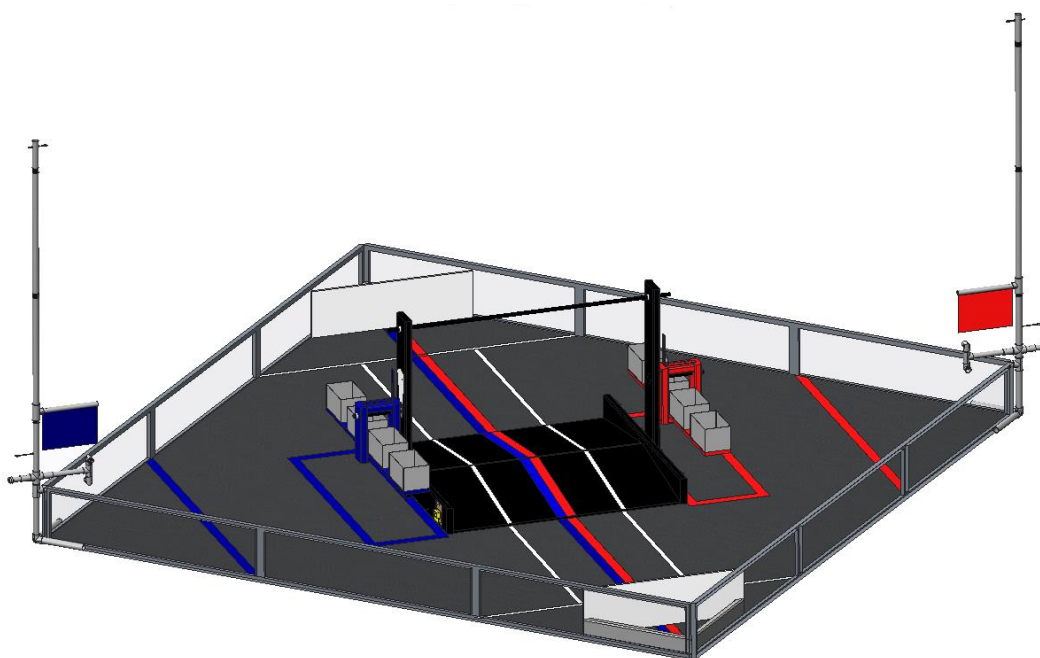




# FTC BLOCK PARTY!

## 2013 - 2014 PLAYING FIELD SET-UP GUIDE



## ***Read through all the instructions before you begin to set up!***

This Guide contains instructions for setting up the Field Elements for the 2013-2014 FTC Game. Field electronics and Playing Field setup are described in separate documents.

<b>Revision History</b>		
<b>Rev</b>	<b>Date</b>	<b>Description</b>
1.00	August 26, 2013	Initial Release
1.1	September 5, 2013	Corrected a diagram in the Critical Dimensions section. The critical dimension of the height of the balance arm board above the Soft Tile floor is 10.5" when measured from the <i>top</i> of the board to the top of the floor.
1.11	September 5, 2013	Made several minor changes to make this document consistent with the game manual and with other documents for this season.
1.12	September 20, 2013	Made changes to the floor plan images to clarify tape placement and measurements. Added information on how to configure the new style IR beacons for competition. Added warnings for the case of an over-tensioned flag.

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# 1 Field Set-up Requirements

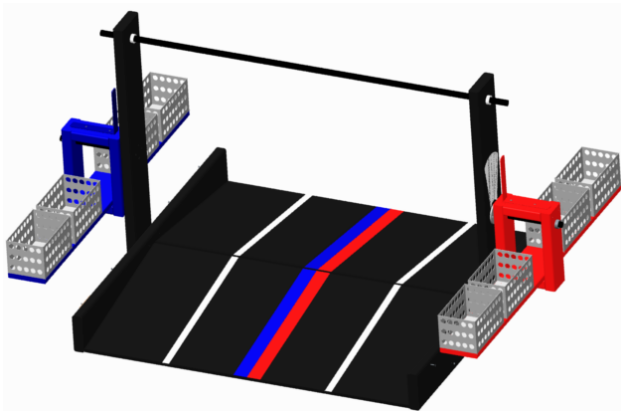
## 1.1 Block Party Field Components

Item	Description	QTY / Field	Where Used
F1	FTC Field perimeter	1	Playing Field
F2	5/8" gray Soft Tiles	36	Playing Field floor surface
T1	1" white gaffer's tape	As needed	Playing Field
T2	2" red gaffer's tape	As needed	Driver stations (outside Field) & on Playing Field
T3	2" electric blue gaffer's tape	As needed	
M8	8" cable ties	As needed	To secure Flags to perimeter.
M12	9V battery	As needed	IR beacons
M10	tape measure	1	For verifying critical dimensions and placing gaffer's tape on Field.

