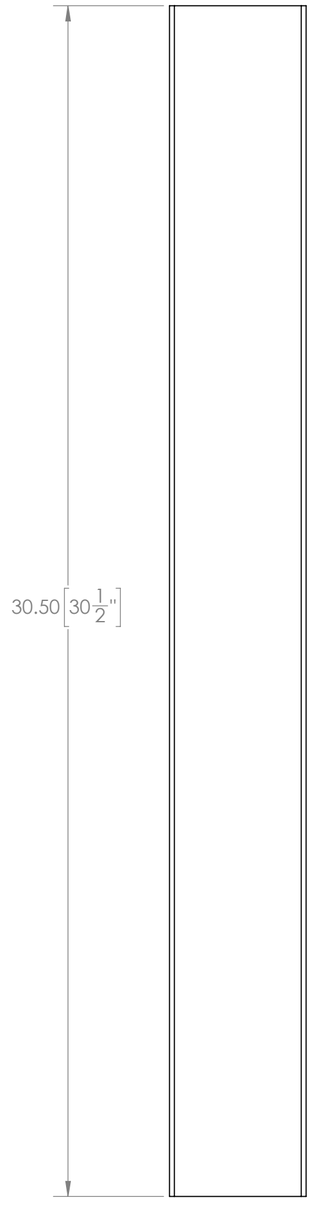
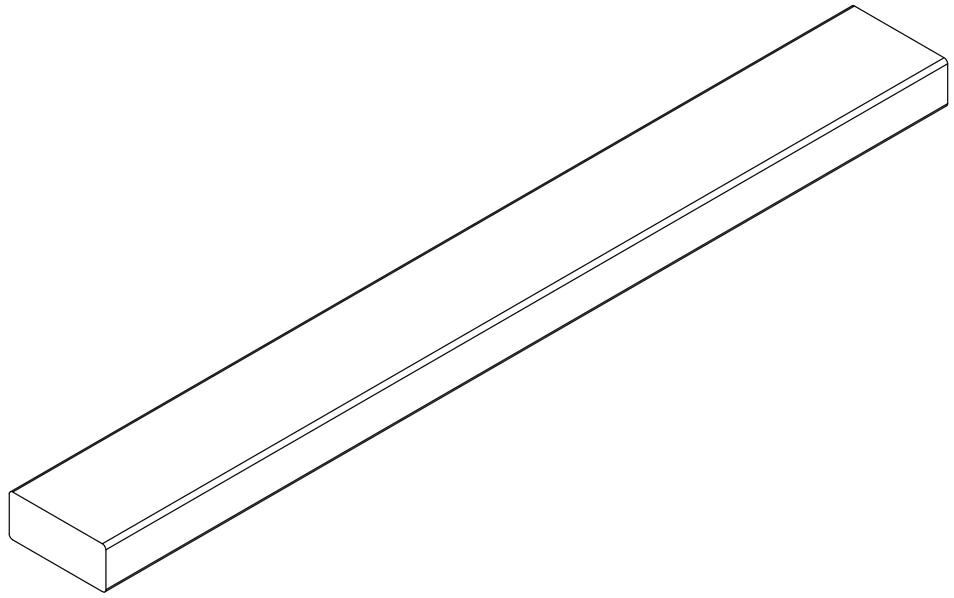
| **MATERIAL/FINISH:** | **PROPRIETARY AND CONFIDENTIAL**<br>THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF ***FIRST®***. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF ***FIRST®*** IS PROHIBITED. | | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL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

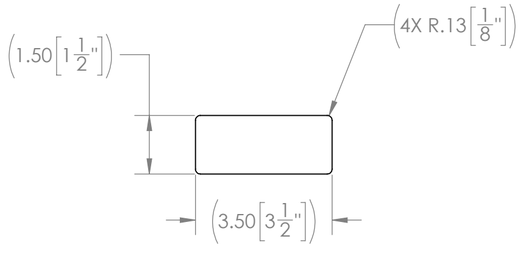
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

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 4 OF 4 | |





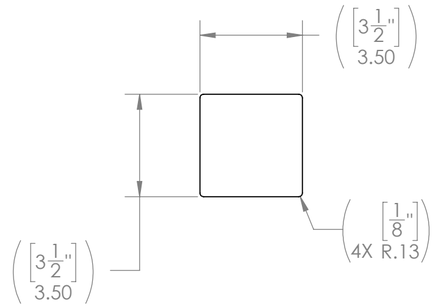

| | | |
|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME / DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC 12/29/2021 |
| **MATERIAL/FINISH:**<br>2"x4" Lumber | **PROPRIETARY AND CONFIDENTIAL**<br>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. | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | |

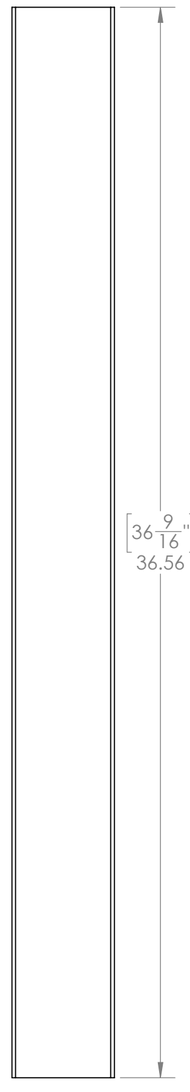
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

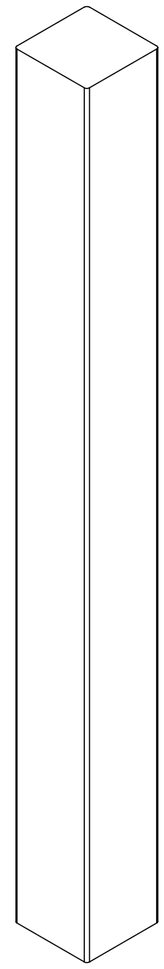
TITLE:

# Hub - Simple Build - Upper Hub Goal 2x4

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22035 | |
| SCALE: 1:3 | 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:**

4"x4" Lumber

DO NOT SCALE DRAWING

| TEAM | NAME | DATE |
|---|---|---|
| DRAWN | KAMC | 12/29/2021 |



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

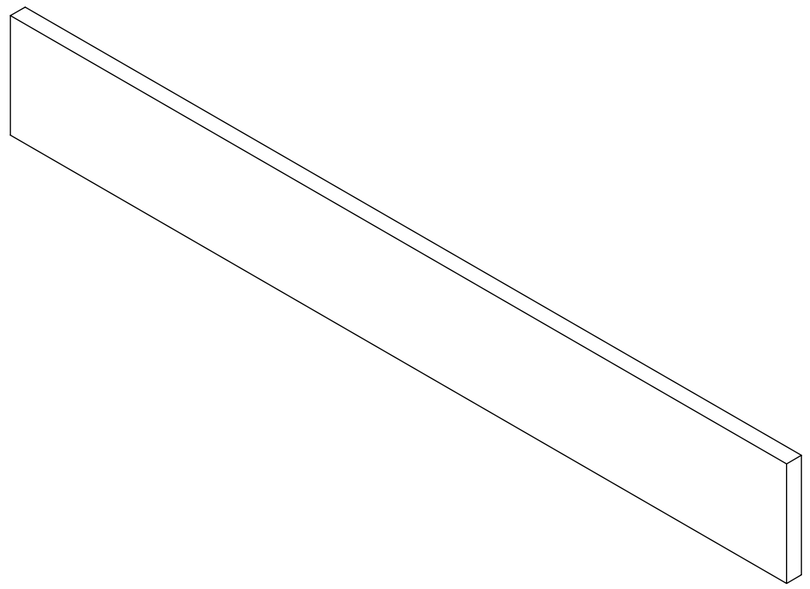
SOLIDWORKS Modeling Solutions Partner

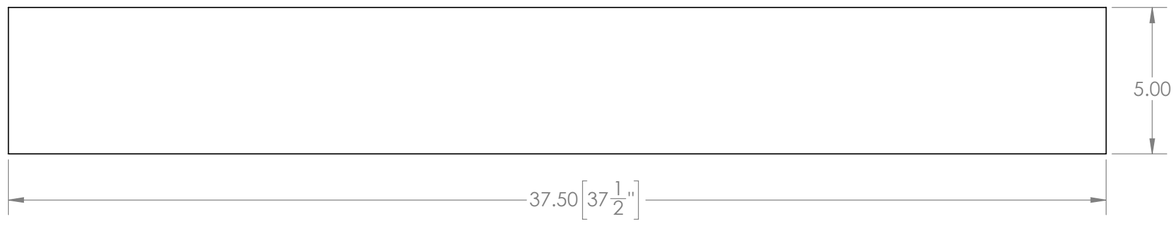
TITLE:

# Hub - Simple Build - Upper Hub Goal 4x4 for AM Ring AM-4672

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22036-AM | |

SCALE: 1:4 SHEET 1 OF 1




| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |

**MATERIAL/FINISH:**

3/4" Plywood

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

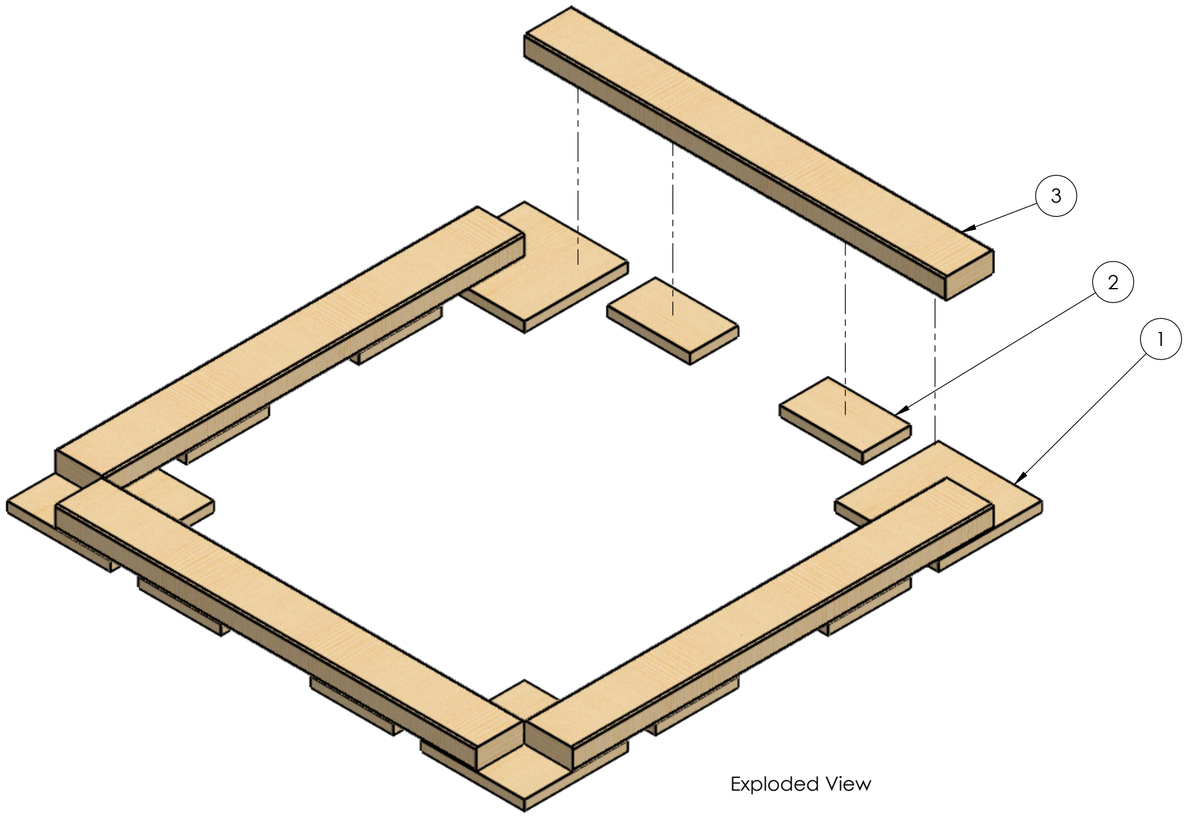
SOLIDWORKS Modeling Solutions Partner

TITLE:

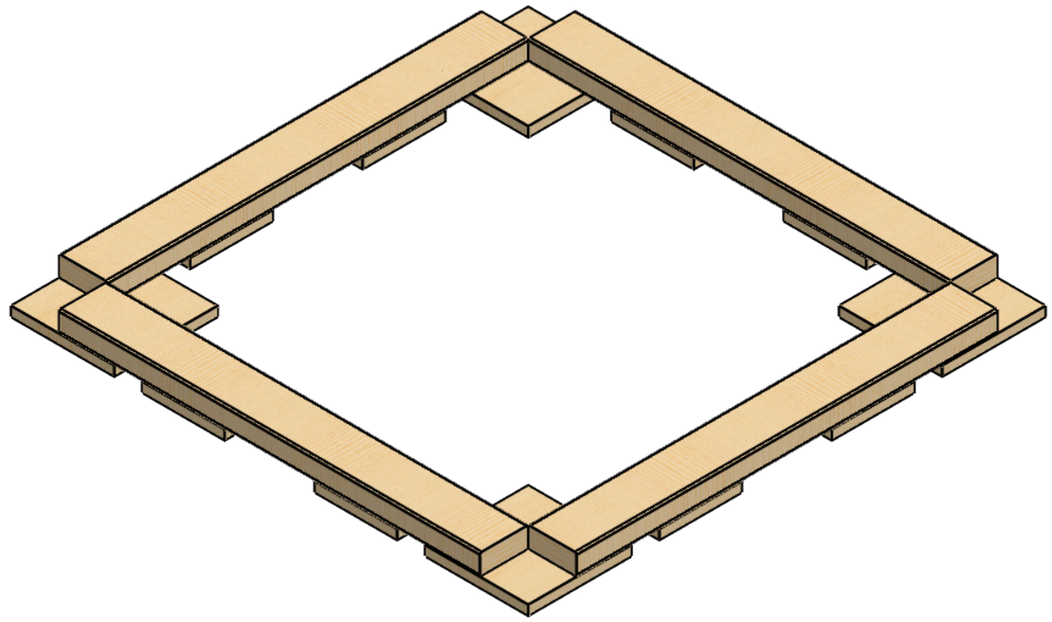
# Hub - Simple Build - Upper Hub Goal Rectangle Connection Plate

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

SCALE: 1:4 | SHEET 1 OF 1




Exploded View



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:

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 | 12/30/2021 |



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

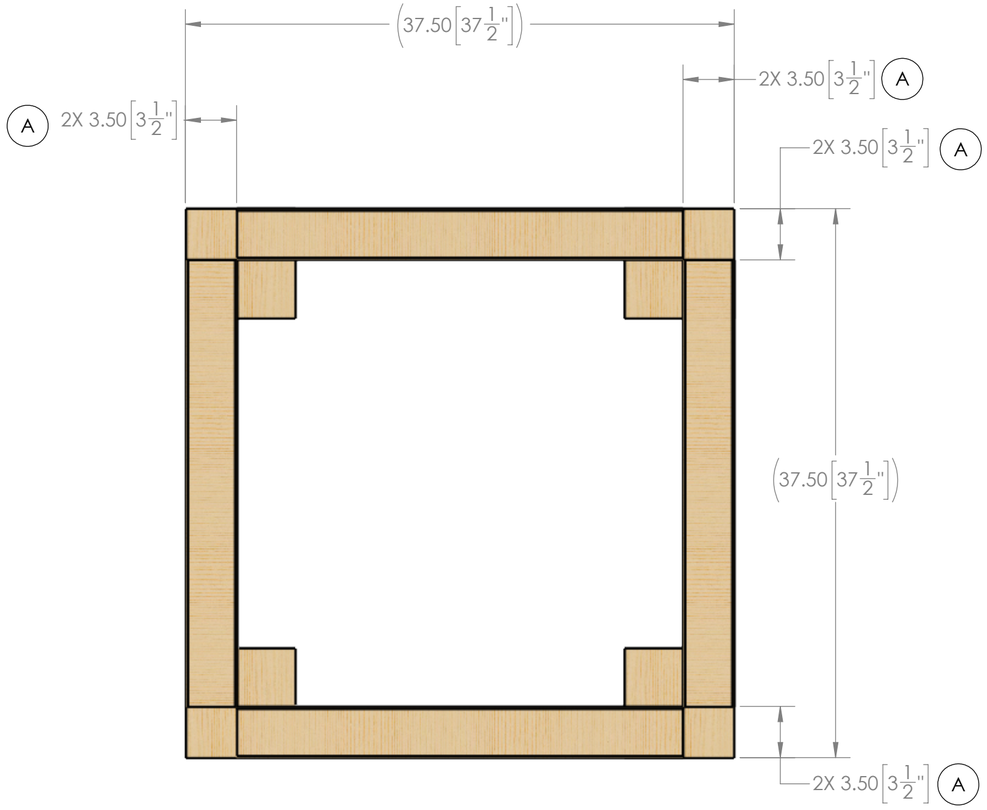
SOLIDWORKS Modeling Solutions Partner

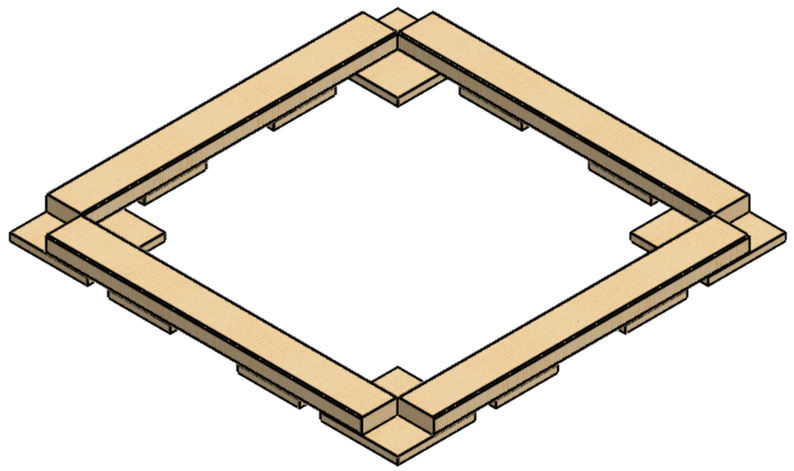
TITLE:

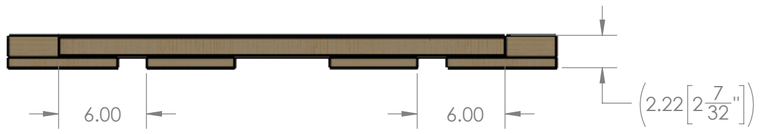
# Hub - Simple Build - Upper Hub Goal Bottom Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22038 | |

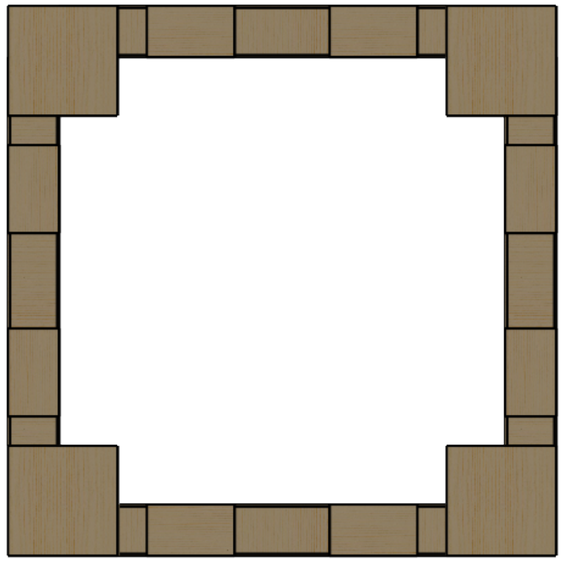
SCALE: 1:6 SHEET 1 OF 3









Note:

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.

| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
| | DRAWN | KAMC | 12/30/2021 |

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



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

SOLIDWORKS Modeling Solutions Partner

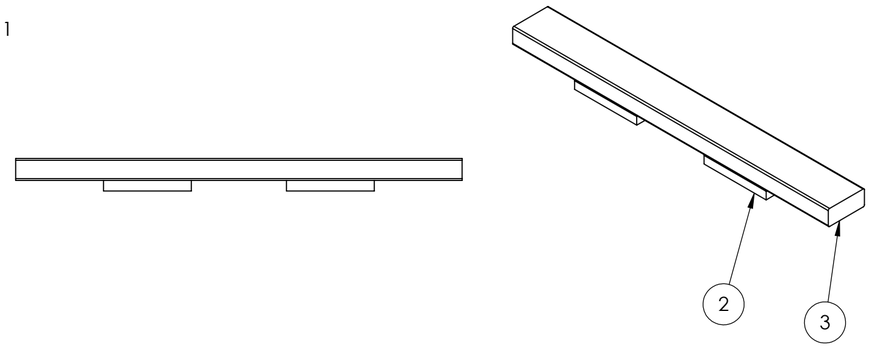
TITLE:

# Hub - Simple Build - Upper Hub Goal Bottom Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22038 | |

SCALE: 1:8 SHEET 2 OF 3

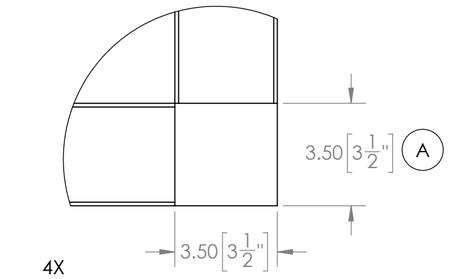
Step 1



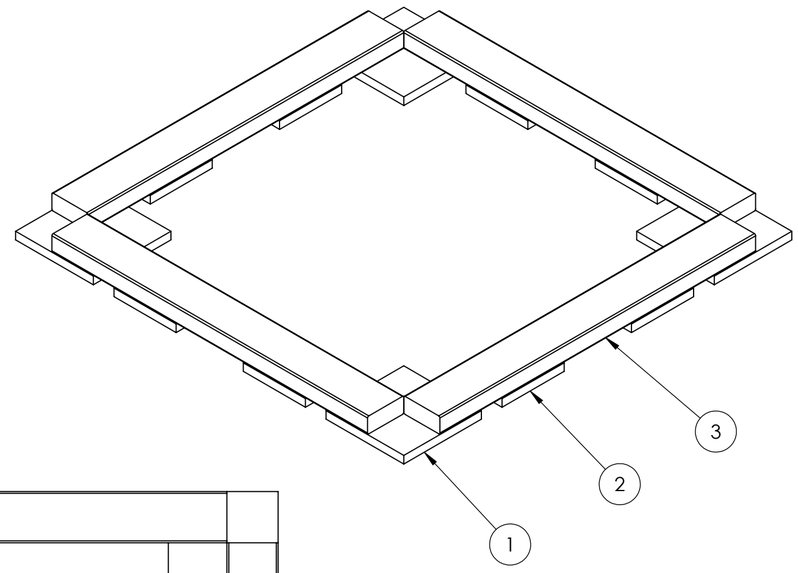

2X
DETAIL A
SCALE 1 : 4

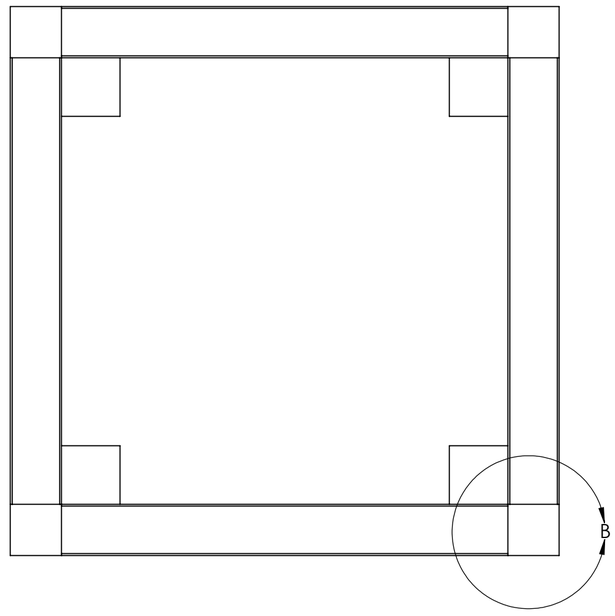
1. Align 2x (2) on (3), as shown.
2. Connect using 2" long screws. It is recommended to use 2x screws per (2) and locate them as shown above. Keep center of (2) clear of screws.
3. Repeat until you have a total of 4x sub-assemblies.

Step 2




4X
DETAIL B
SCALE 1 : 4




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.

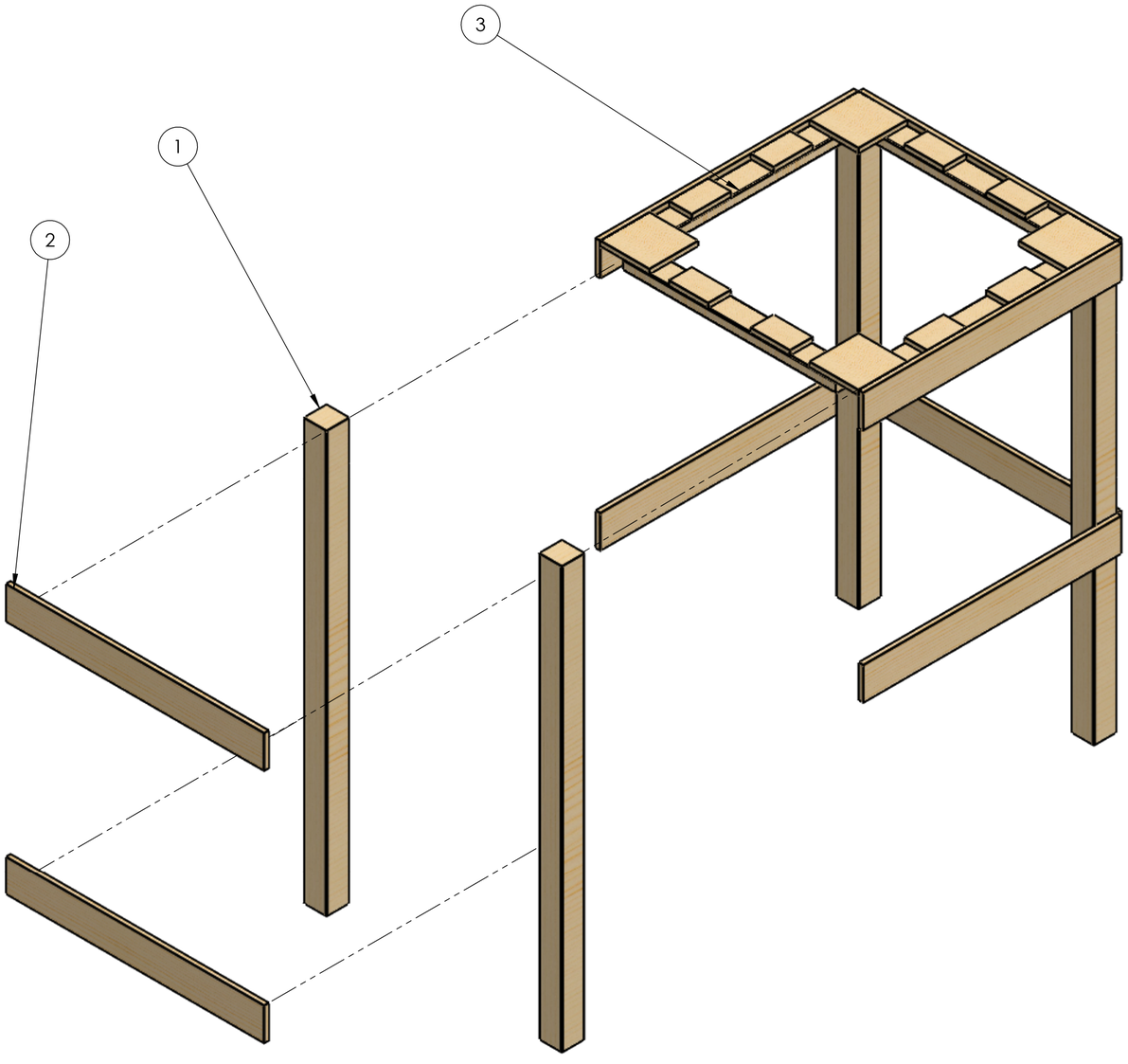
| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
| | DRAWN | KAMC | 12/30/2021 |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | **PROPRIETARY AND CONFIDENTIAL**<br>THE 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:**<br>REMOVE ALL BURRS AND SHARP EDGES. | | |
| DO NOT SCALE DRAWING | | | |

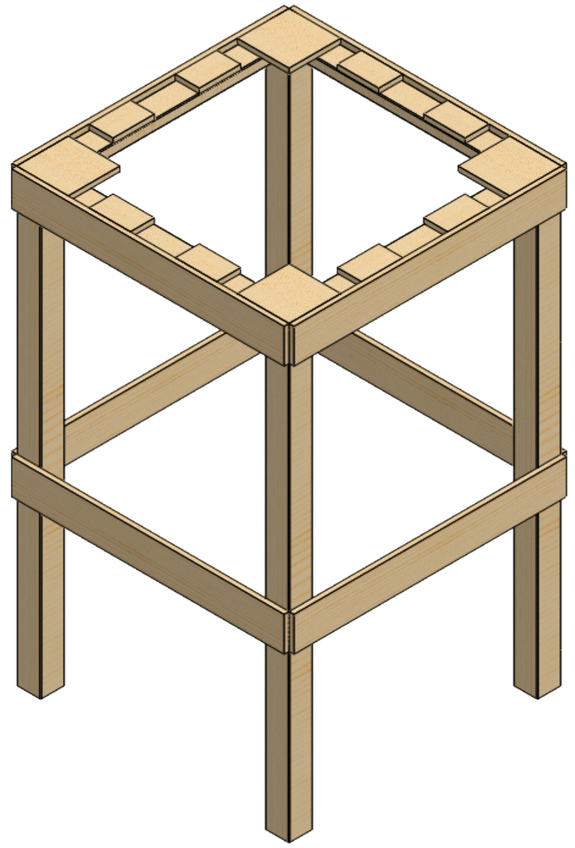
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

TITLE:

# Hub - Simple Build - Upper Hub Goal Bottom Assembly

| SIZE | DWG. NO. | 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 Connetion Plate | 8 |
| 3 | TE-22044 | Hub - Simple Build - Upper Hub Base Top Assembly | 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 | 12/30/2021 |

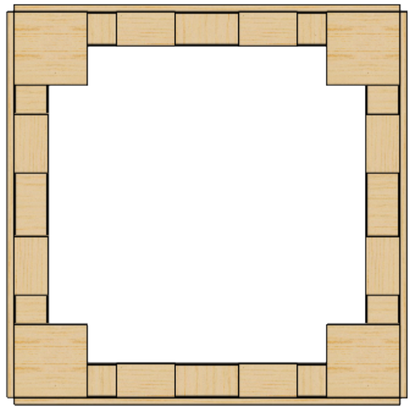


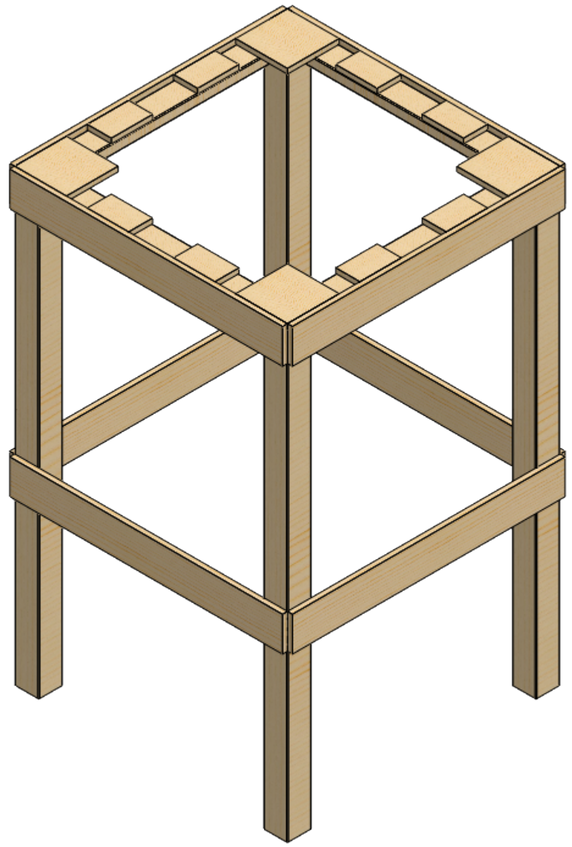
**COMMENTS:**
REMOVE ALL BURRS AND SHARP EDGES.

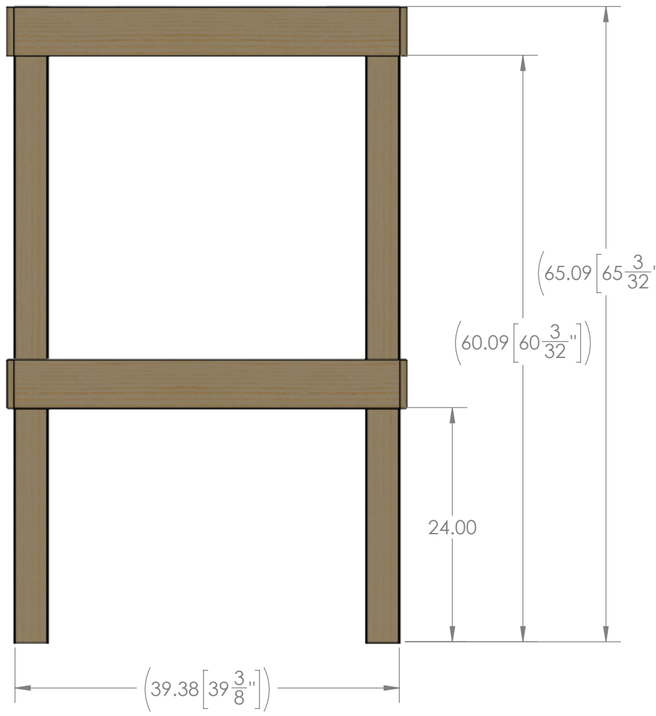
FIRST ROBOTICS COMPETITION
SOLIDWORKS Modeling Solutions Partner

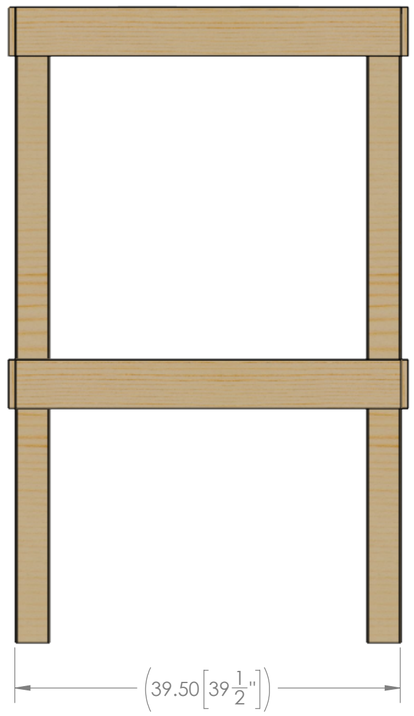
TITLE:
# Hub - Simple Build - Upper Hub Base Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22040 | |
| SCALE: 1:12 | SHEET 1 OF 4 | |








| | | |
|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME / DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC 12/30/2021 |
| **MATERIAL/FINISH:** | **PROPRIETARY AND CONFIDENTIAL**<br>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. | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | |

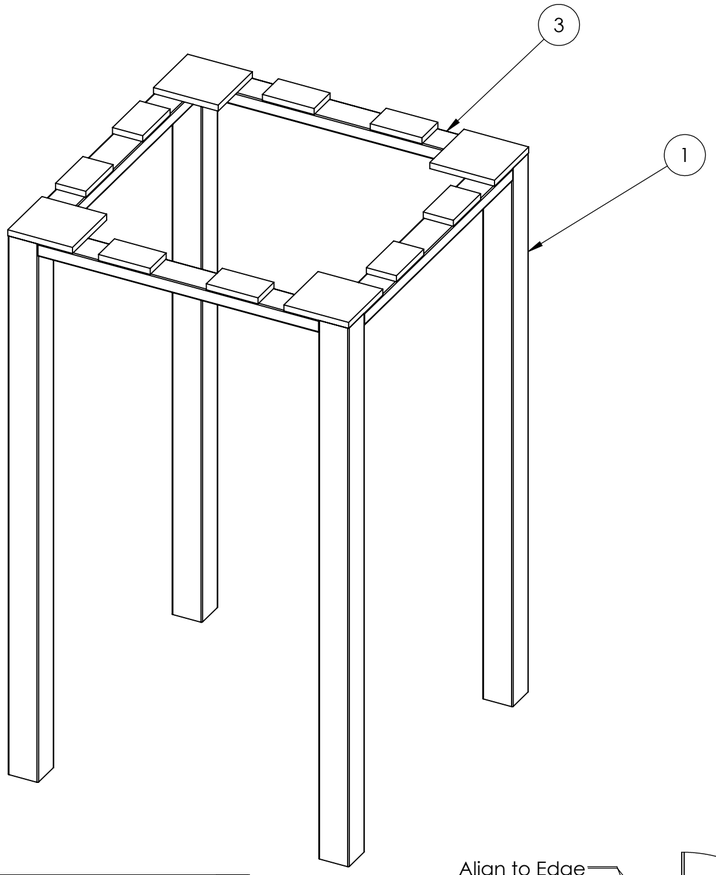
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

TITLE:

# Hub - Simple Build - Upper Hub Base Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22040 | |
| SCALE: 1:12 | SHEET 2 OF 4 | |

Step 1





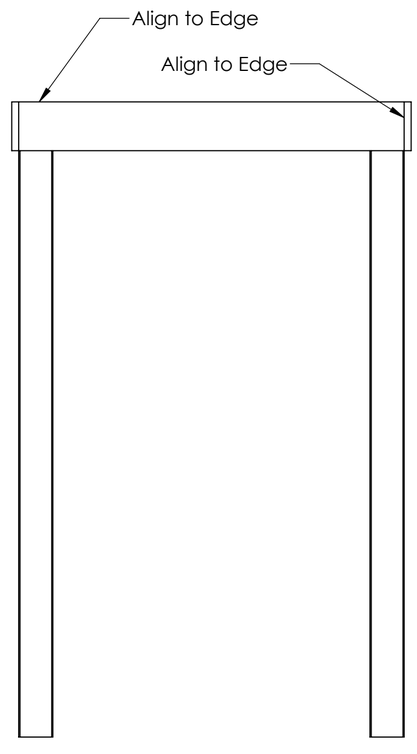


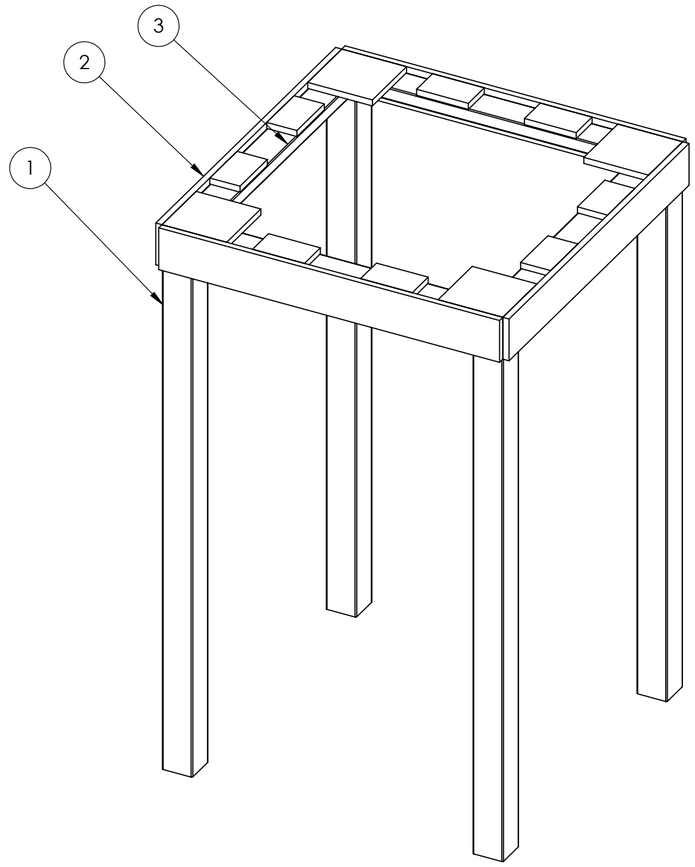



4X
DETAIL A
SCALE 1 : 6

1. Align 4x (1) to (3), as shown.
2. Connect using 2" Long Screws. It is recommended to use 4x screws per (1).

Step 2




1. Align 4x (2) to Step 1 , as shown.
2. Attach (2) to (1) using 2" Long Screws. It is recommended to use 8x screws per (2), 4x into each (1).
3. Attach (2) to the 2"x4" Lumber of (3) using 1.25" long screws. It is recommended to use 3x screws per (2). Be careful to center the screw into the 2"x4" Lumber to avoid splitting the wood.

| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
| | DRAWN | KAMC | 12/30/2021 |

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



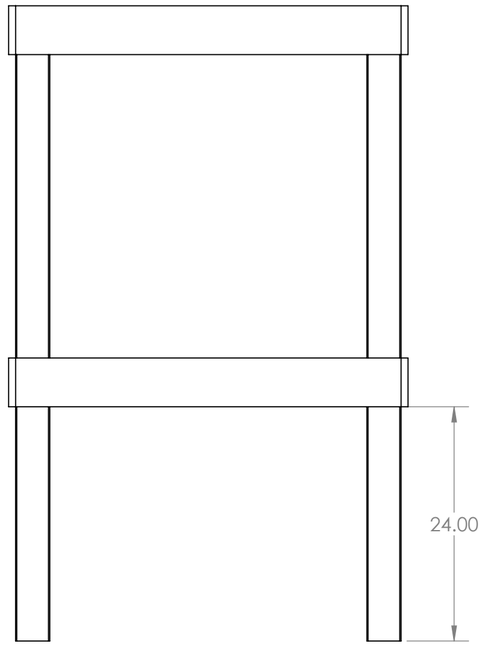
**COMMENTS:**
REMOVE ALL BURRS AND SHARP EDGES.

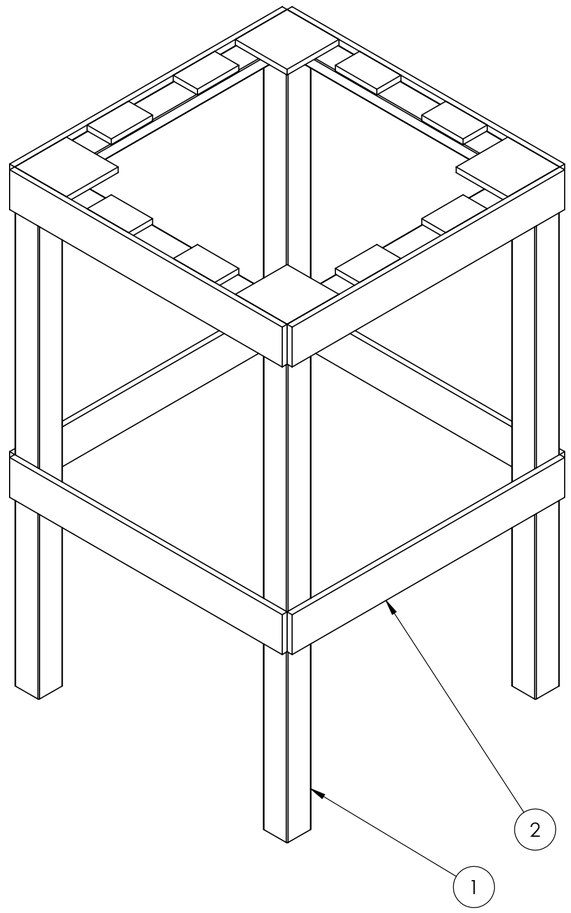
FIRST ROBOTICS COMPETITION
SOLIDWORKS Modeling Solutions Partner

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

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22040 | |
| SCALE: 1:12 | SHEET 3 OF 4 | |

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 |

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



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

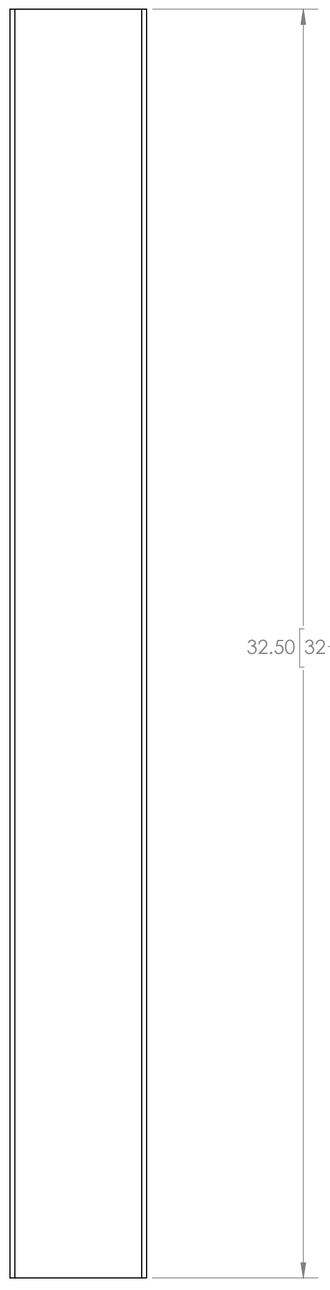
FIRST ROBOTICS COMPETITION

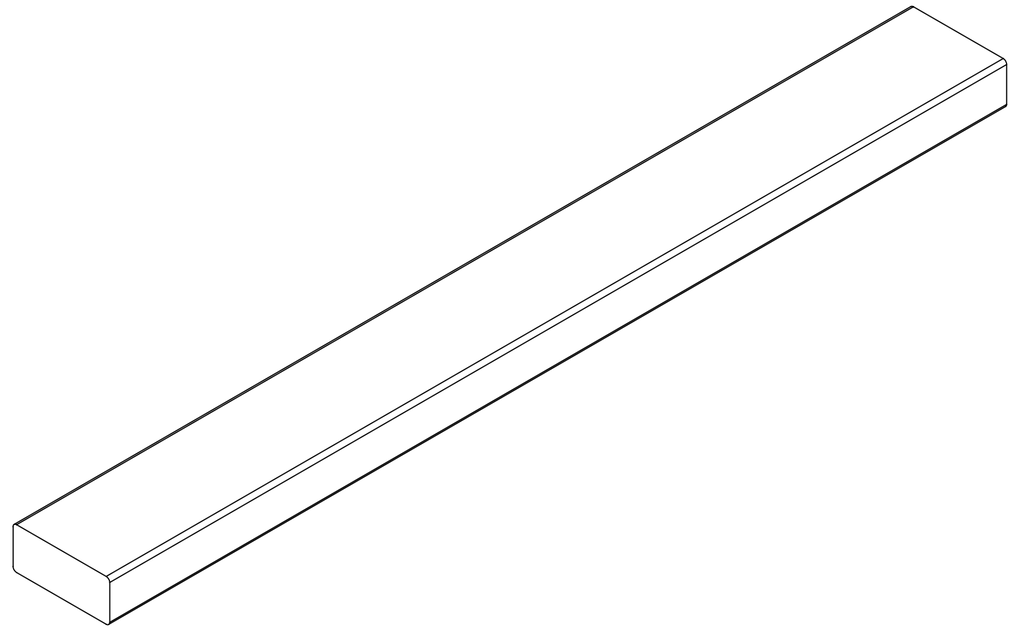
SOLIDWORKS Modeling Solutions Partner

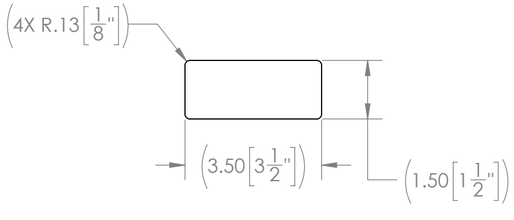
TITLE:

# Hub - Simple Build - Upper Hub Base Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22040 | |
| SCALE: 1:12 | SHEET 4 OF 4 | |





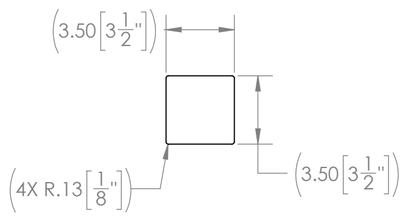

| | | |
|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME / DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC 12/29/2021 |
| **MATERIAL/FINISH:**<br>2"x4" Lumber | **PROPRIETARY AND CONFIDENTIAL**<br>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. | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | |

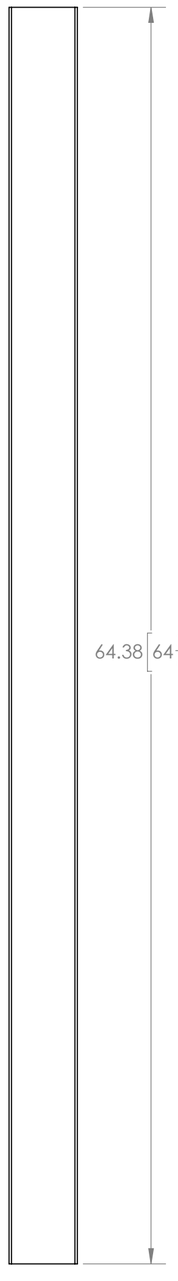
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

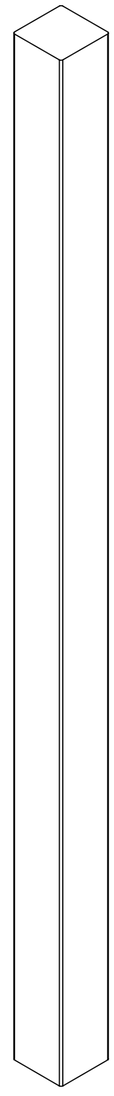
TITLE:

# Hub - Simple Build - Upper Hub Base 2x4

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22041 | |
| SCALE: 1:3 | SHEET 1 OF 1 | |



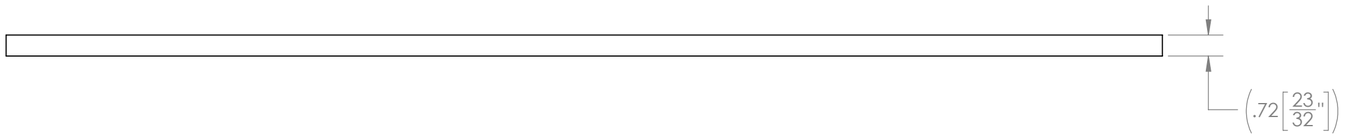



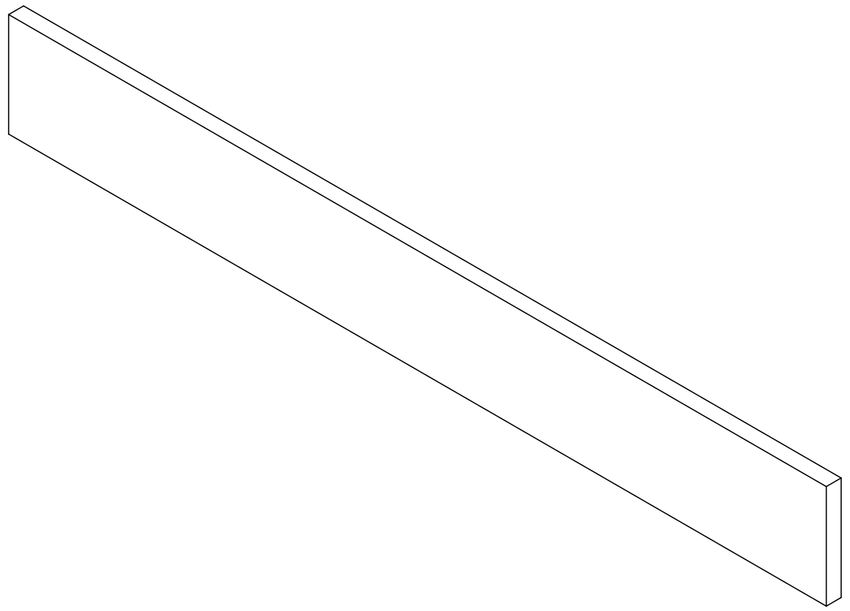
| | | |
|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME / DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC 12/29/2021 |
| **MATERIAL/FINISH:**<br>4"x4" Lumber | **PROPRIETARY AND CONFIDENTIAL**<br>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. | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | |

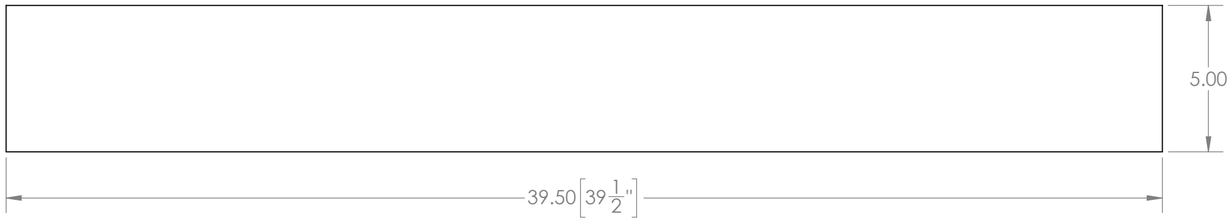
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

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

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22042 | |
| SCALE: 1:6 | SHEET 1 OF 1 | |






| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | | 12/29/2021 |

**MATERIAL/FINISH:**

3/4" Plywood

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

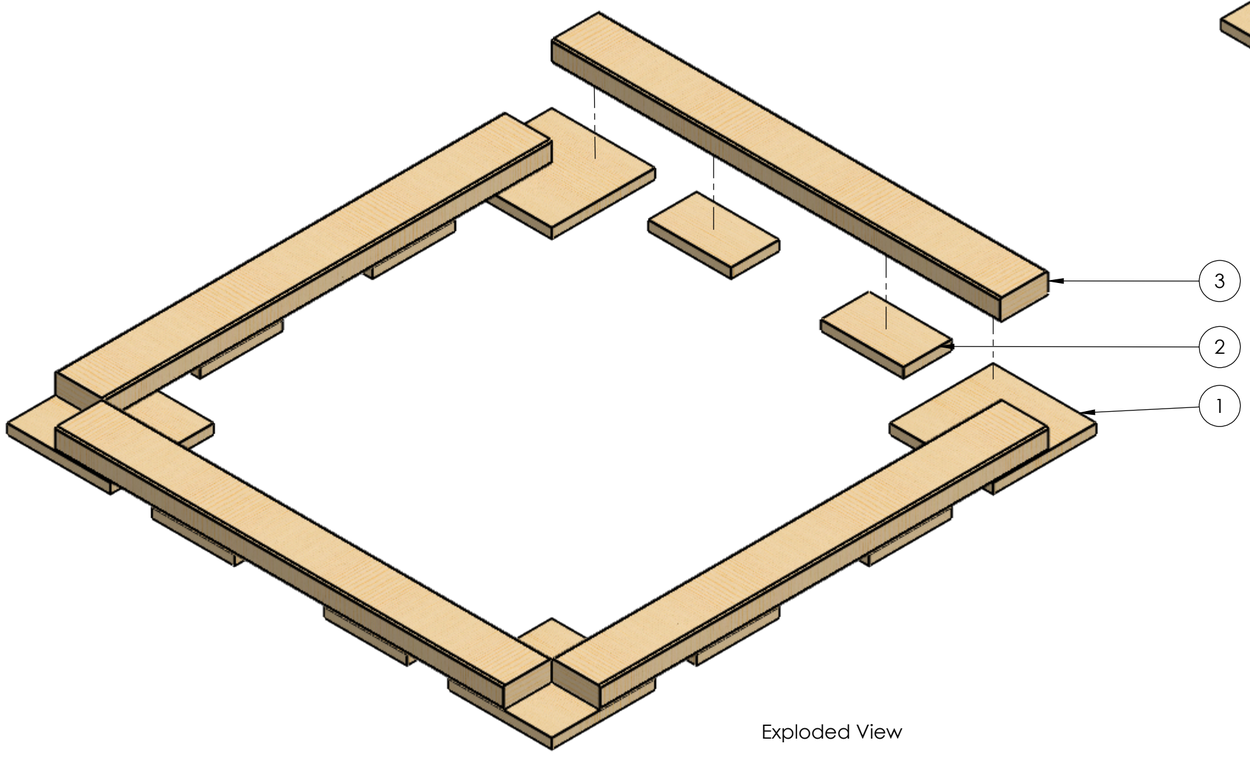
SOLIDWORKS Modeling Solutions Partner

TITLE:

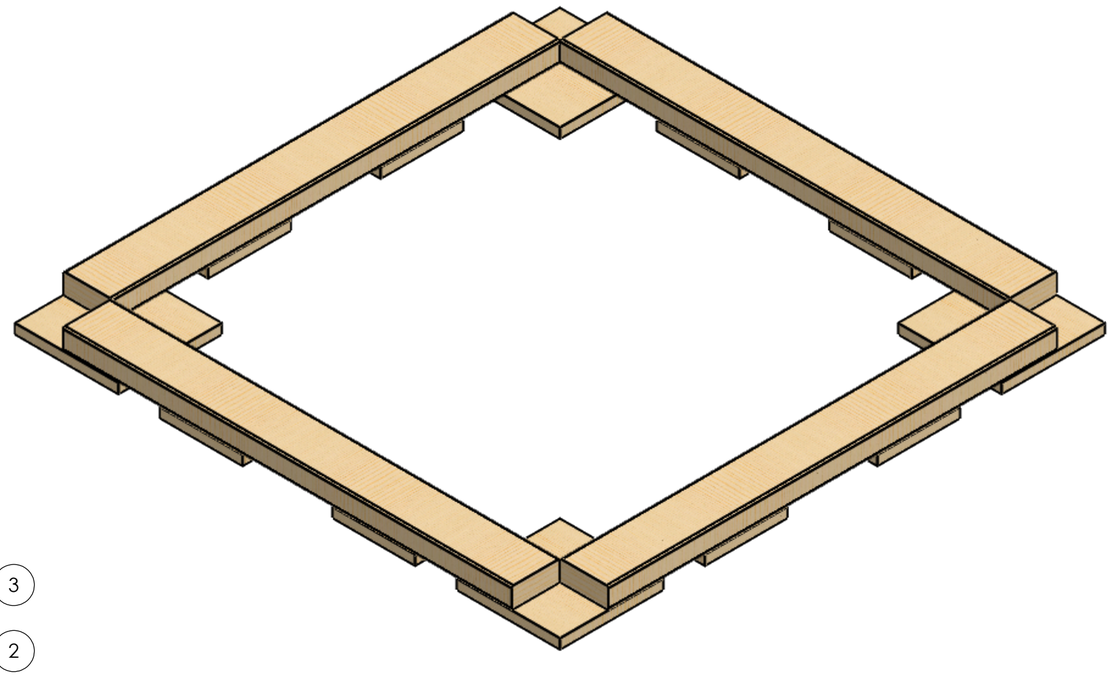
# Hub - Simple Build - Upper Hub Base Rectangle Connetion Plate

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22043 | |

SCALE: 1:4 SHEET 1 OF 1




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:

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 | 12/30/2021 | |



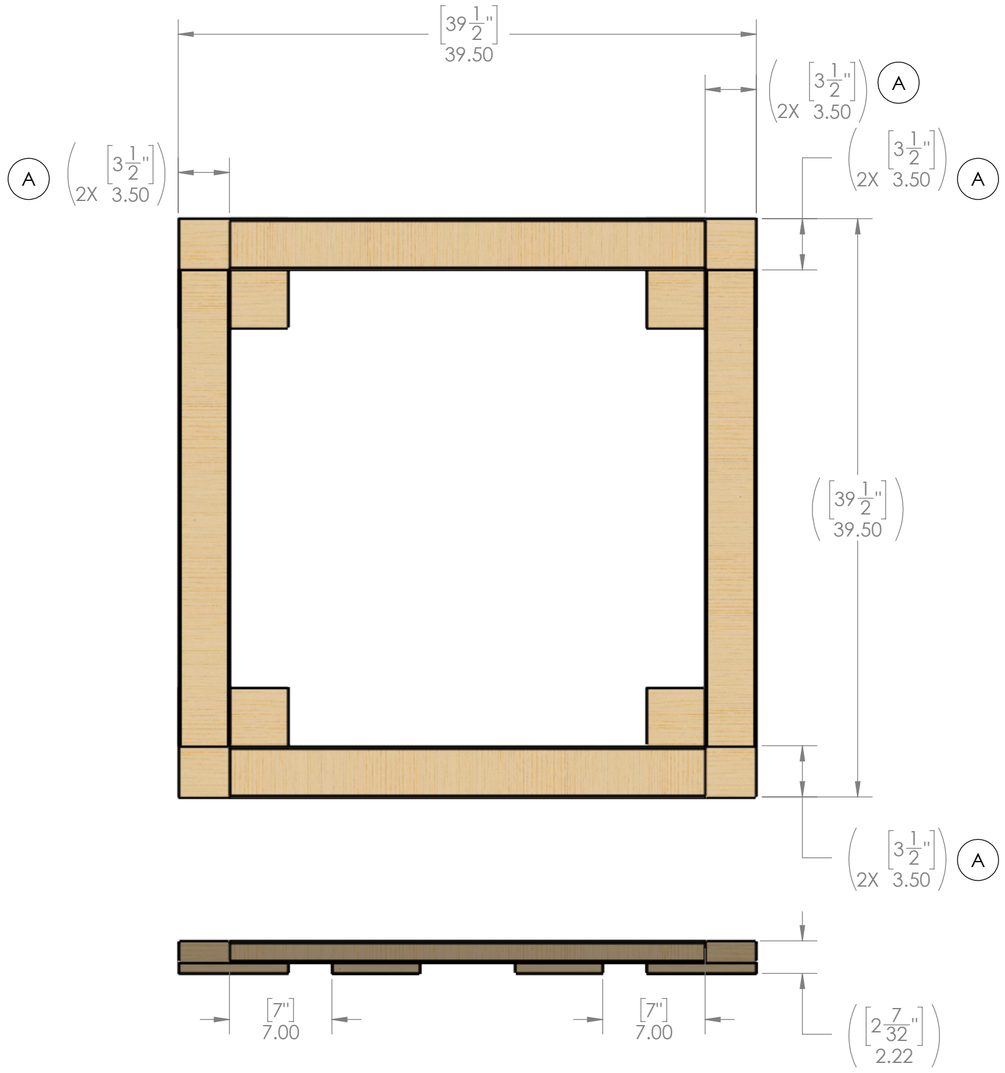
**COMMENTS:**
REMOVE ALL BURRS AND SHARP EDGES.

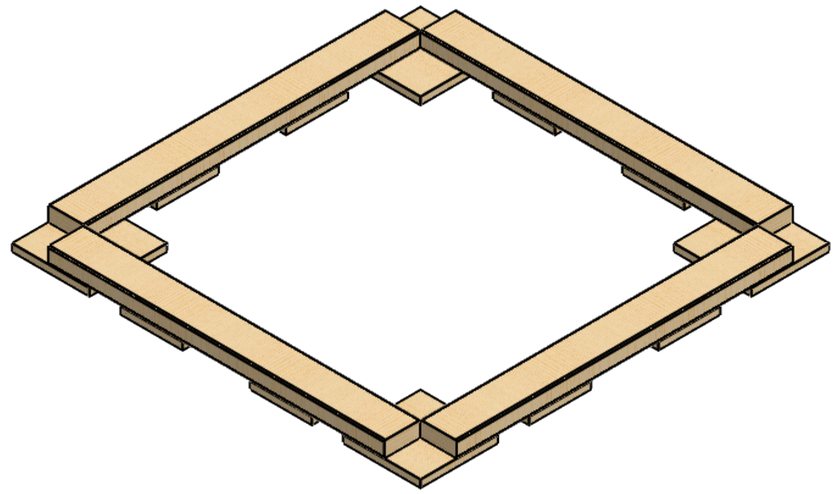
FIRST ROBOTICS COMPETITION
SOLIDWORKS Modeling Solutions Partner

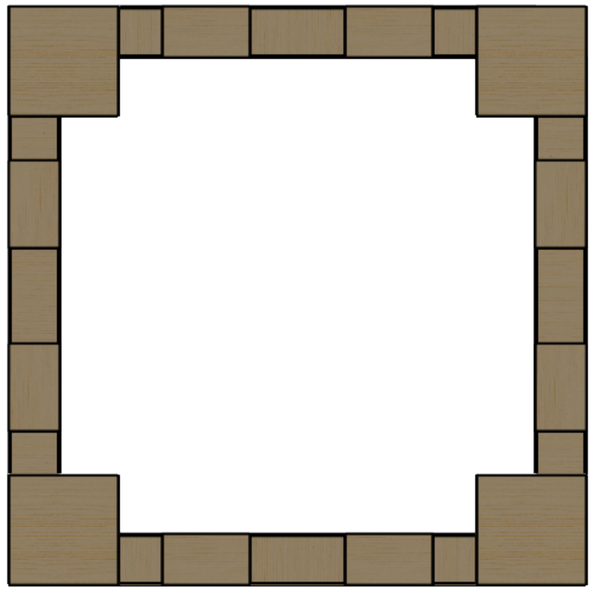
TITLE:
# Hub - Simple Build - Upper Hub Base Top Assembly

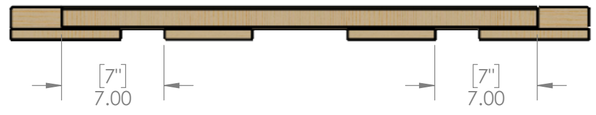
| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22044 | |

SCALE: 1:6 SHEET 1 OF 3








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 |

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



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

SOLIDWORKS Modeling Solutions Partner

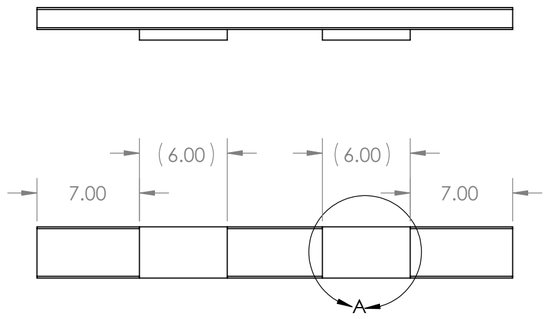
TITLE:

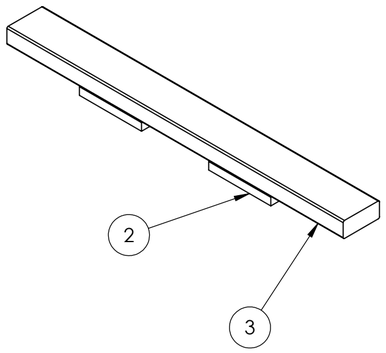
# Hub - Simple Build - Upper Hub Base Top Assembly

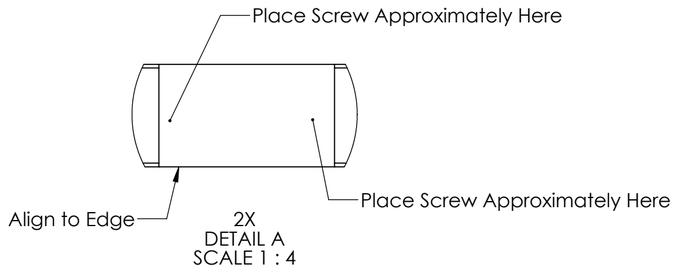
| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22044 | |

SCALE: 1:8 SHEET 2 OF 3

Step 1

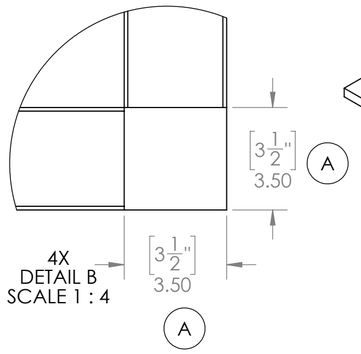


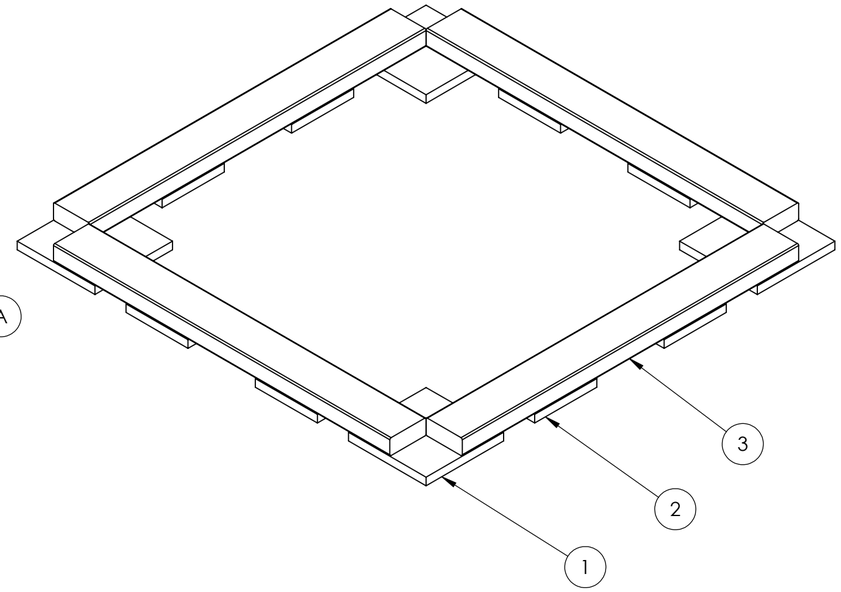



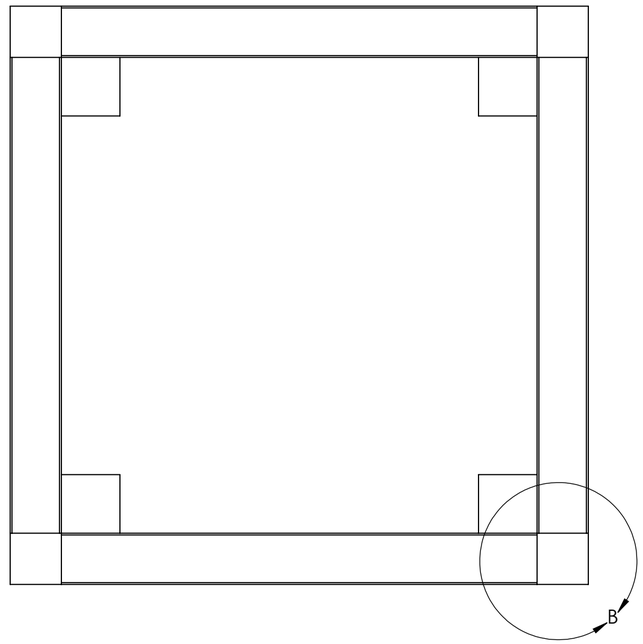




1. Align 2x (2) on (3), as shown.
2. Connect using 2" long screws. It is recommended to use x2 screws per (2) and locate them as shown above. Keep center of (2) clear of screws.
3. Repeat until you have a total of 4 assemblies.

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 |

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



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

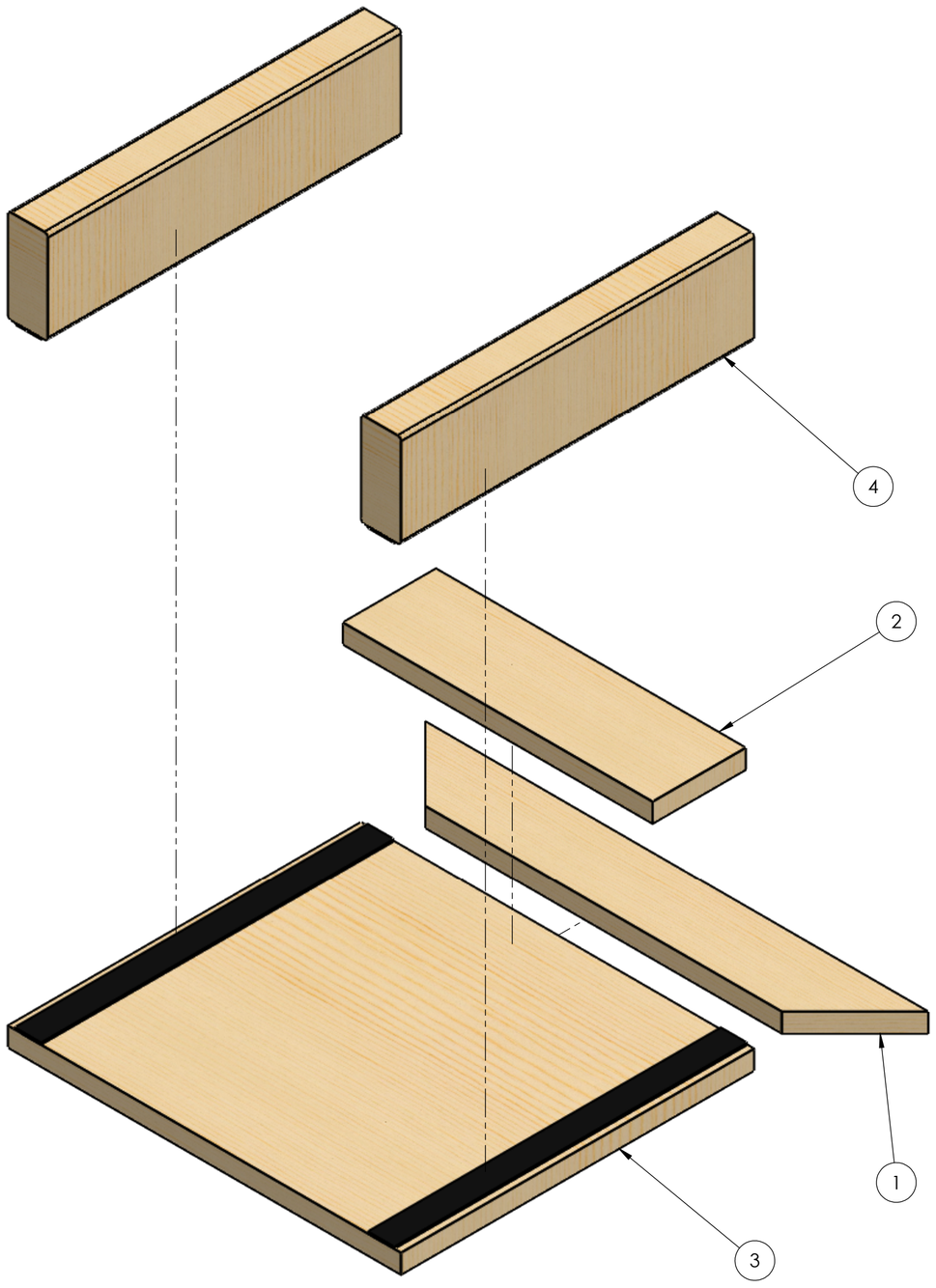
FIRST ROBOTICS COMPETITION

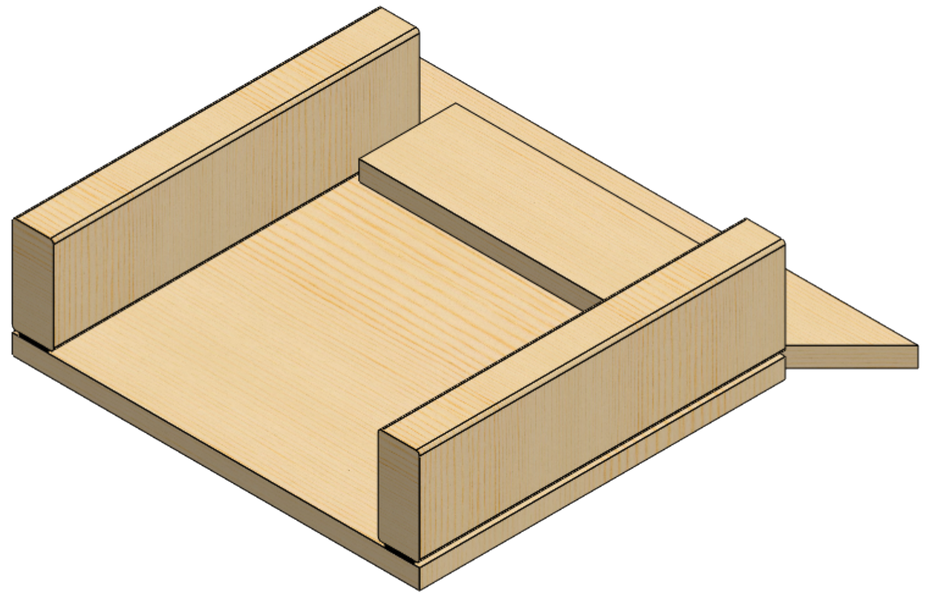
SOLIDWORKS Modeling Solutions Partner

TITLE:

# Hub - Simple Build - Upper Hub Base Top Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22044 | |
| SCALE: 1:8 | SHEET 3 OF 3 | |



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

| ITEM NO. | PART NUMBER | DESCRIPTION | |
|---|---|---|---|
| 1 | TE-22052 | HUB - Simple Build - Lower Exit Base Back | 1 |
| 2 | TE-22053 | HUB - Simple Build - Lower Exit Base Connection | 1 |
| 3 | TE-22055 | HUB - Simple Build - Lower Exit Base Front with Loop Assembly | 1 |
| 4 | TE-22056 | HUB - Simple Build - Lower Exit 2x4 with Hook Assembly | 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 |
|---|---|---|
| DRAWN | KAMC | 12/30/2021 |



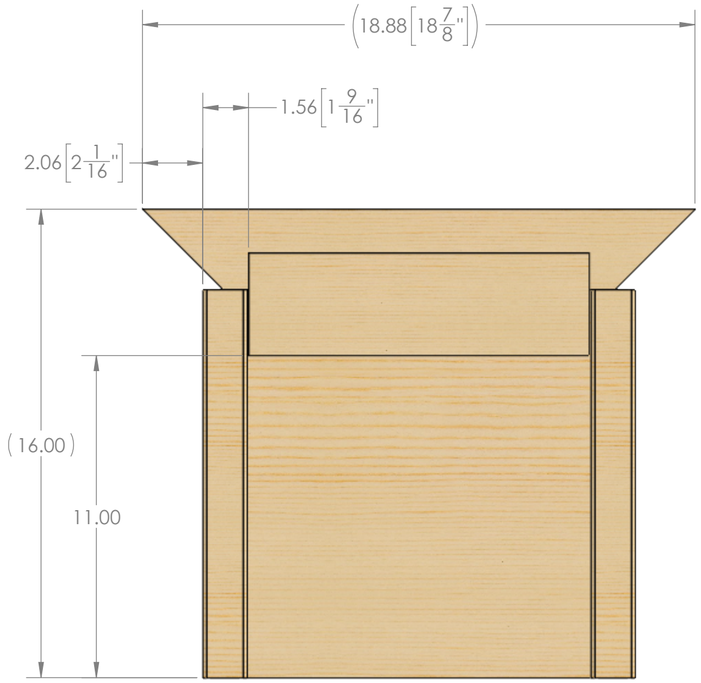
**COMMENTS:**
REMOVE ALL BURRS AND SHARP EDGES.

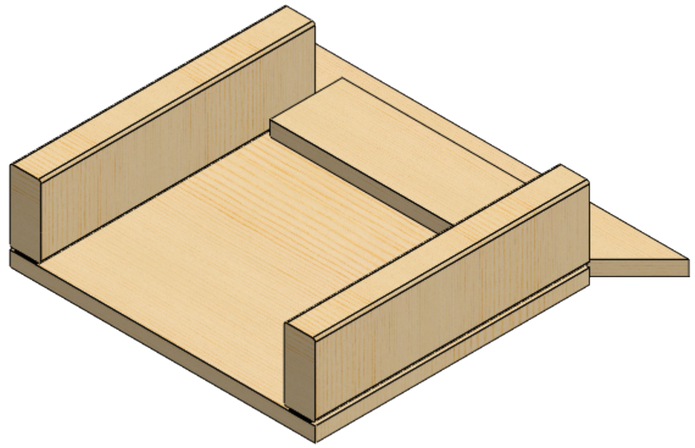
FIRST ROBOTICS COMPETITION
SOLIDWORKS Modeling Solutions Partner

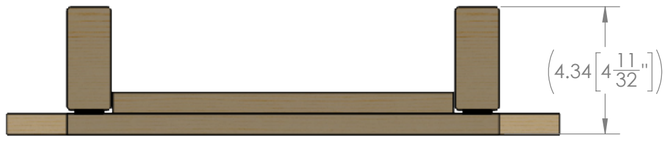
TITLE:
# Hub - Simple Build - Lower Exit Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22050 | |

SCALE: 1:3 SHEET 1 OF 3






| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/30/2021 |

**MATERIAL/FINISH:**

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

SOLIDWORKS Modeling Solutions Partner

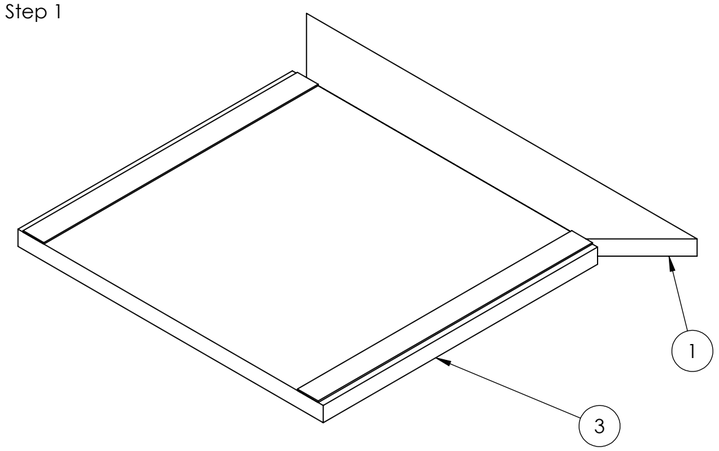
TITLE:

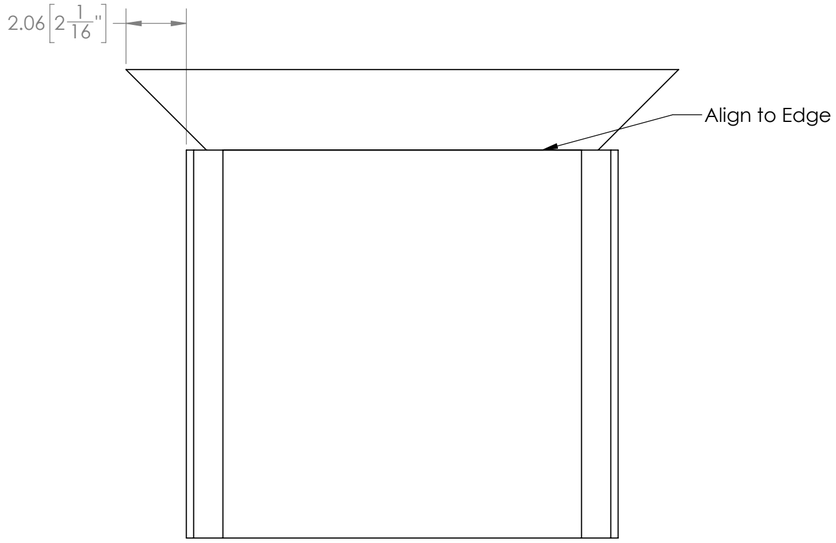
# Hub - Simple Build - Lower Exit Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22050 | |

SCALE: 1:4 SHEET 2 OF 3

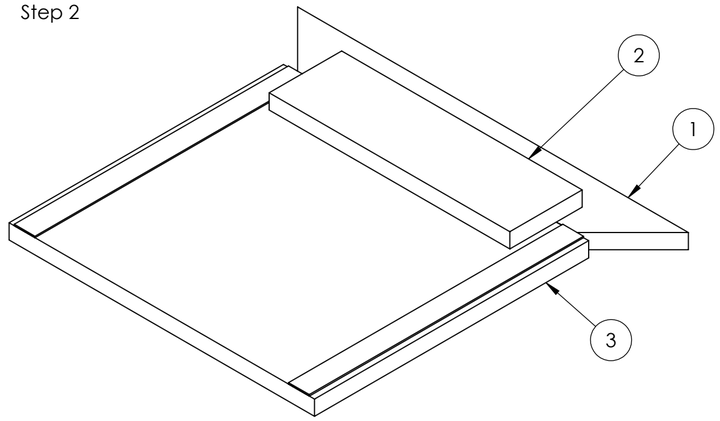
Step 1

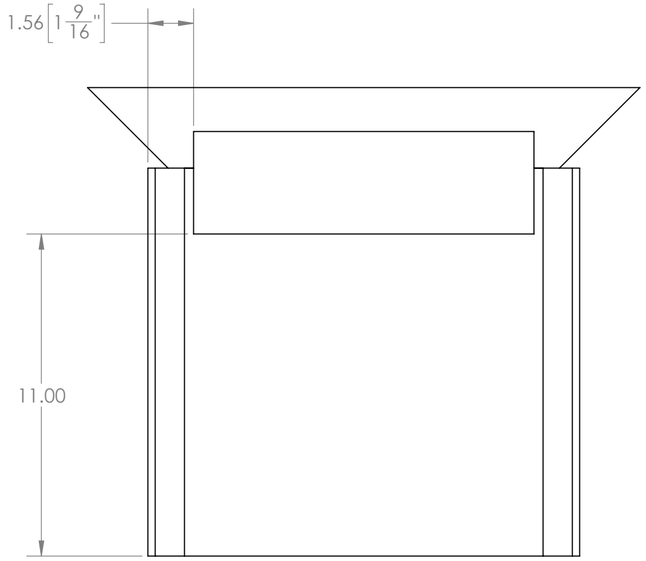



1. Align (3) to (1) , as shown. Connection will happen in the next step.

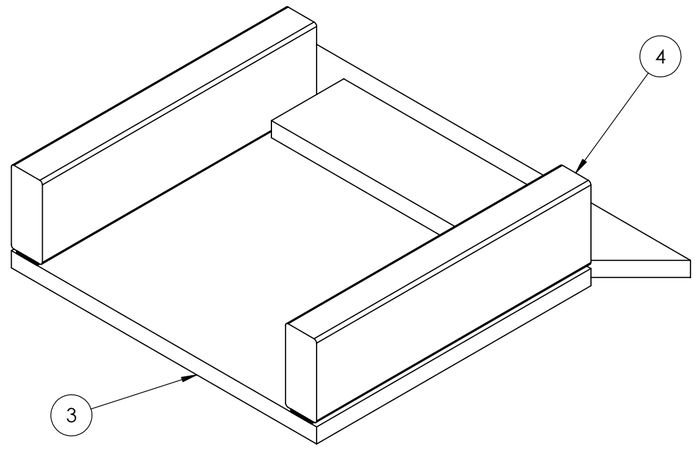
Step 2



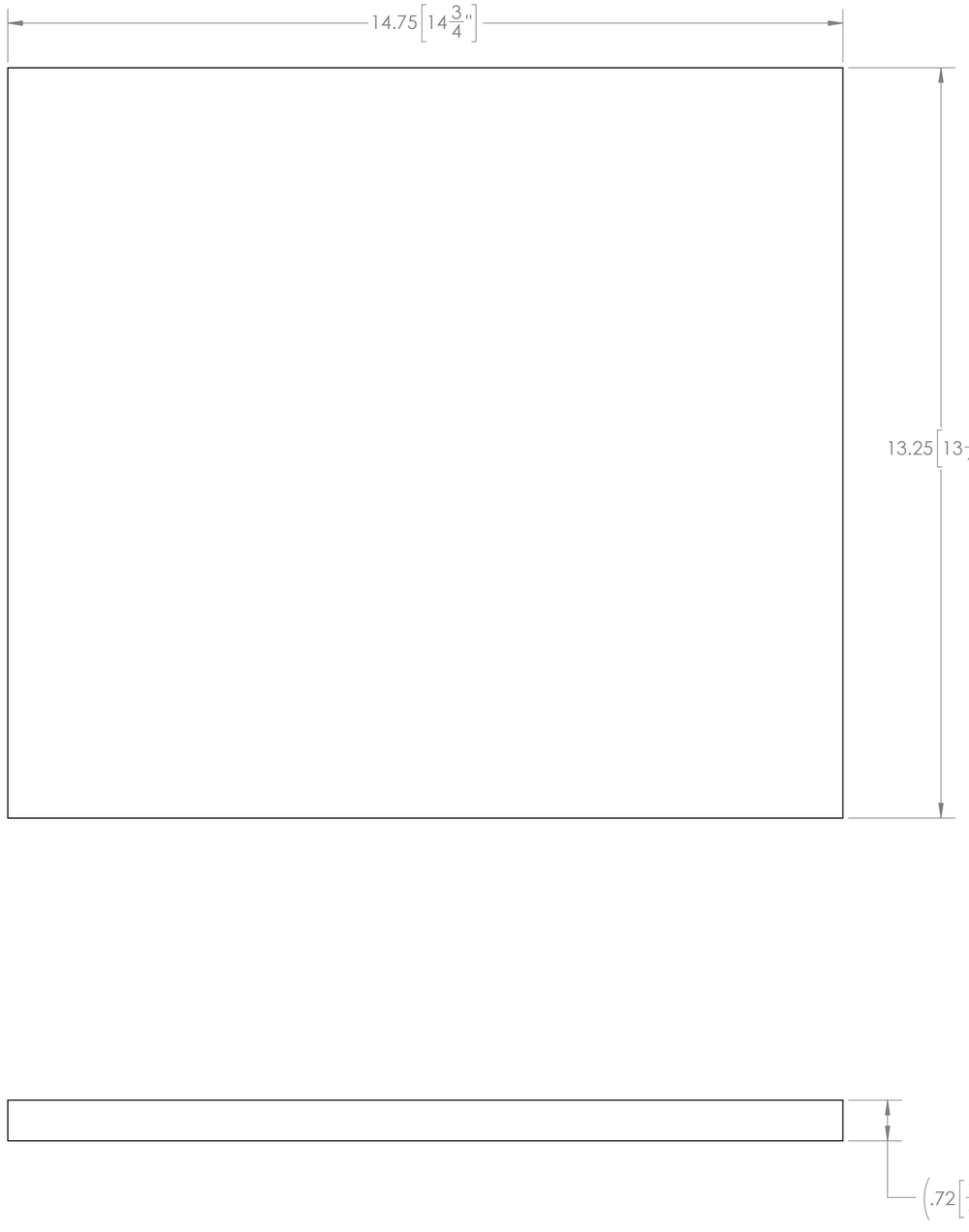

1. Align (2) to Step 1 , as shown.
2. Connect using 1.25" Long Screws. It is recommended to use 8x screws, 4x into (3) and 4x into (1) .

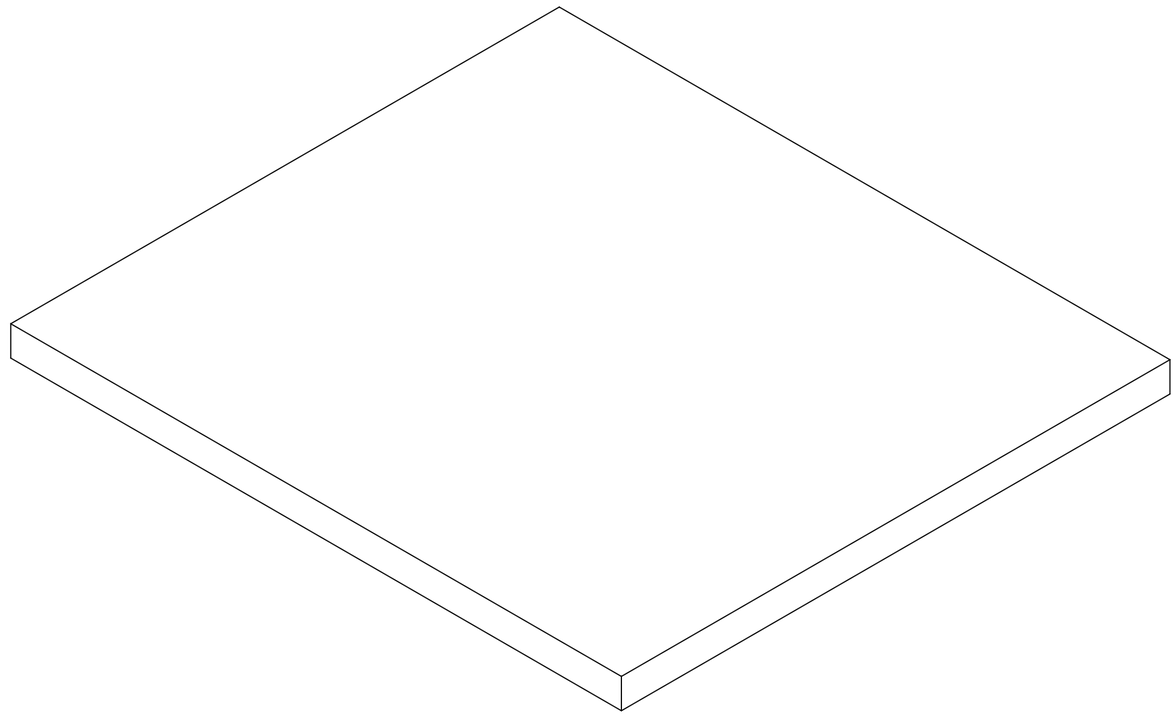
Step 3




1. Add 2x (4) to hook on (3) , as shown.

| | | |
|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME / DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC / 12/30/2021 |
| **MATERIAL/FINISH:** | **PROPRIETARY AND CONFIDENTIAL**<br>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 - Simple Build - Lower Exit Assembly |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | SIZE: C / DWG. NO.: TE-22050 / REV<br>SCALE: 1:4 / SHEET 3 OF 3 |



| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |

**MATERIAL/FINISH:**

3/4" Plywood

DO NOT SCALE DRAWING

**PROPRIETARY AND CONFIDENTIAL**



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

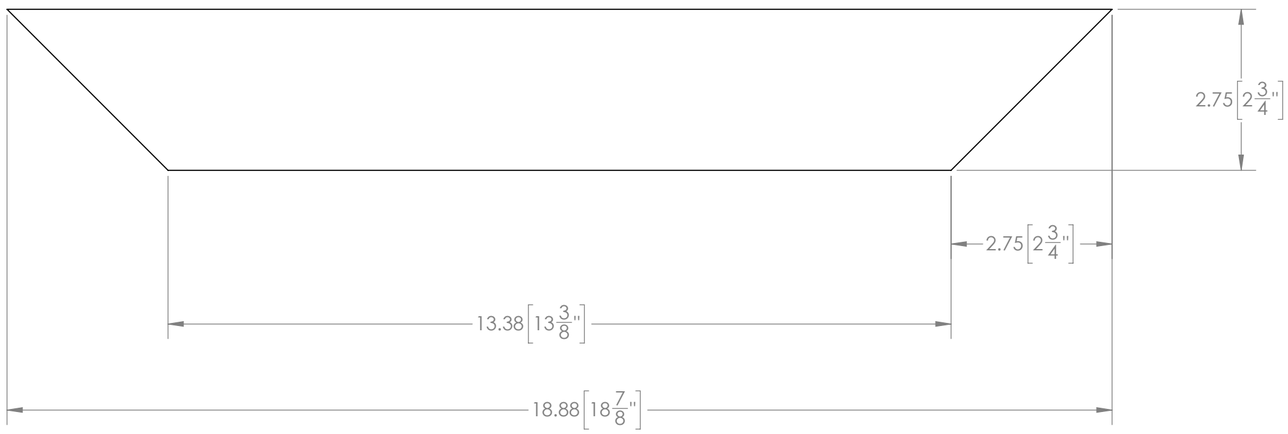
SOLIDWORKS Modeling Solutions Partner

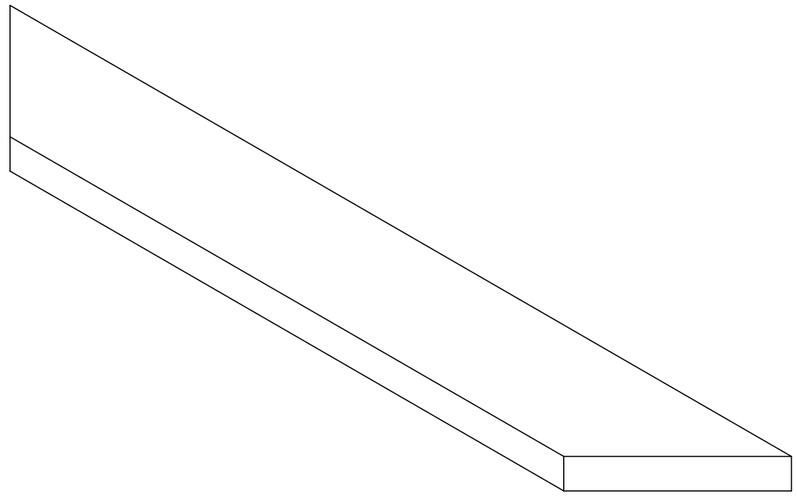
TITLE:

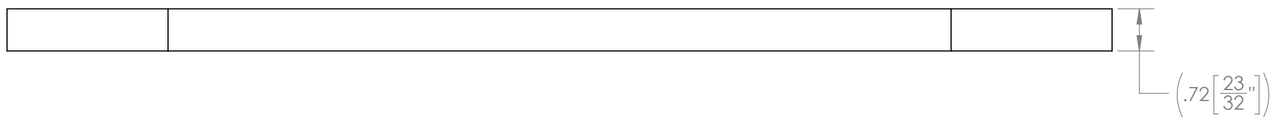
# HUB - Basic Build - Lower Exit Base Front

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22051 | |

SCALE: 1:2 | SHEET 1 OF 1






| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |

**MATERIAL/FINISH:**

3/4" Plywood

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

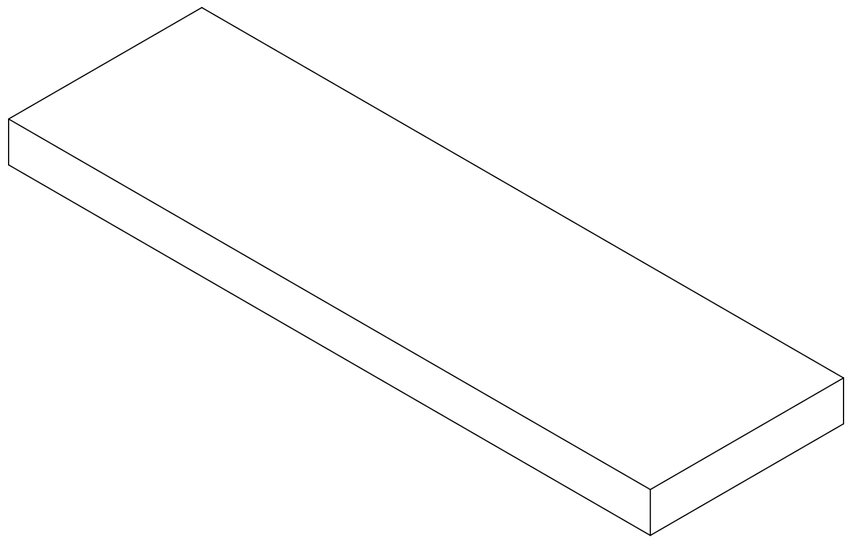
SOLIDWORKS Modeling Solutions Partner

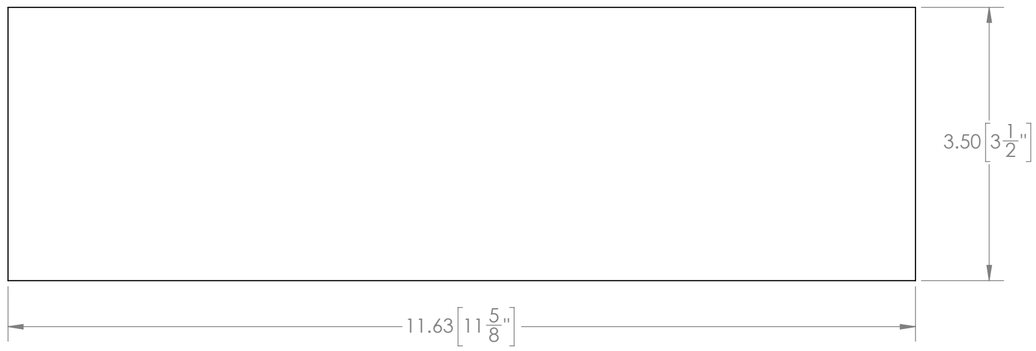
TITLE:

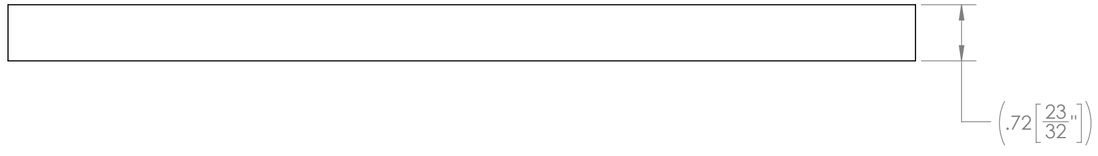
# HUB - Simple Build - Lower Exit Base Back

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22052 | |

SCALE: 1:2 SHEET 1 OF 1






| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |

**MATERIAL/FINISH:**

3/4" Plywood

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

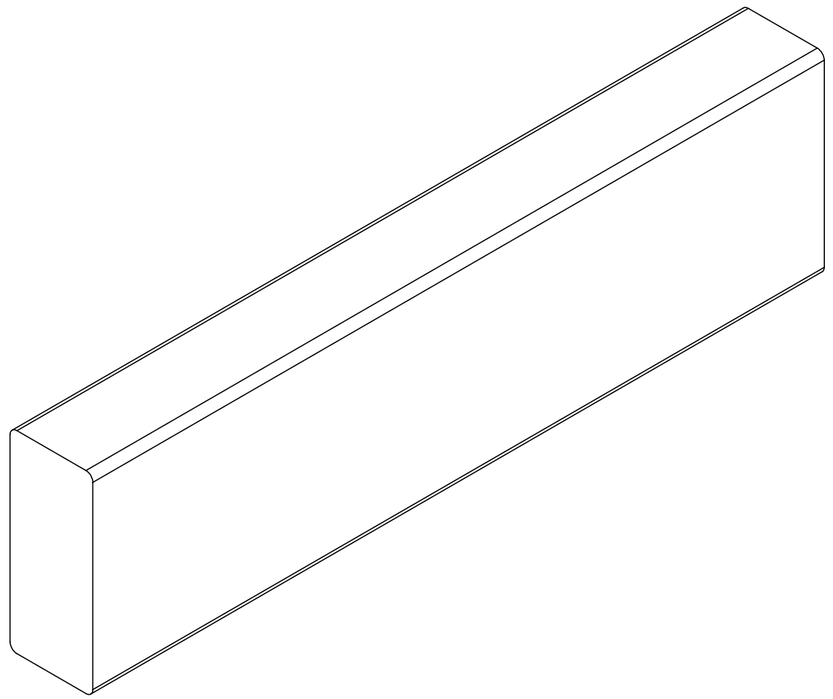
SOLIDWORKS Modeling Solutions Partner

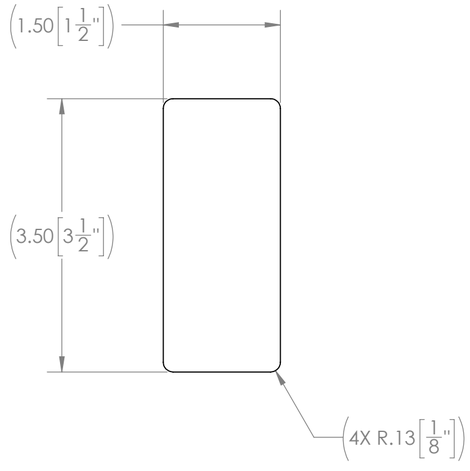
TITLE:

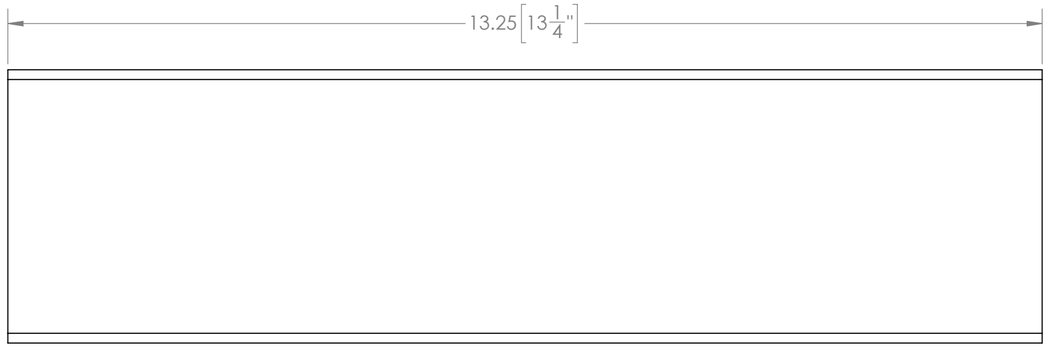
# HUB - Simple Build - Lower Exit Base Connection

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22053 | |

SCALE: 2:3 SHEET 1 OF 1





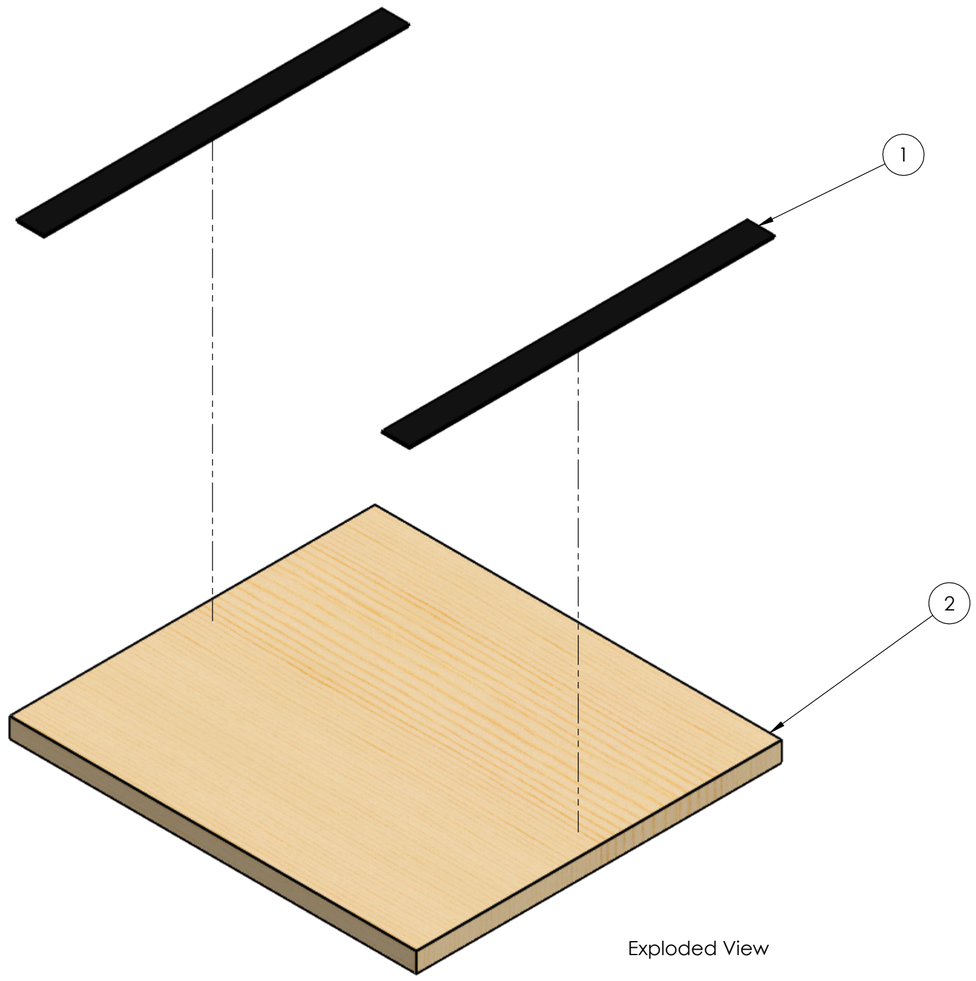




| | | |
|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME / DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC 12/29/2021 |
| **MATERIAL/FINISH:**<br>2"x4" Lumber | **PROPRIETARY AND CONFIDENTIAL**<br>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. | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | |

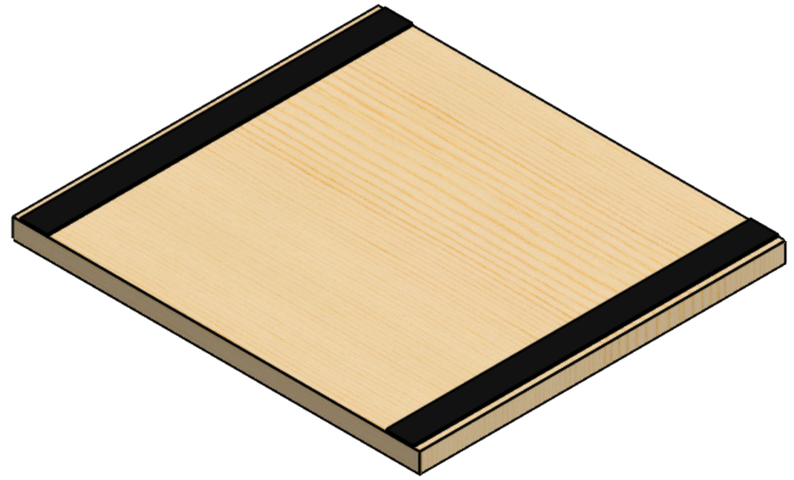
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

TITLE:
# HUB - Simple Build - Lower Exit 2x4

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22054 | |
| SCALE: 2:3 | SHEET 1 OF 1 | |




Exploded View



Hardware Needed:
Optional: Wood Staples

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | Loop_1_13.25 | 1" x 13.25" Loop, Adhesive Backed | 2 |
| 2 | TE-22051 | HUB - Basic Build - Lower Exit Base Front | 1 |

Step 1

1. Attach 2x (1) to (2) as shown using adhesive backing.
2. Optional: Use wood staples to connect (1) to (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 |
|---|---|---|
| DRAWN | KAMC | 12/30/2021 |



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

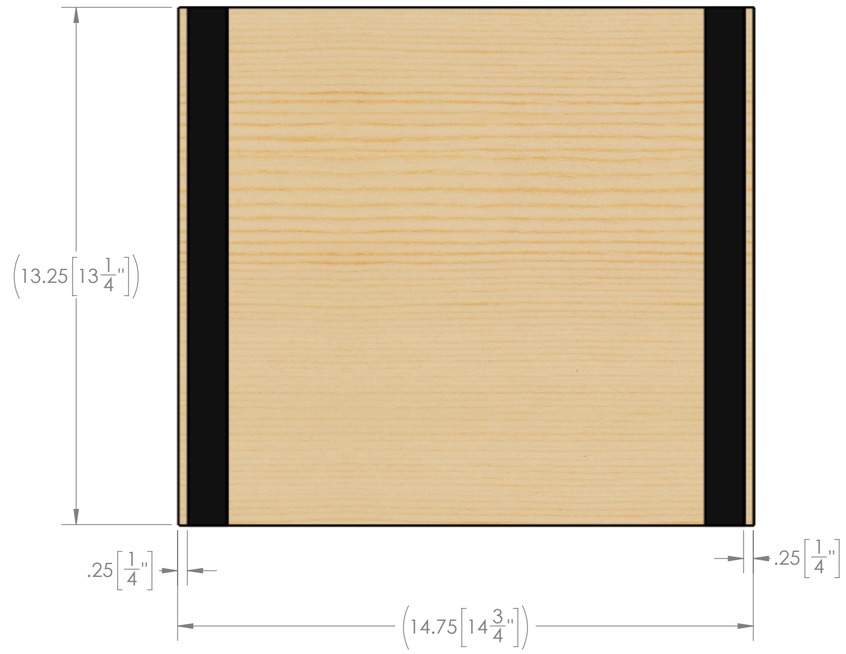
SOLIDWORKS Modeling Solutions Partner

TITLE:

# HUB - Simple Build - Lower Exit Base Front with Loop Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22055 | |

SCALE: 1:3 SHEET 1 OF 2





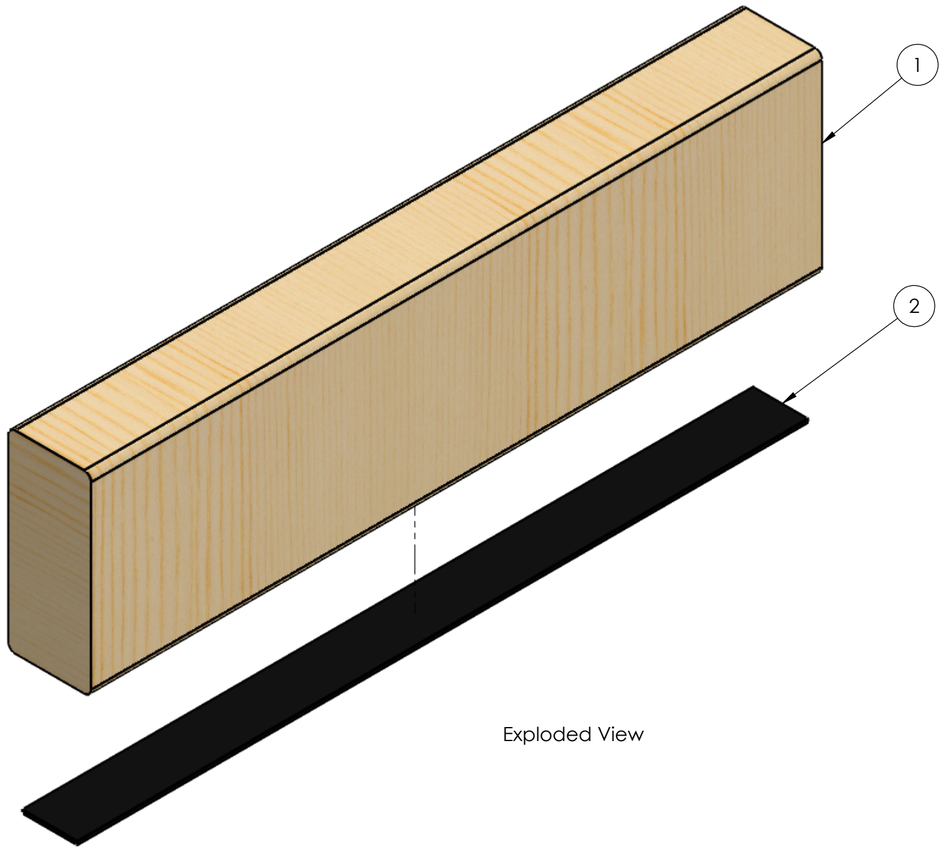
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/30/2021 |
| **MATERIAL/FINISH:** | **PROPRIETARY AND CONFIDENTIAL**<br>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. | | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | | |

FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

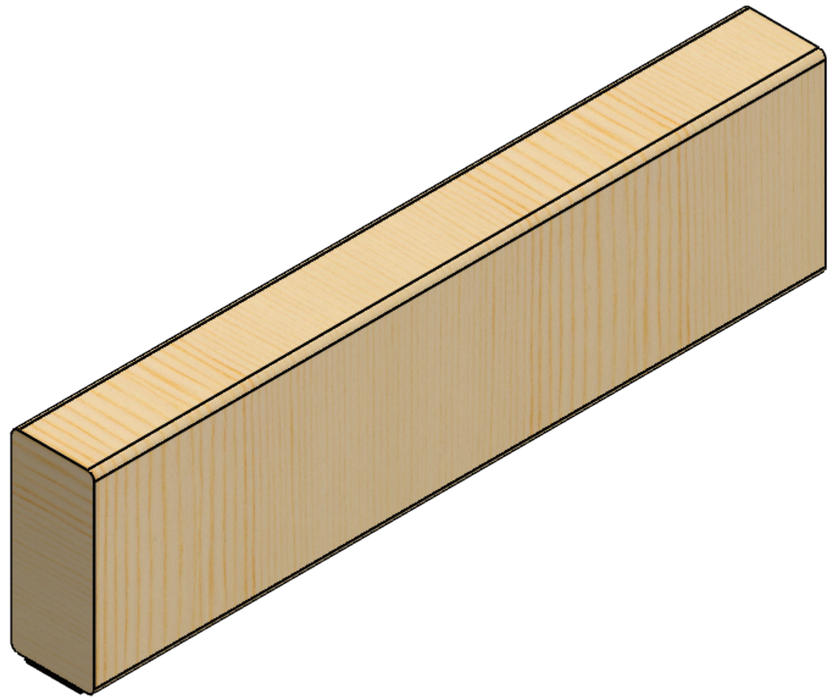
TITLE:

# HUB - Simple Build - Lower Exit Base Front with Loop Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22055 | |
| SCALE: 1:3 | SHEET 2 OF 2 | |




Exploded View



Hardware Needed:
Optional: Wood Staples

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | TE-22054 | HUB - Simple Build - Lower Exit 2x4 | 1 |
| 2 | Hook_1_13.25 | 1" x 13" Hook, Adhesive Backed | 1 |

Attach (2) to (1) as shown using adhesive backing.

Optional: Use wood staples to connect (2) to (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 | 12/30/2021 |



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

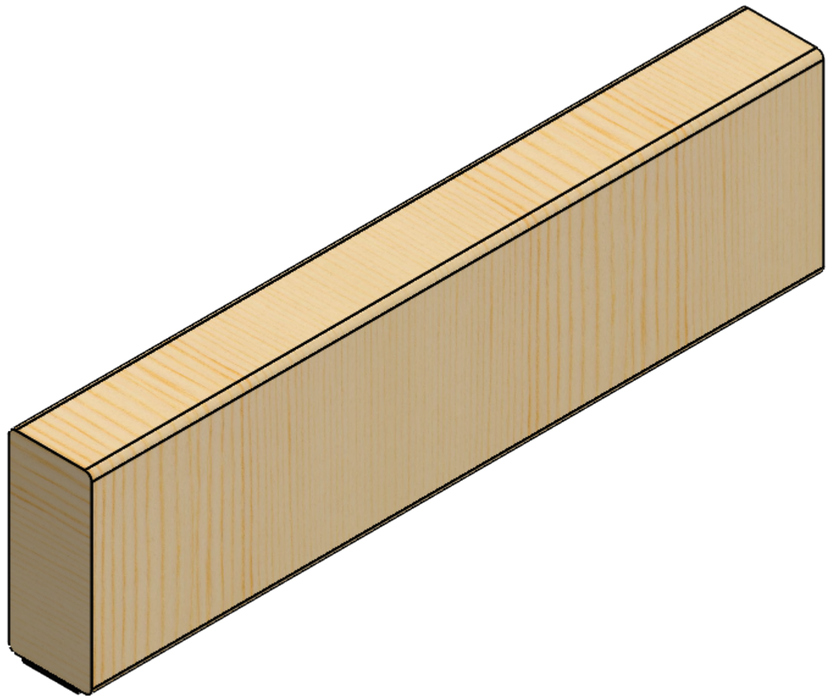
SOLIDWORKS Modeling Solutions Partner

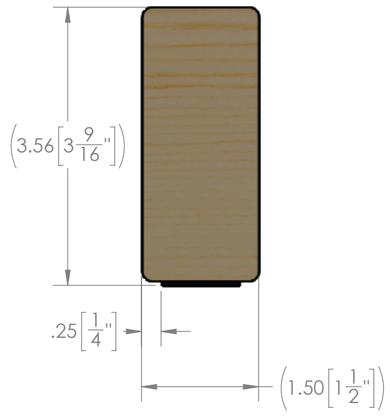
TITLE:

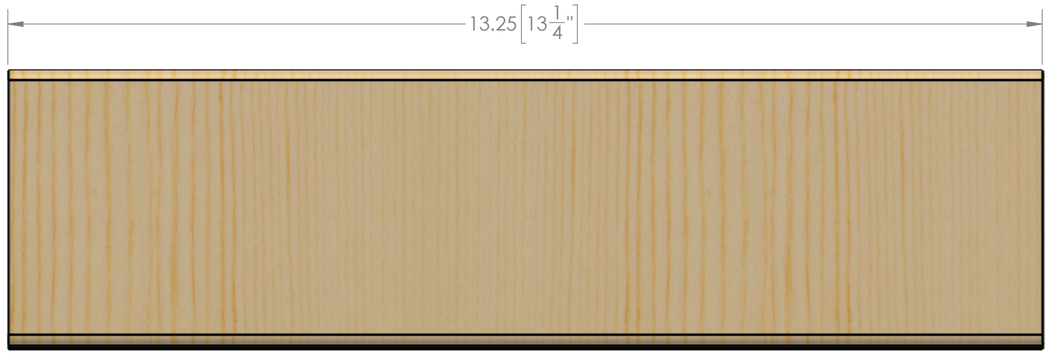
# HUB - Simple Build - Lower Exit 2x4 with Hook Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22056 | |

SCALE: 2:3 SHEET 1 OF 2






| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/30/2021 |

**MATERIAL/FINISH:**

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

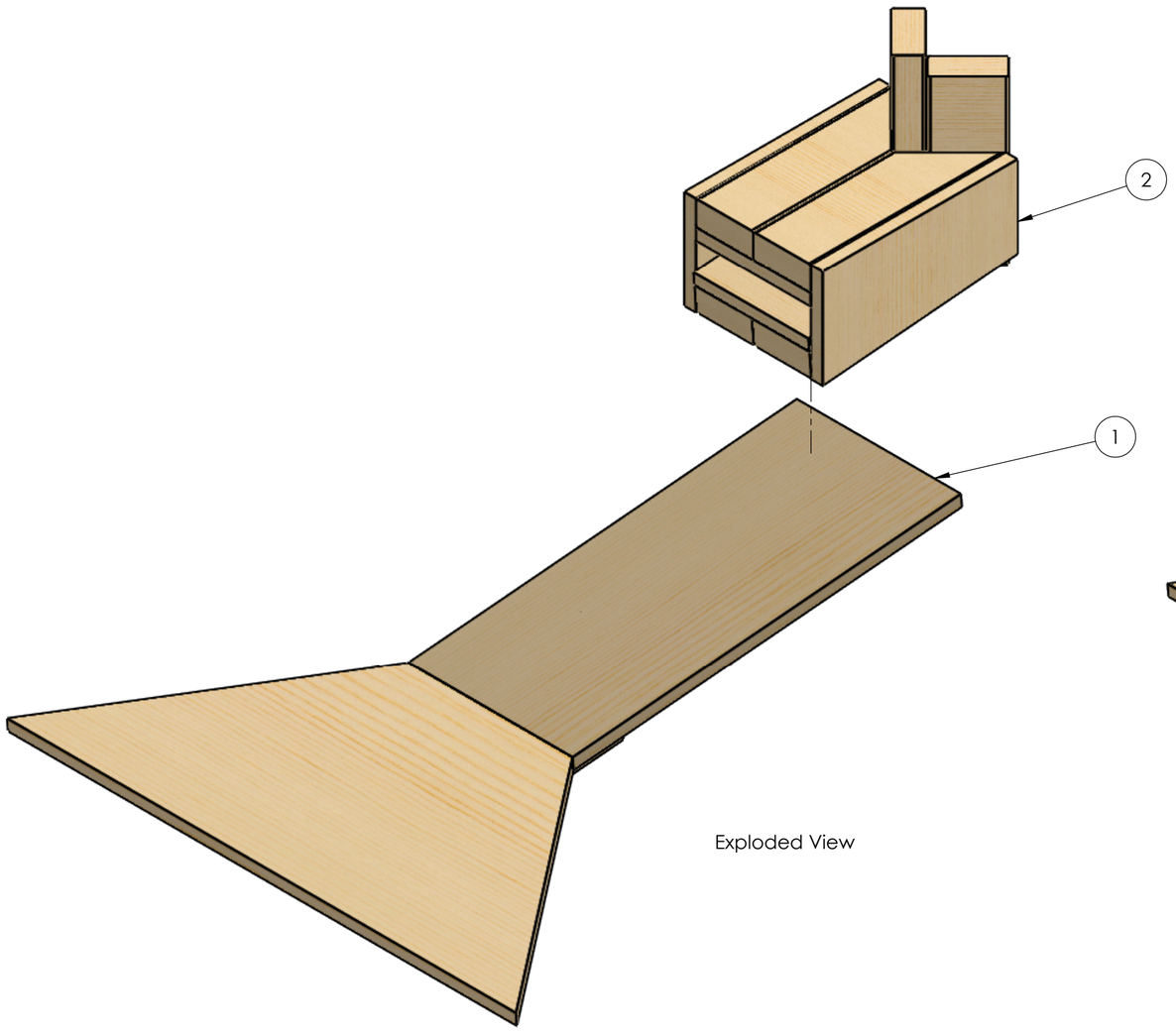
SOLIDWORKS Modeling Solutions Partner

TITLE:

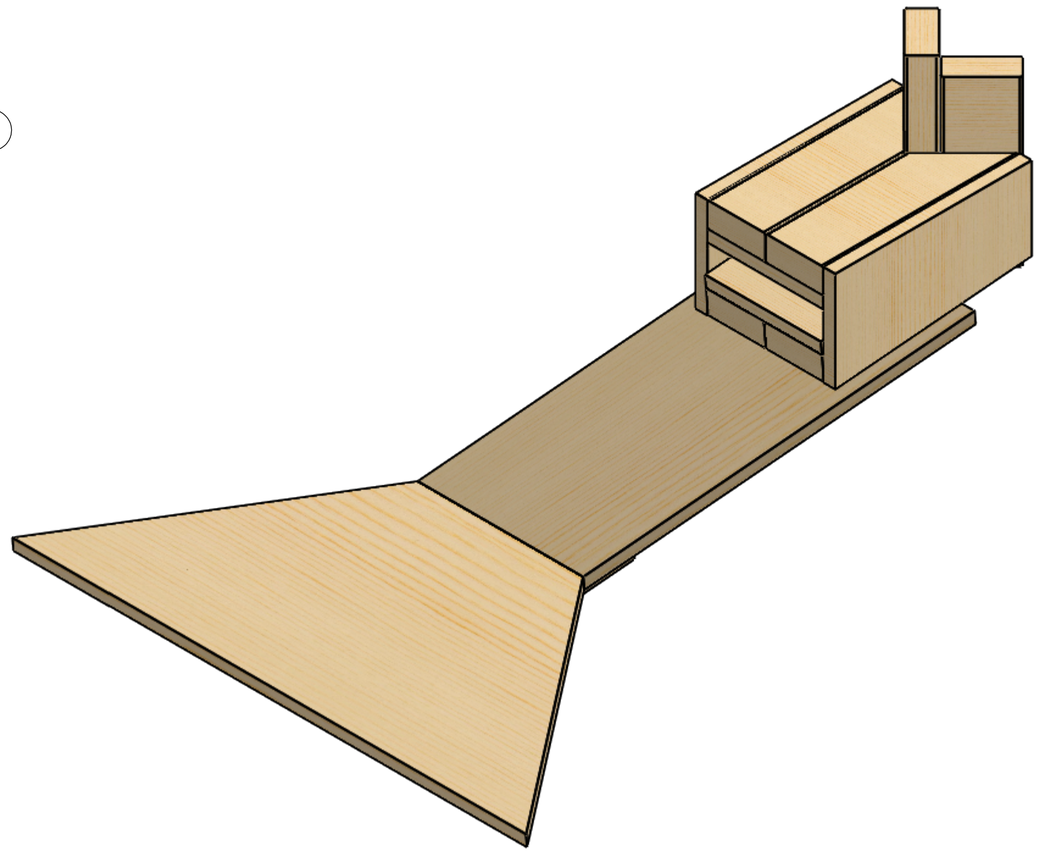
# HUB - Simple Build - Lower Exit 2x4 with Hook Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22056 | |

SCALE: 2:3 SHEET 2 OF 2




Exploded View



Hardware Needed:
#8 x 2" Long Screw - Qty 6

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | TE-22064 | Hub - Simple Build - Upper Exit Chute Assembly | 1 |
| 2 | TE-22068 | Hub - Simple Build - Upper Exit Connection Assembly | 1 |

Step 1:

1. Align (1) and (2), as shown on Sheet 2.
2. Connect using 2" Long Screws. It is recommended to use 6x screws.

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 | 12/30/2021 |



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

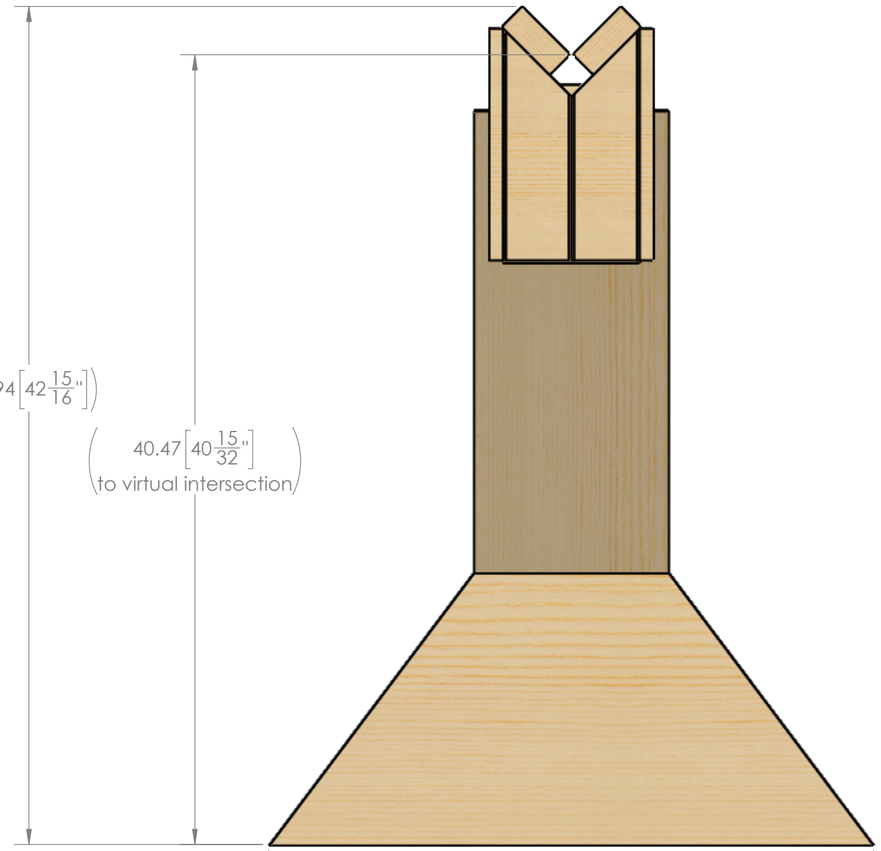
SOLIDWORKS Modeling Solutions Partner

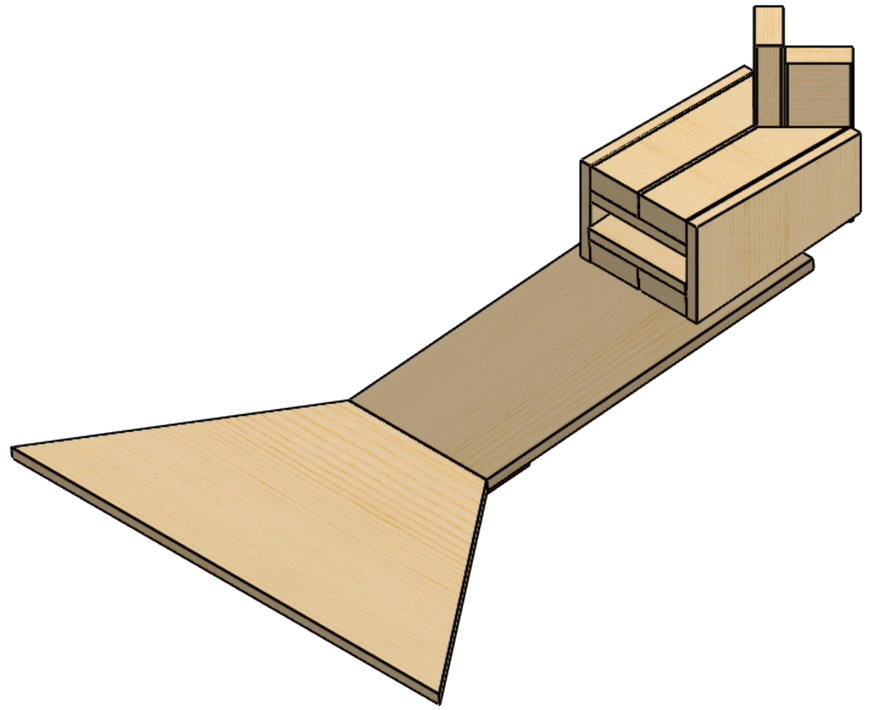
TITLE:

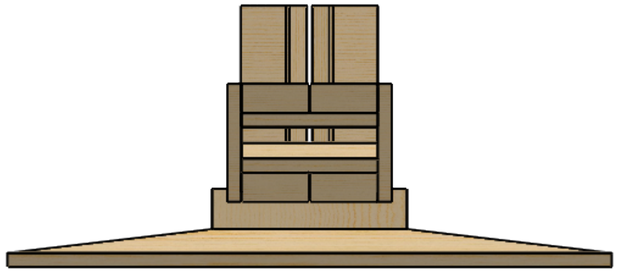
# Hub - Simple Build - Upper Exit Assembly

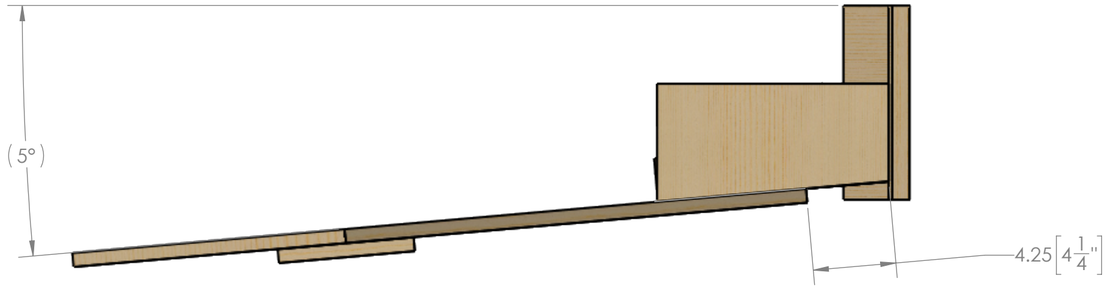
| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22060 | |

SCALE: 1:5 SHEET 1 OF 2








| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
| | DRAWN | KAMC | 12/30/2021 |

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



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

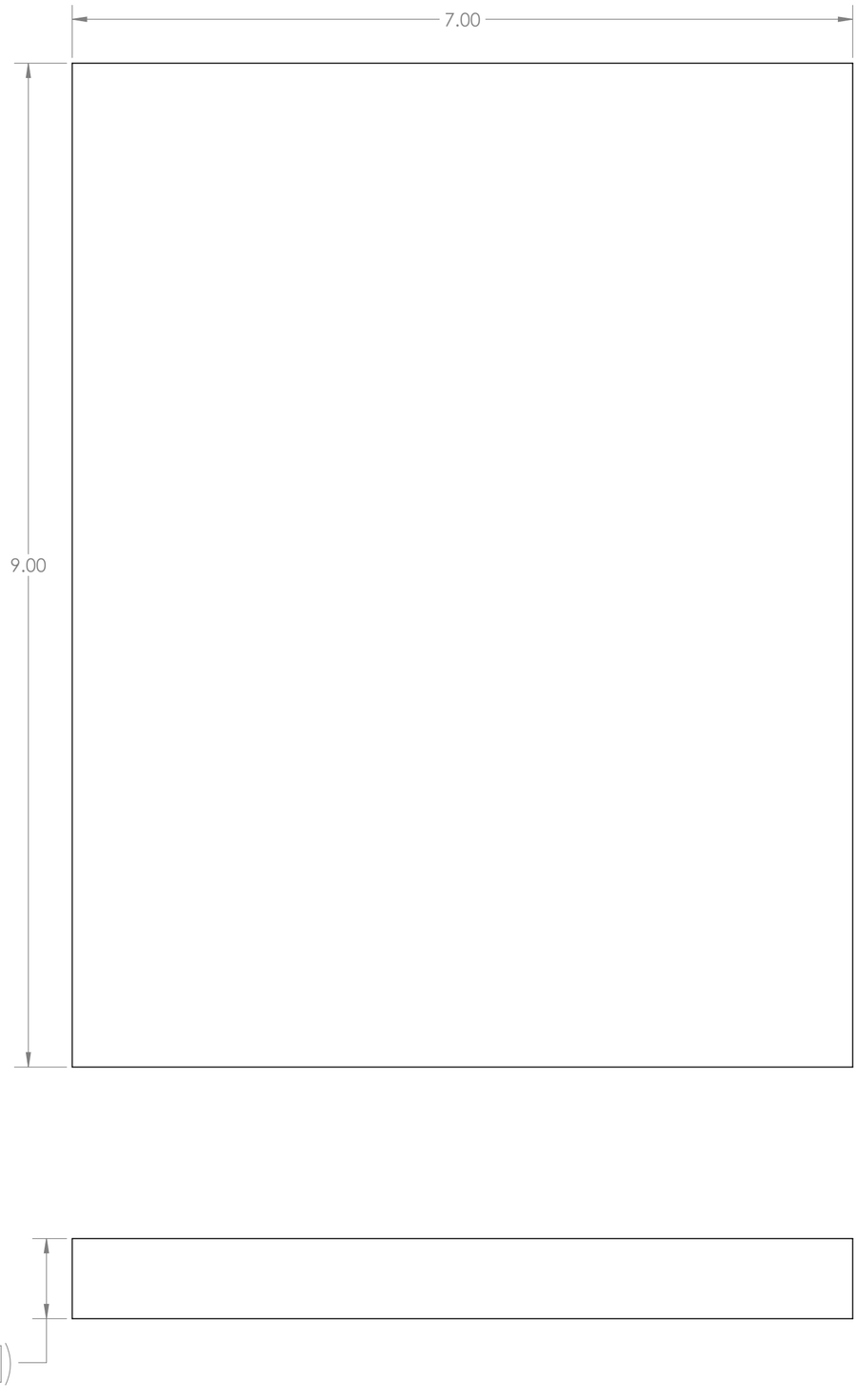
FIRST ROBOTICS COMPETITION

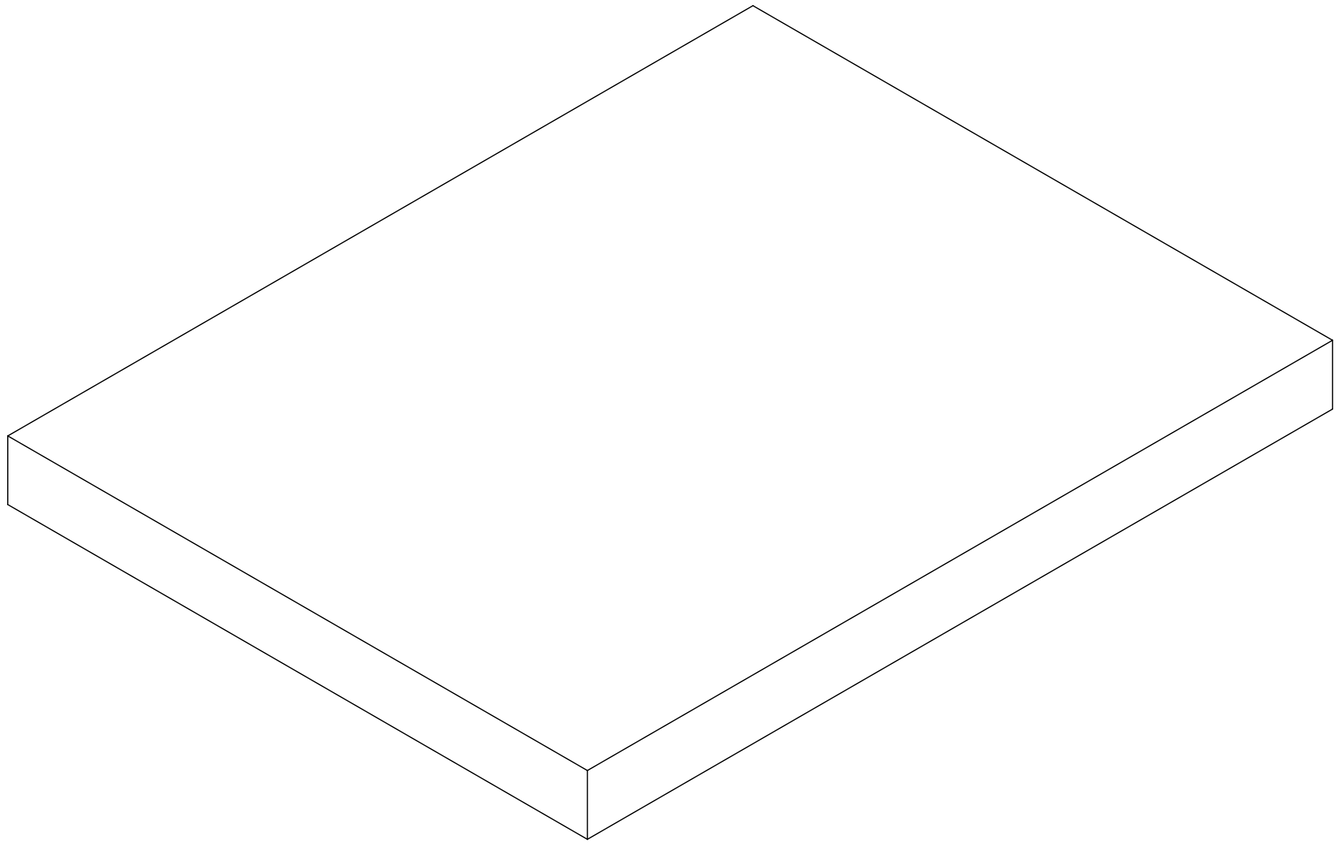
SOLIDWORKS Modeling Solutions Partner

TITLE:

# Hub - Simple Build - Upper Exit Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22060 | |
| SCALE: 1:6 | SHEET 2 OF 2 | |



| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |

**MATERIAL/FINISH:**

3/4" Plywood

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

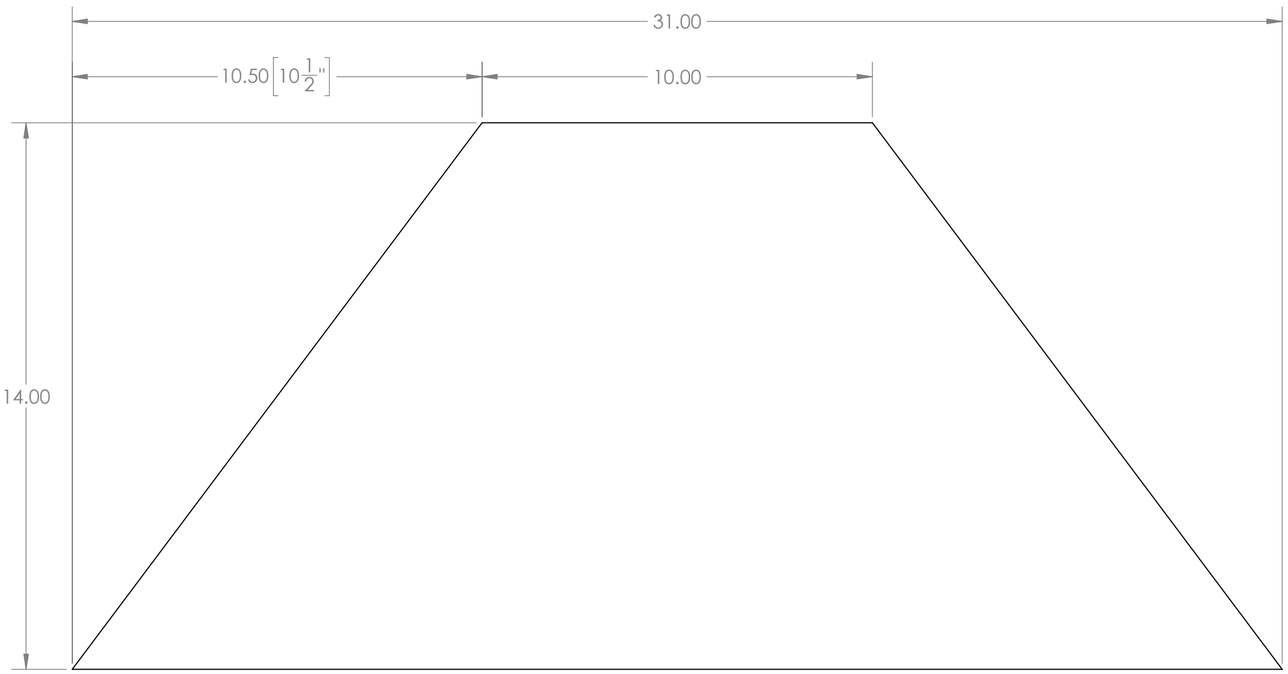
SOLIDWORKS Modeling Solutions Partner

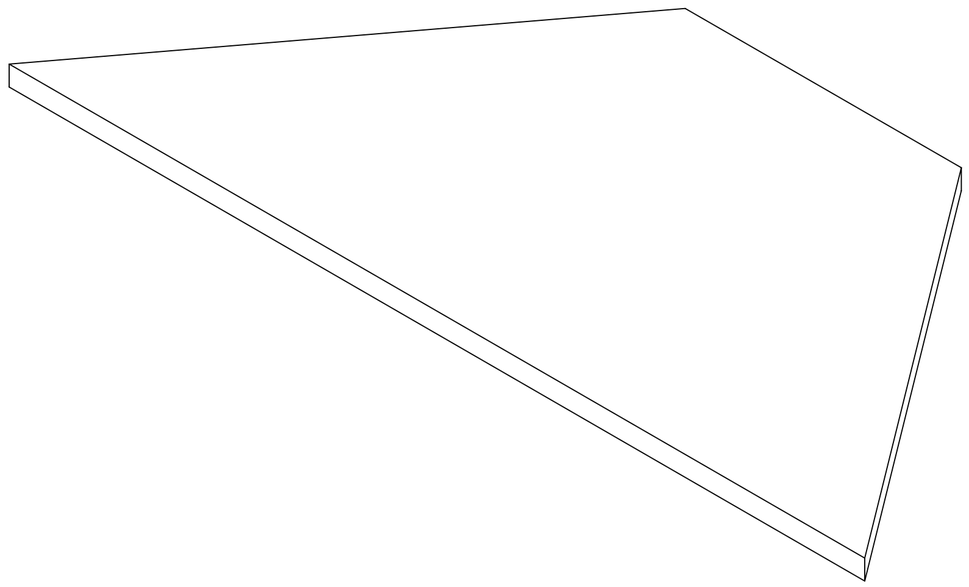
TITLE:

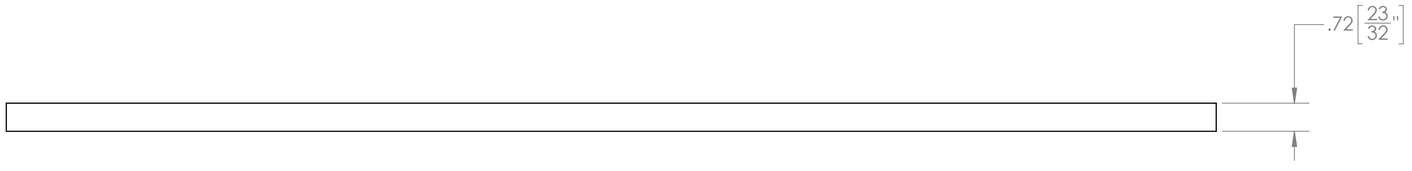
# Hub - Simple Build - Upper Exit Connection Plate

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22061 | |

SCALE: 1:1 SHEET 1 OF 1






| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |

**MATERIAL/FINISH:**

3/4" Plywood

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

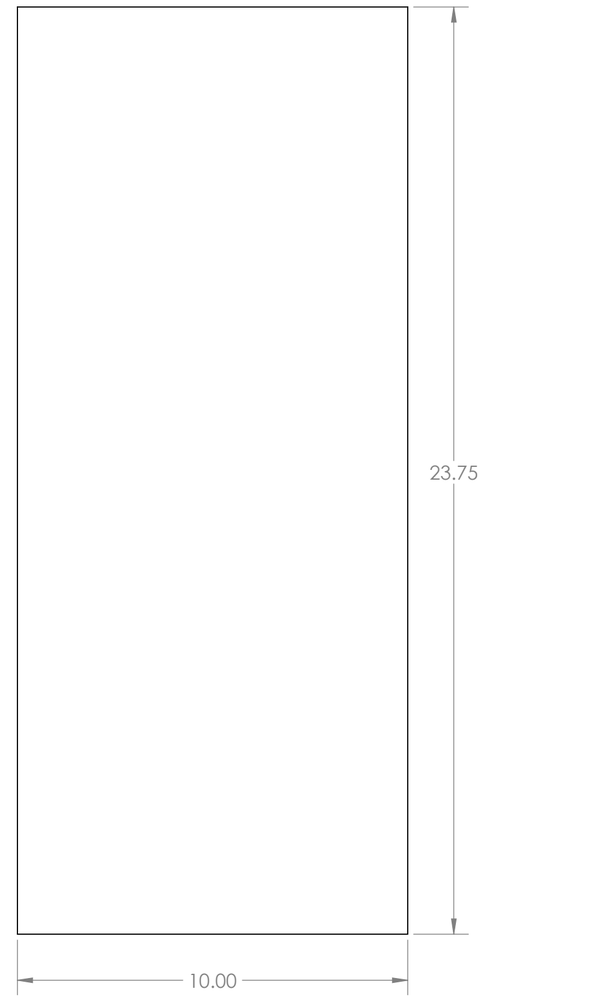
SOLIDWORKS Modeling Solutions Partner

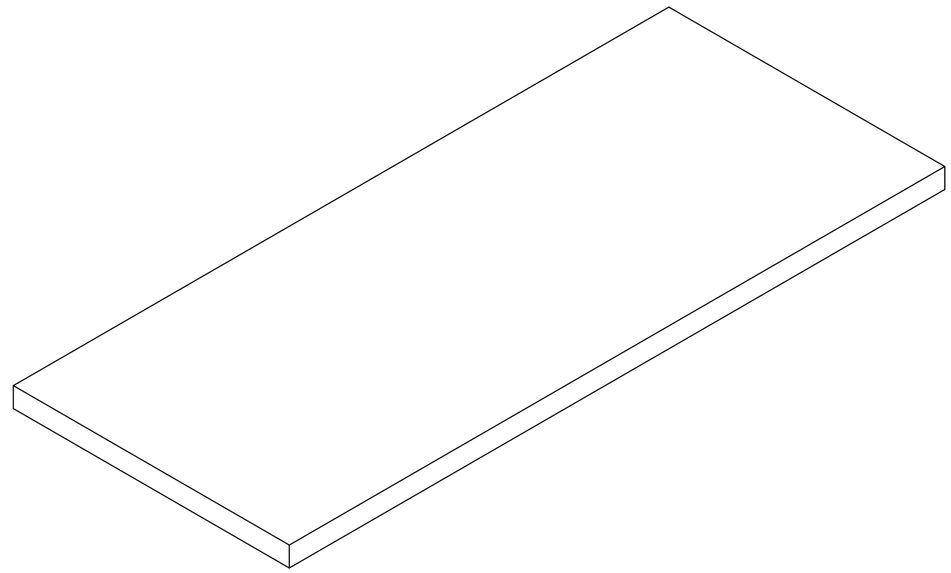
TITLE:

# Hub - Simple Build - Upper Exit Chute End

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22062 | |

SCALE: 1:3 SHEET 1 OF 1



| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |

**MATERIAL/FINISH:**

3/4" Plywood

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

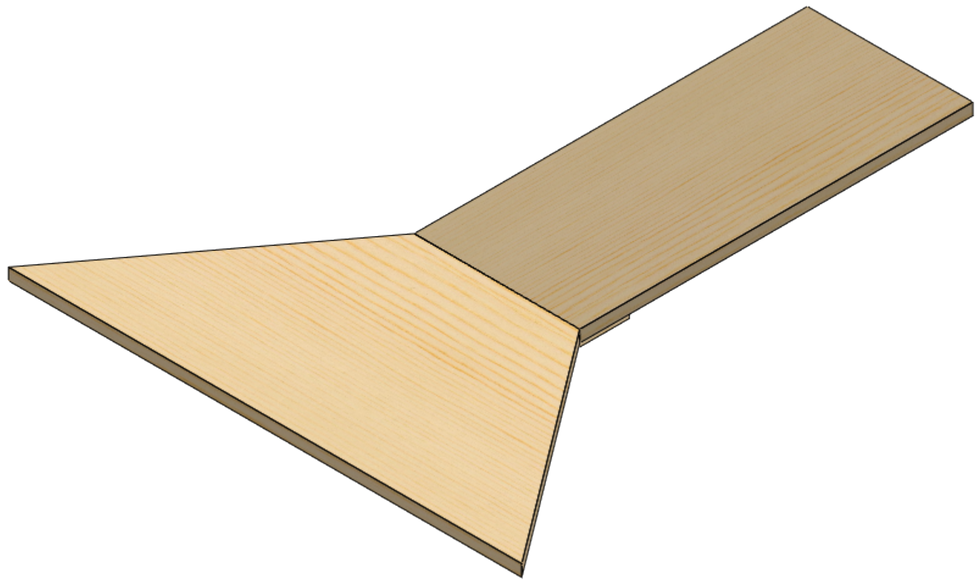
SOLIDWORKS Modeling Solutions Partner

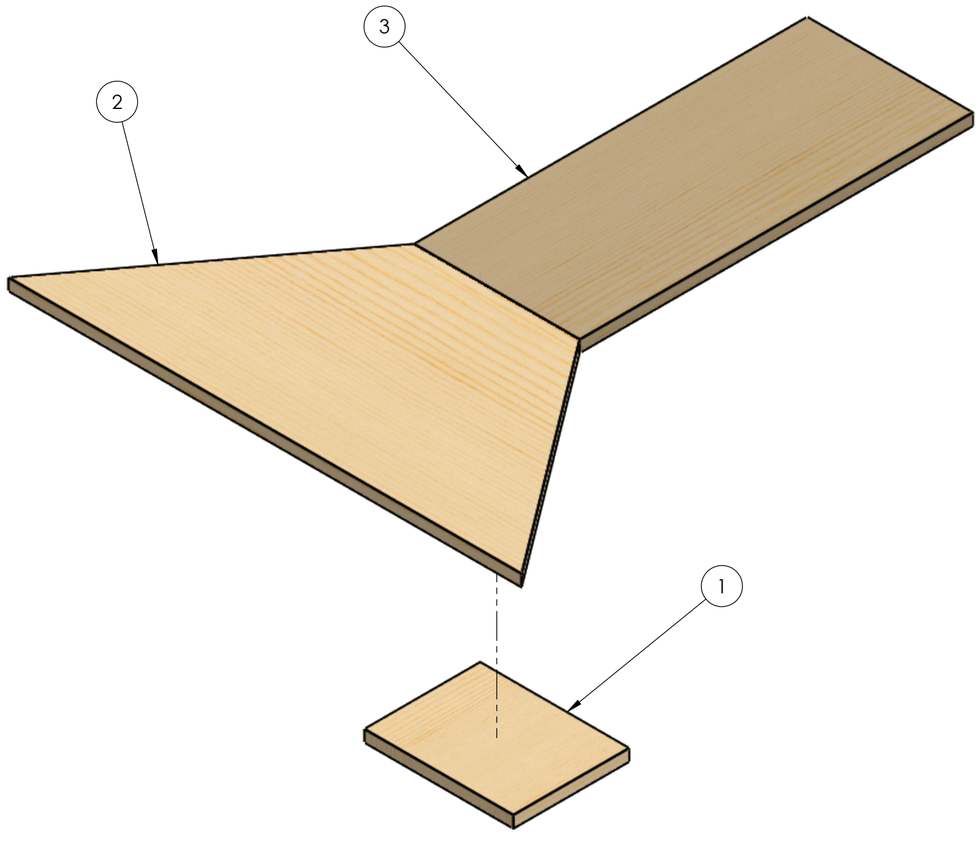
TITLE:

# Hub - Simple Build - Upper Exit Chute Base

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22063 | |

SCALE: 1:3 | SHEET 1 OF 1






| ITEM NO. | PART NUMBER | DESCRIPTION | |
|---|---|---|---|
| 1 | TE-22061 | Hub - Simple Build - Upper Exit Connection Plate | 1 |
| 2 | TE-22062 | Hub - Simple Build - Upper Exit Chute End | 1 |
| 3 | TE-22063 | Hub - Simple Build - Upper Exit Chute Base | 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 | 12/30/2021 |



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

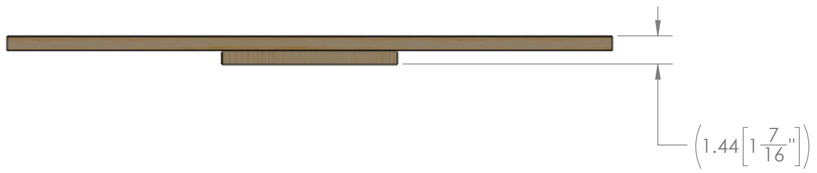
SOLIDWORKS Modeling Solutions Partner

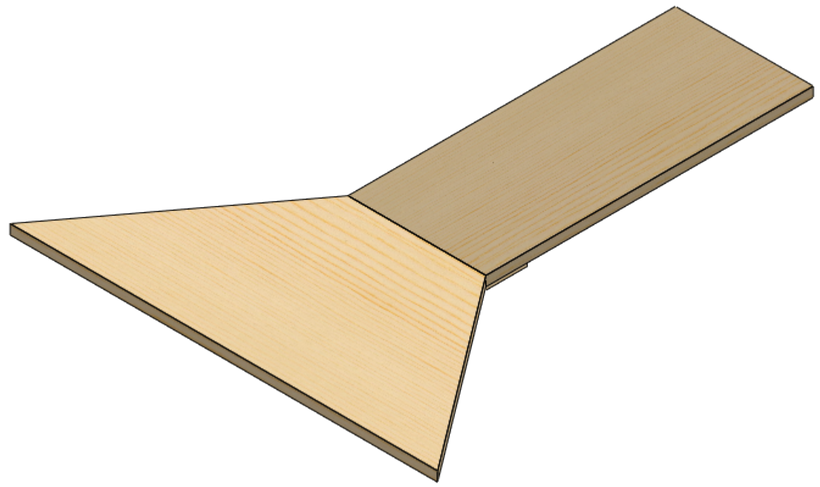
TITLE:

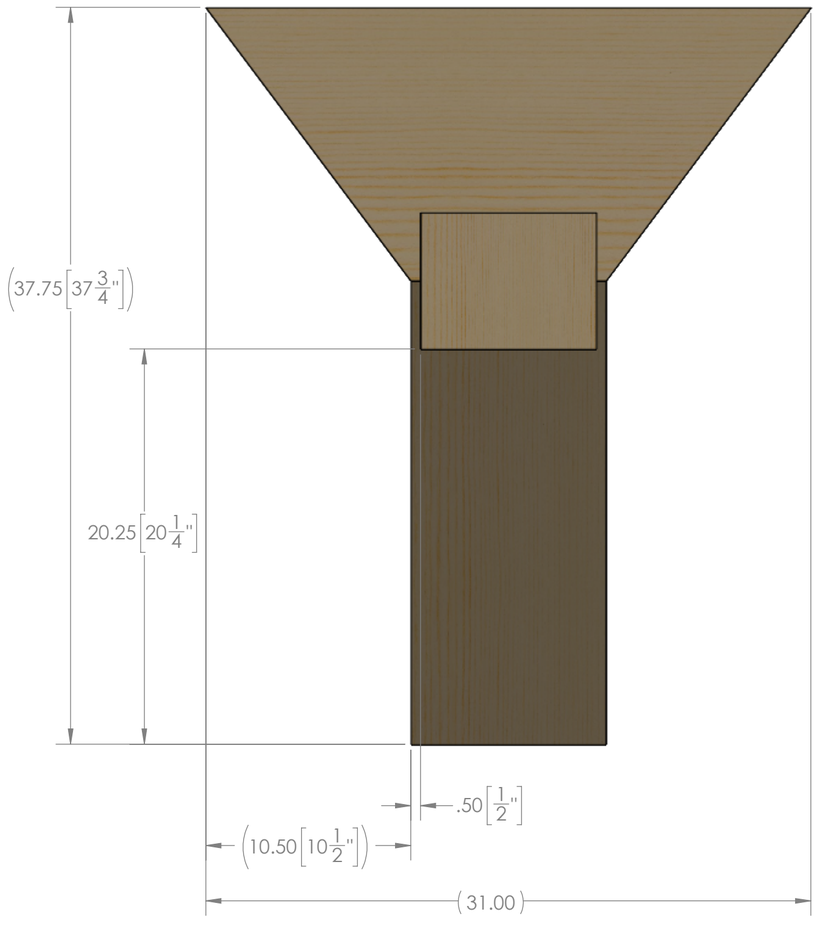
# Hub - Simple Build - Upper Exit Chute Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22064 | |

SCALE: 1:5 SHEET 1 OF 3






| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/30/2021 |
| **MATERIAL/FINISH:** | **PROPRIETARY AND CONFIDENTIAL**<br>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. | | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | | |

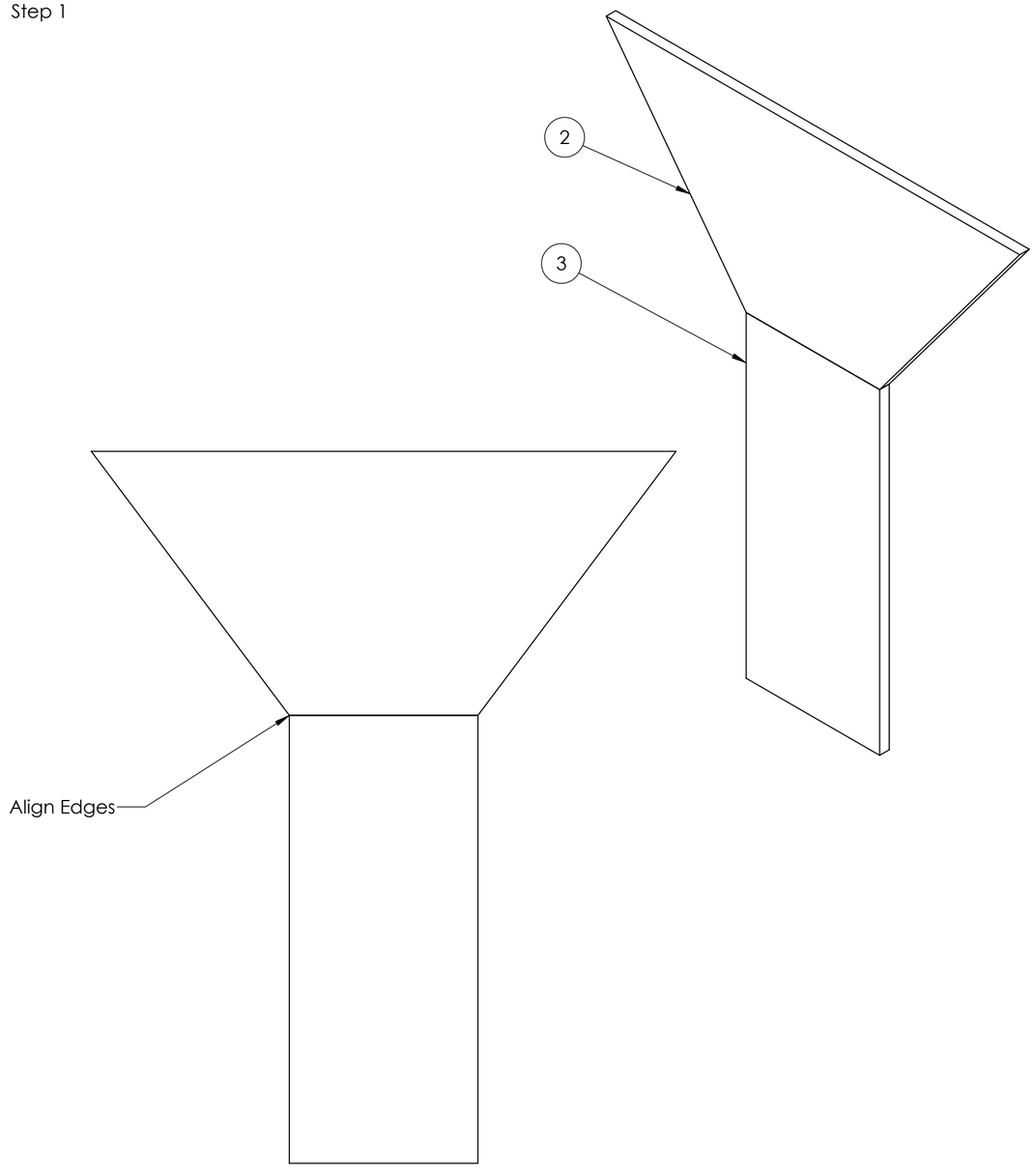
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

TITLE:

# Hub - Simple Build - Upper Exit Chute Assembly

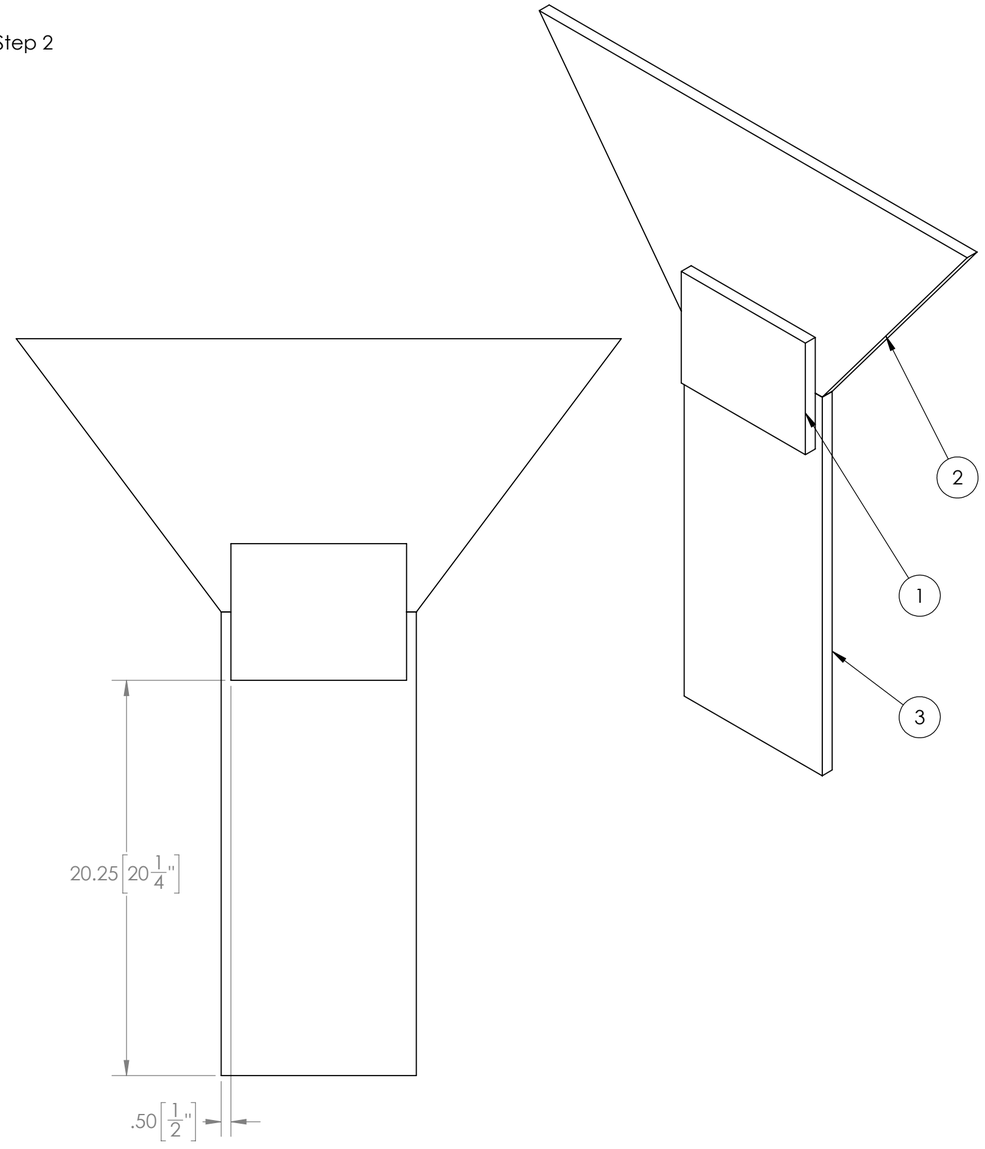
| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22064 | |
| SCALE: 1:6 | SHEET 2 OF 3 | |

Step 1




1. Align (3) to (2), as shown. Connection will happen in the next step.

Step 2




1. Align (1) to Step 1 , as shown.
2. Connect using 1.25" Long Screws. It is recommended to use 8x screws, 4x screws into (3) and 4x screws into (2).

| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
| | DRAWN | KAMC | 12/30/2021 |

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



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

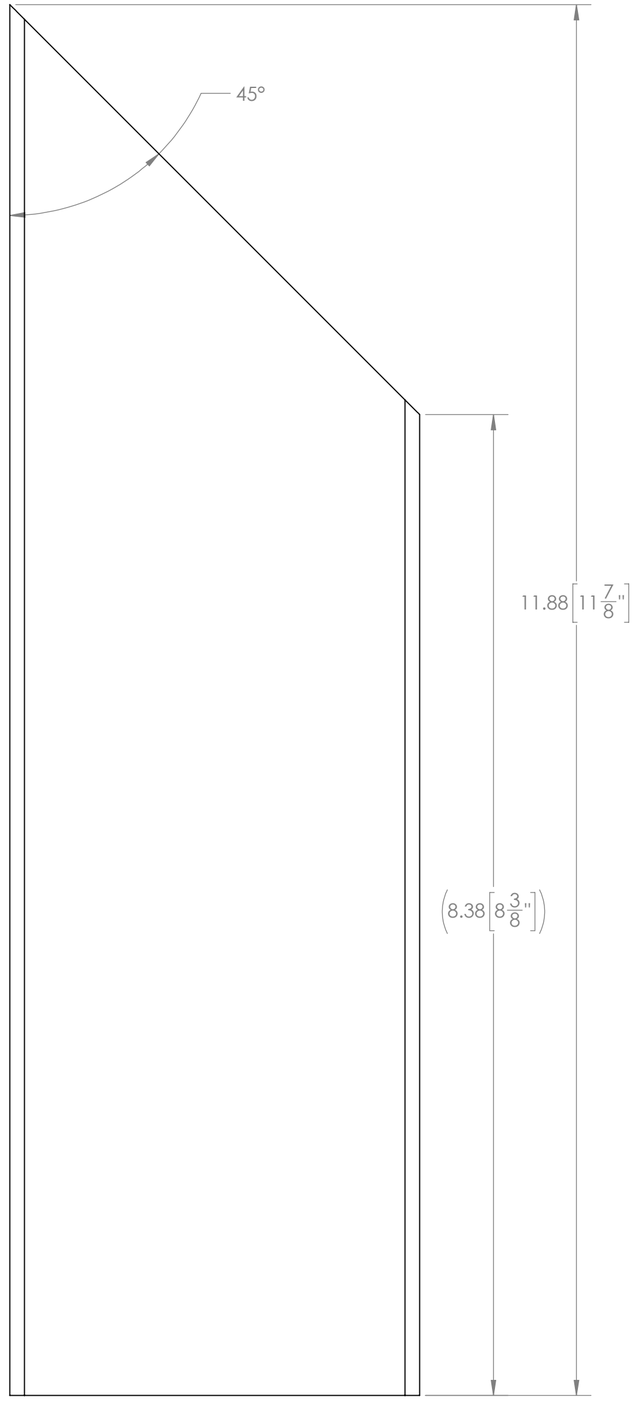
FIRST ROBOTICS COMPETITION

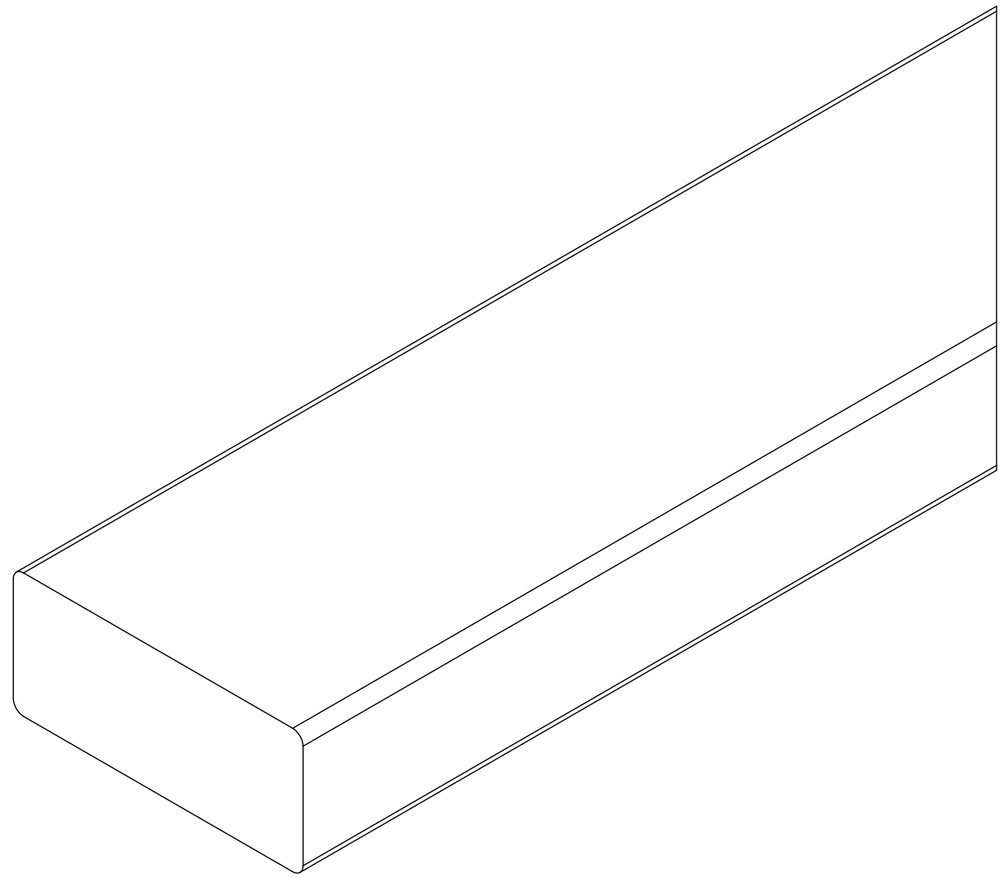
SOLIDWORKS Modeling Solutions Partner

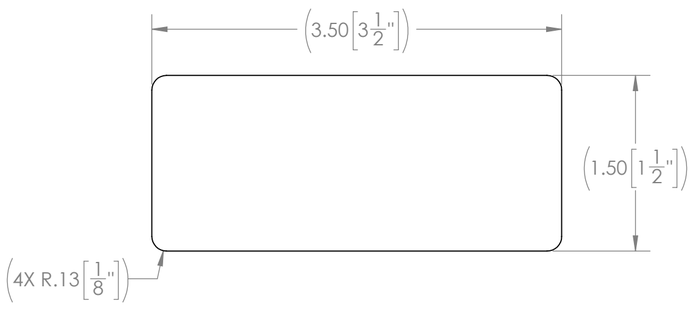
TITLE:

# Hub - Simple Build - Upper Exit Chute Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22064 | |
| SCALE: 1:6 | SHEET 3 OF 3 | |





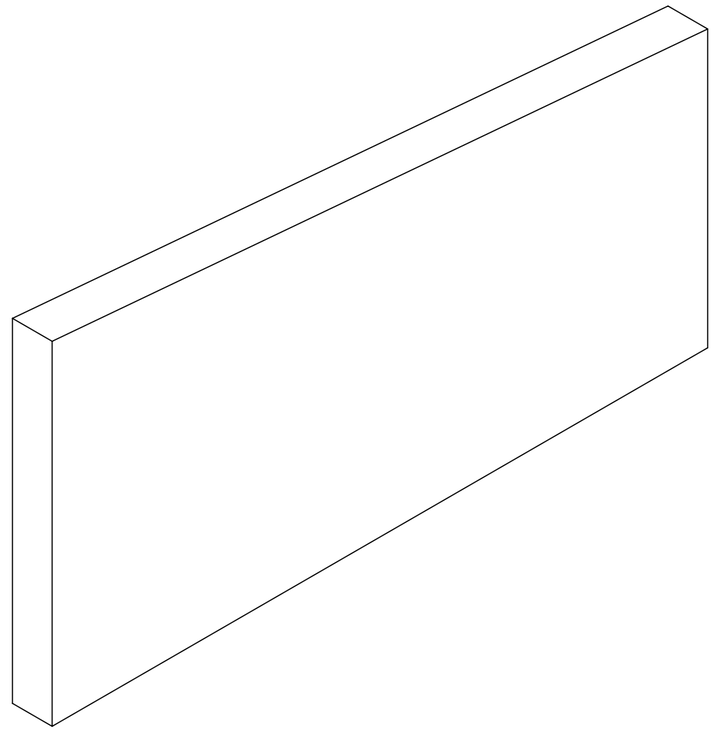

| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |
| **MATERIAL/FINISH:**<br>2"x4" Lumber | **PROPRIETARY AND CONFIDENTIAL**<br>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. | | |
| DO NOT SCALE DRAWING | **COMMENTS:**<br>REMOVE ALL BURRS AND SHARP EDGES. | | |

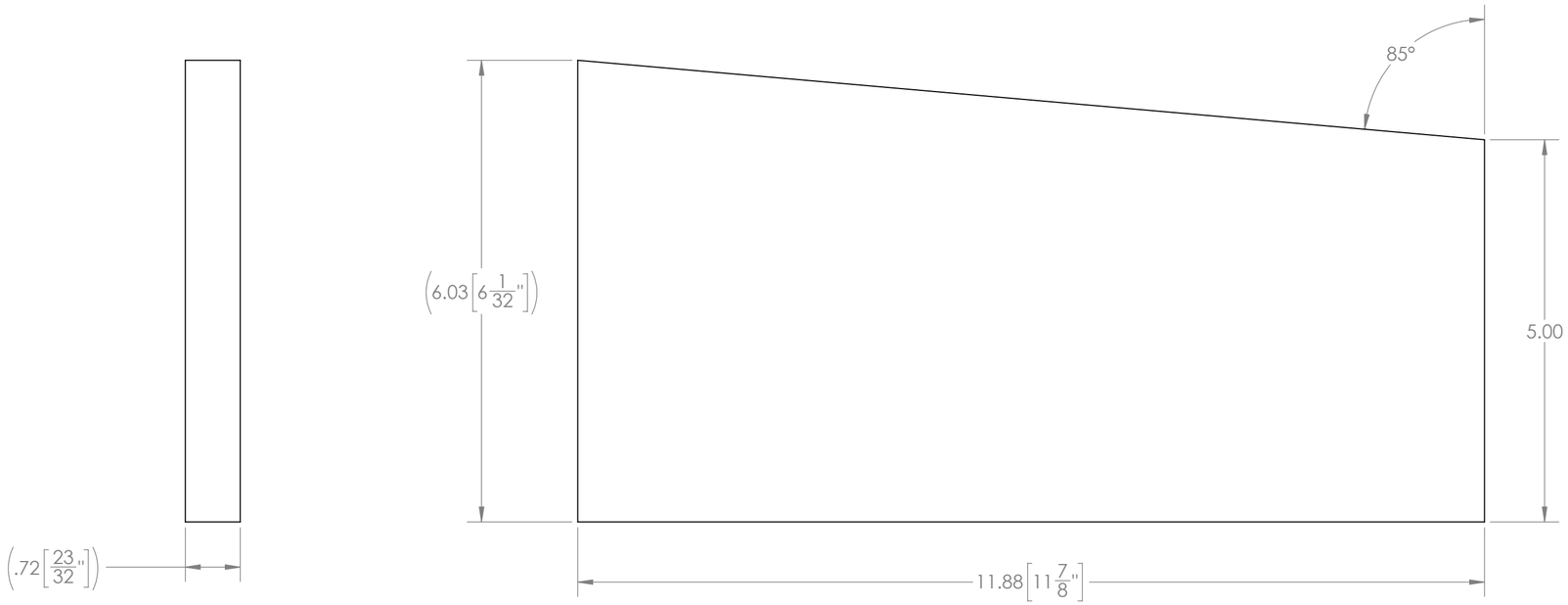
FIRST ROBOTICS COMPETITION — SOLIDWORKS Modeling Solutions Partner

TITLE:

# Hub - Simple Build - Upper Exit Connection Box 2x4

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22065 | |
| SCALE: 1:1 | SHEET 1 OF 1 | |






| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 1/3/2022 |

**MATERIAL/FINISH:**

3/4" Plywood

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

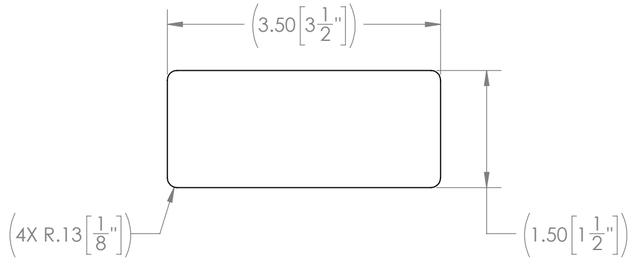
SOLIDWORKS Modeling Solutions Partner

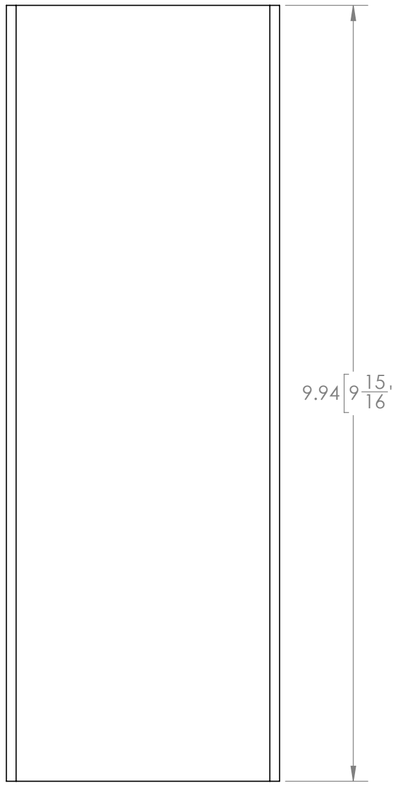
TITLE:

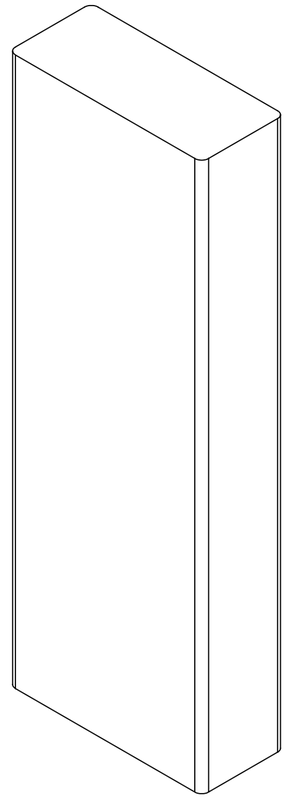
# Hub - Simple Build - Upper Exit Connection Box Side

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22066 | |

SCALE: 2:3 | SHEET 1 OF 1



| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/29/2021 |

**MATERIAL/FINISH:**

2"x4" Lumber

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

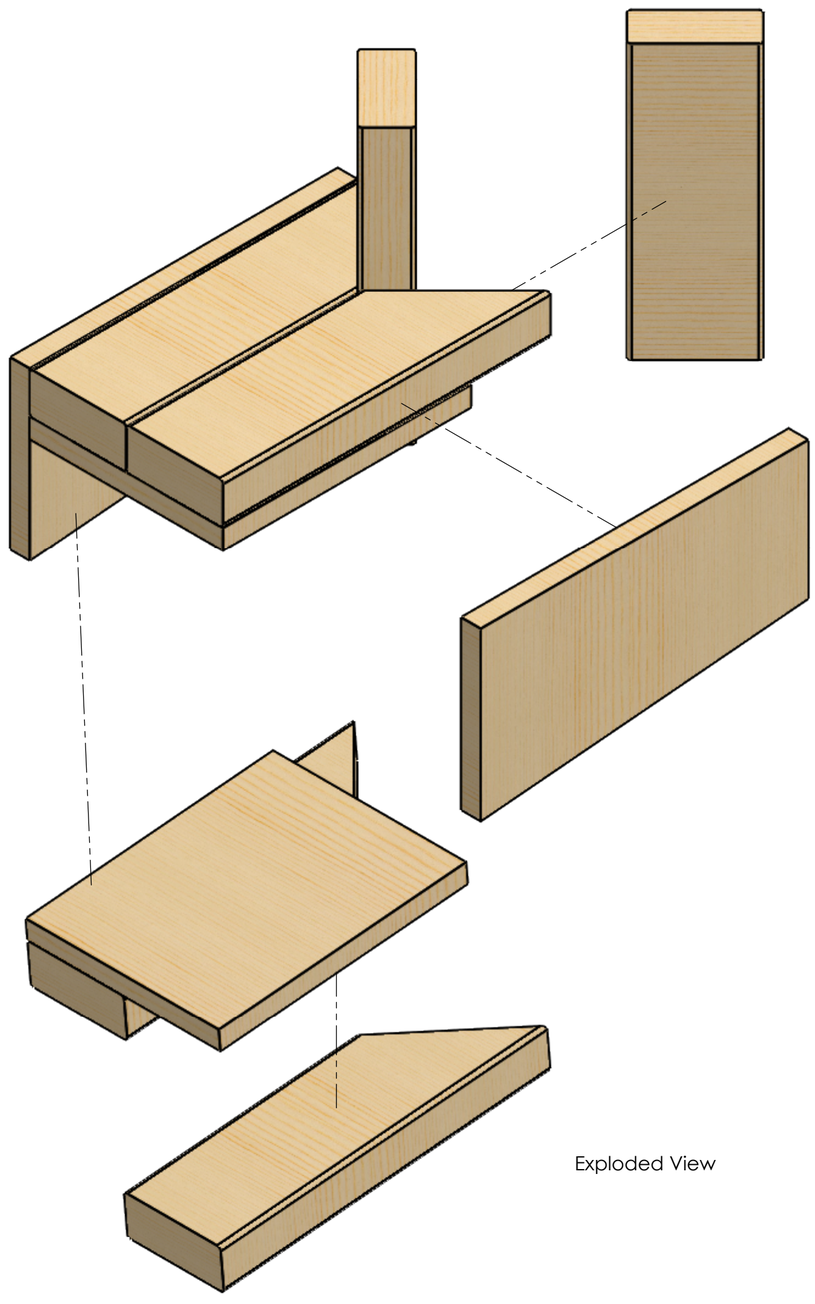
SOLIDWORKS Modeling Solutions Partner

TITLE:

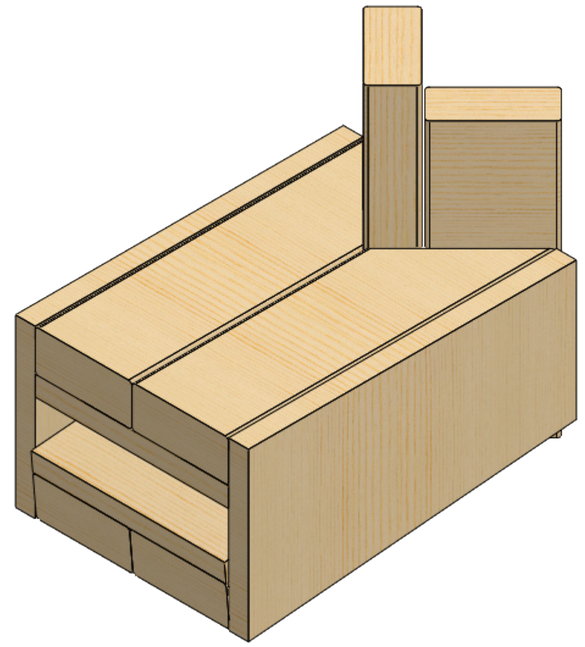
# Hub - Simple Build - Upper Exit Connection 2x4

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22067 | |

SCALE: 2:3 | SHEET 1 OF 1



Exploded View



Hardware Needed:
#8 x 2" Long Screw - Qty 24
#8 x 2.5" Long Screw - Qty 8

| ITEM NO. | PART NUMBER | DESCRIPTION | QTY. |
|---|---|---|---|
| 1 | TE-22065 | Hub - Simple Build - Upper Exit Connection Box 2x4 | 4 |
| 2 | TE-22061 | Hub - Simple Build - Upper Exit Connection Plate | 2 |
| 3 | TE-22066 | Hub - Simple Build - Upper Exit Connection Box Side | 2 |
| 4 | TE-22067 | Hub - Simple Build - Upper Exit Connection 2x4 | 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 |
|---|---|---|
| DRAWN | KAMC | 12/30/2021 |

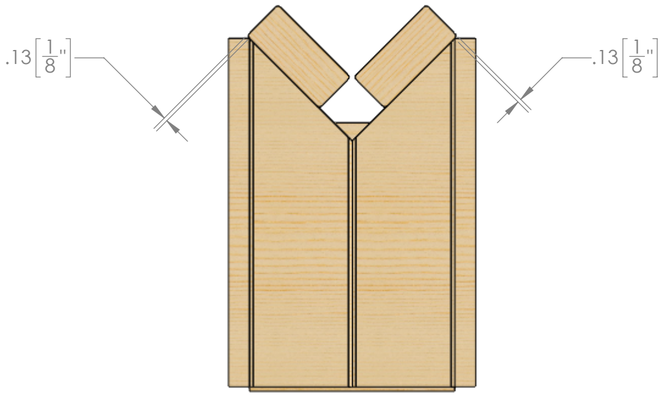


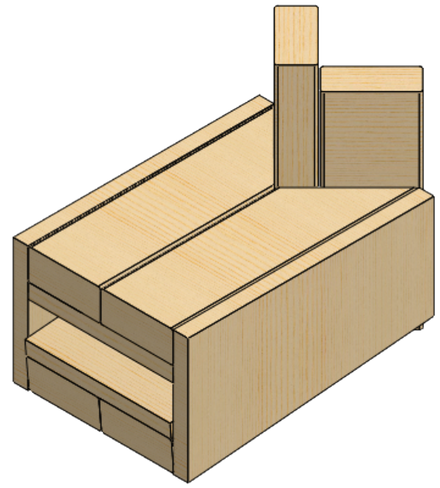
**COMMENTS:**
REMOVE ALL BURRS AND SHARP EDGES.

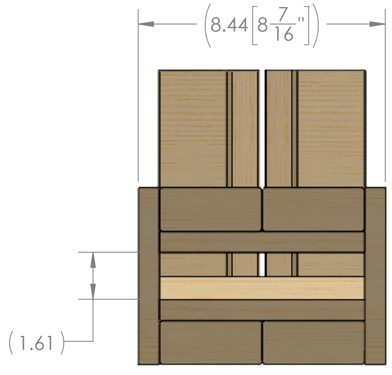
FIRST ROBOTICS COMPETITION
SOLIDWORKS Modeling Solutions Partner

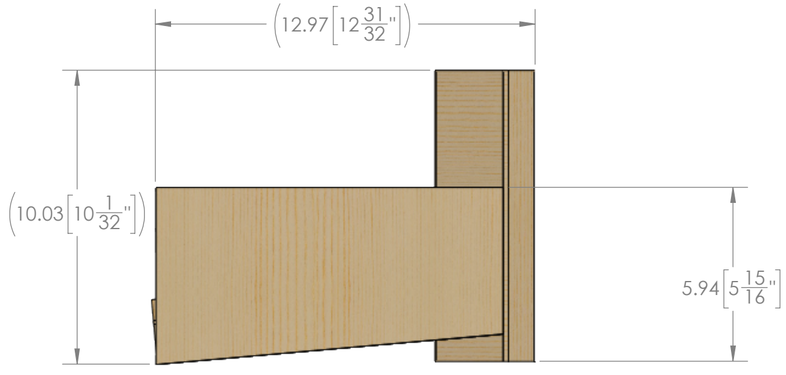
TITLE:
# Hub - Simple Build - Upper Exit Connection Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22068 | |
| SCALE: 1:3 | SHEET 1 OF 3 | |






| | | | |
|---|---|---|---|
| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
| | DRAWN | KAMC | 12/30/2021 |

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



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

SOLIDWORKS Modeling Solutions Partner

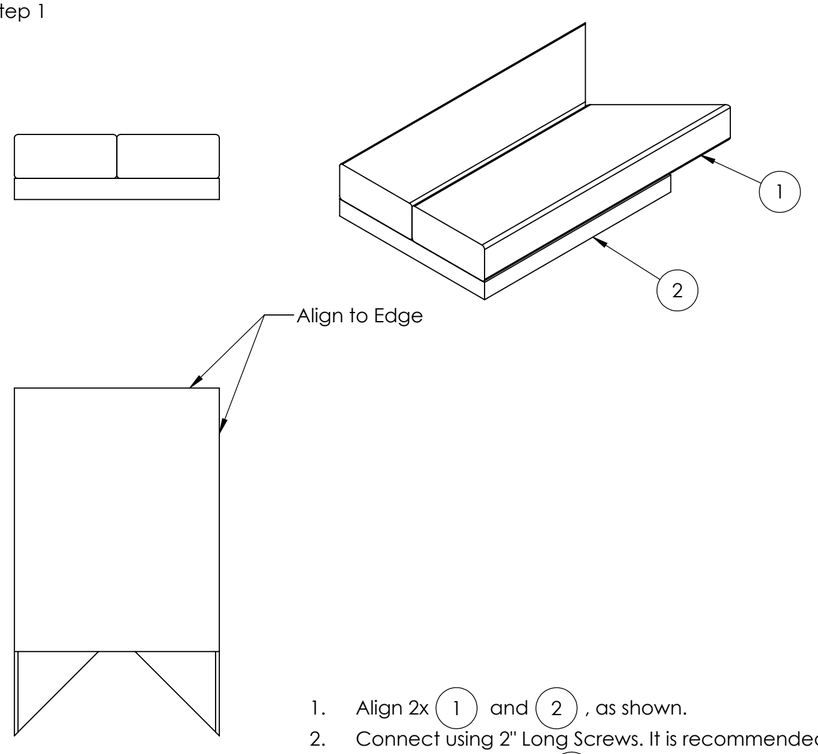
TITLE:

# Hub - Simple Build - Upper Exit Connection Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22068 | |

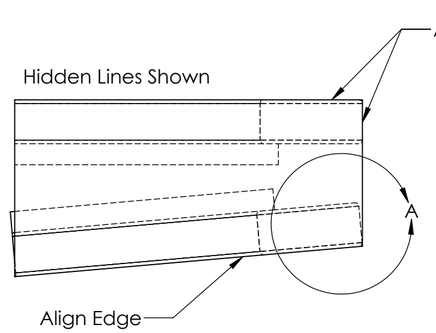
SCALE: 1:4 SHEET 2 OF 3

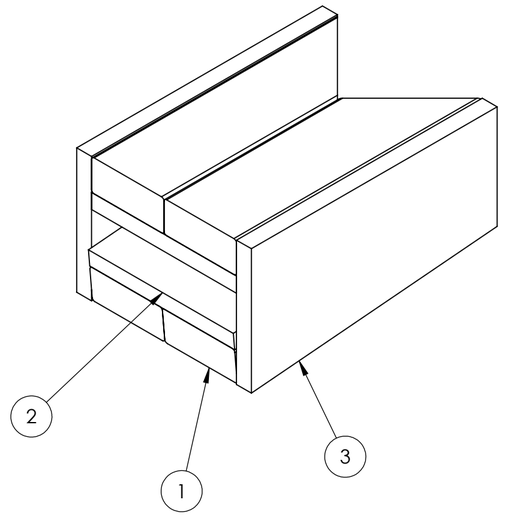
Step 1

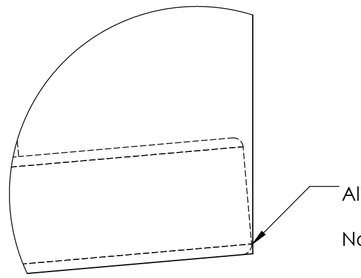



1. Align 2x (1) and (2), as shown.
2. Connect using 2" Long Screws. It is recommended to use 3x screws per (1).
3. Repeat until you have a total of 2 assemblies.

Step 2



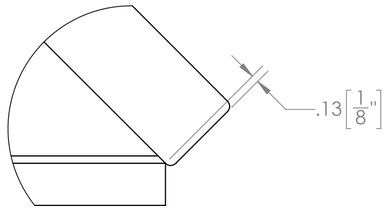
Align back corner of (1) with edge of (3).

Note: (1) should not extend past (3).

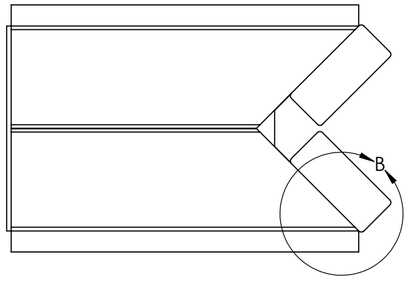
DETAIL A
SCALE 2 : 3
Hidden Lines Shown

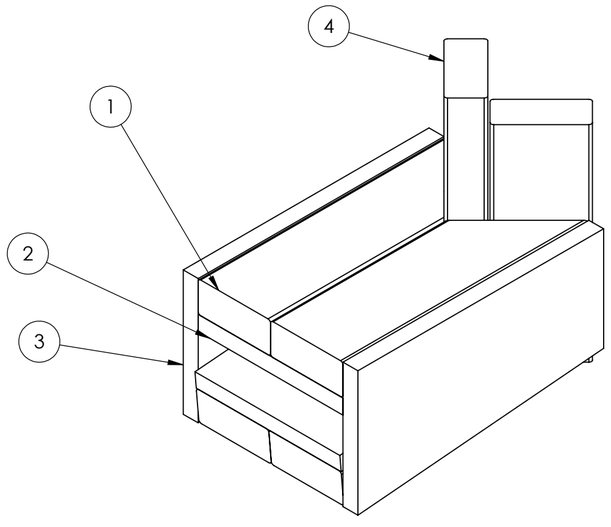
1. Align 2x (3) to 2x Step 1 assemblies, as shown. Note the alignment information called out in Detail A.
2. Connect using 2" Long Screws. It is recommended to use 3x screws into each (1). Screws should not be used to attach (3) to (2).

Step 3

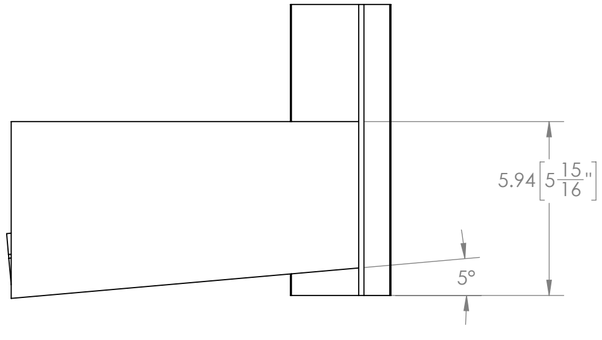



2X
DETAIL B
SCALE 1 : 2




1. Align 2x (4) to Step 2, as shown. Note dimension in Detail B.
2. Connect using 2.5" Long Screws. It is recommended to use 2x screws per (1).




| UNLESS OTHERWISE SPECIFIED: | TEAM | NAME | DATE |
|---|---|---|---|
| DIMENSIONS ARE IN INCHES<br>TOLERANCES:<br>FRACTIONAL ±1/16<br>ANGULAR: MACH ±1° BEND ±1°<br>TWO PLACE DECIMAL ±.13<br>THREE PLACE DECIMAL ±.125 | DRAWN | KAMC | 12/30/2021 |

**MATERIAL/FINISH:**

DO NOT SCALE DRAWING



**COMMENTS:**

REMOVE ALL BURRS AND SHARP EDGES.

FIRST ROBOTICS COMPETITION

SOLIDWORKS Modeling Solutions Partner

TITLE:

# Hub - Simple Build - Upper Exit Connection Assembly

| SIZE | DWG. NO. | REV |
|---|---|---|
| C | TE-22068 | |

SCALE: 1:4 SHEET 3 OF 3