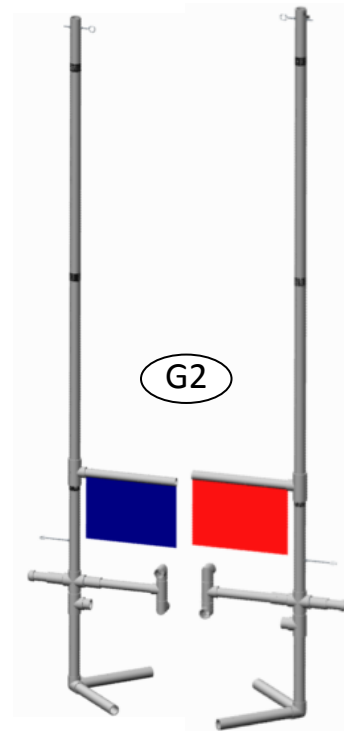
## 1.2 Block Party Game Components

Item	Description	QTY / Field
G1	Center assembly	1
G2	Flags (1 red, 1 blue)	2
G3	Corner barrier	2
G4	IR beacon hanger with beacon mounted	2
G5	Yellow blocks	100

G1



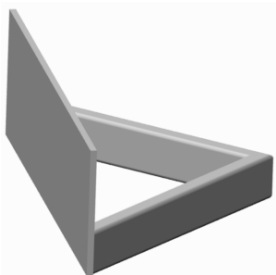
G2



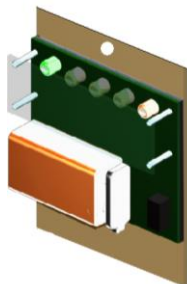
G5



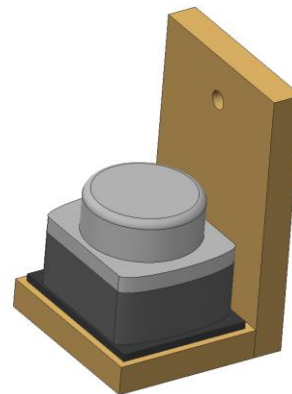
G3



G4

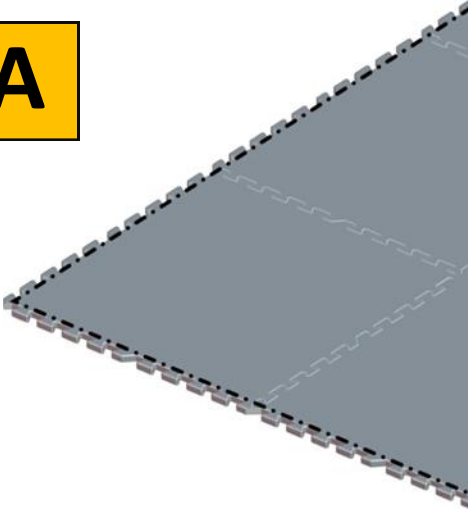


OR

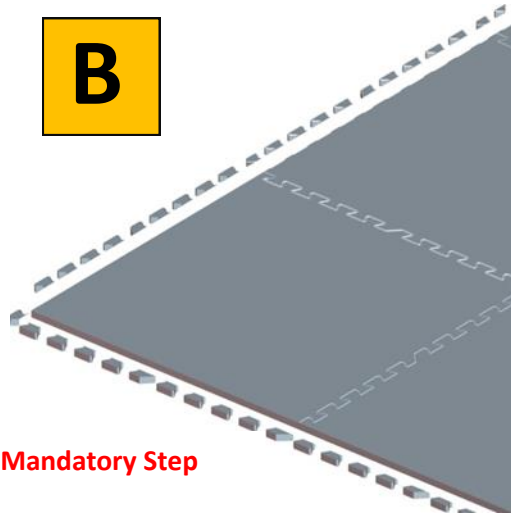


## 2 Setting up the Floor and Field Perimeter

**A**



**B**

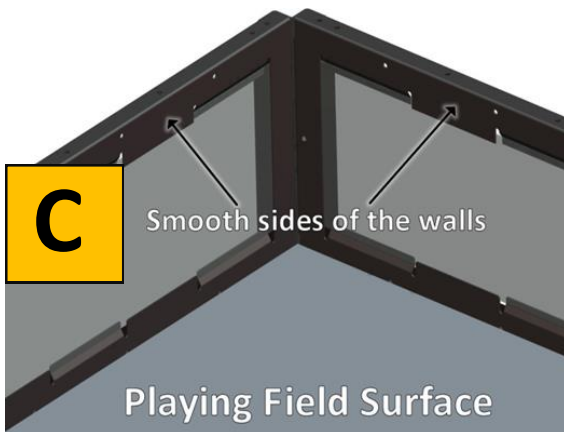


**Critical Mandatory Step**

**TIP**

Lay the tiles out and mark the outer edge to be cut. Use a sharp box cutter and a straight edge or, if available, a band saw to get a smooth, clean edge.

**C**

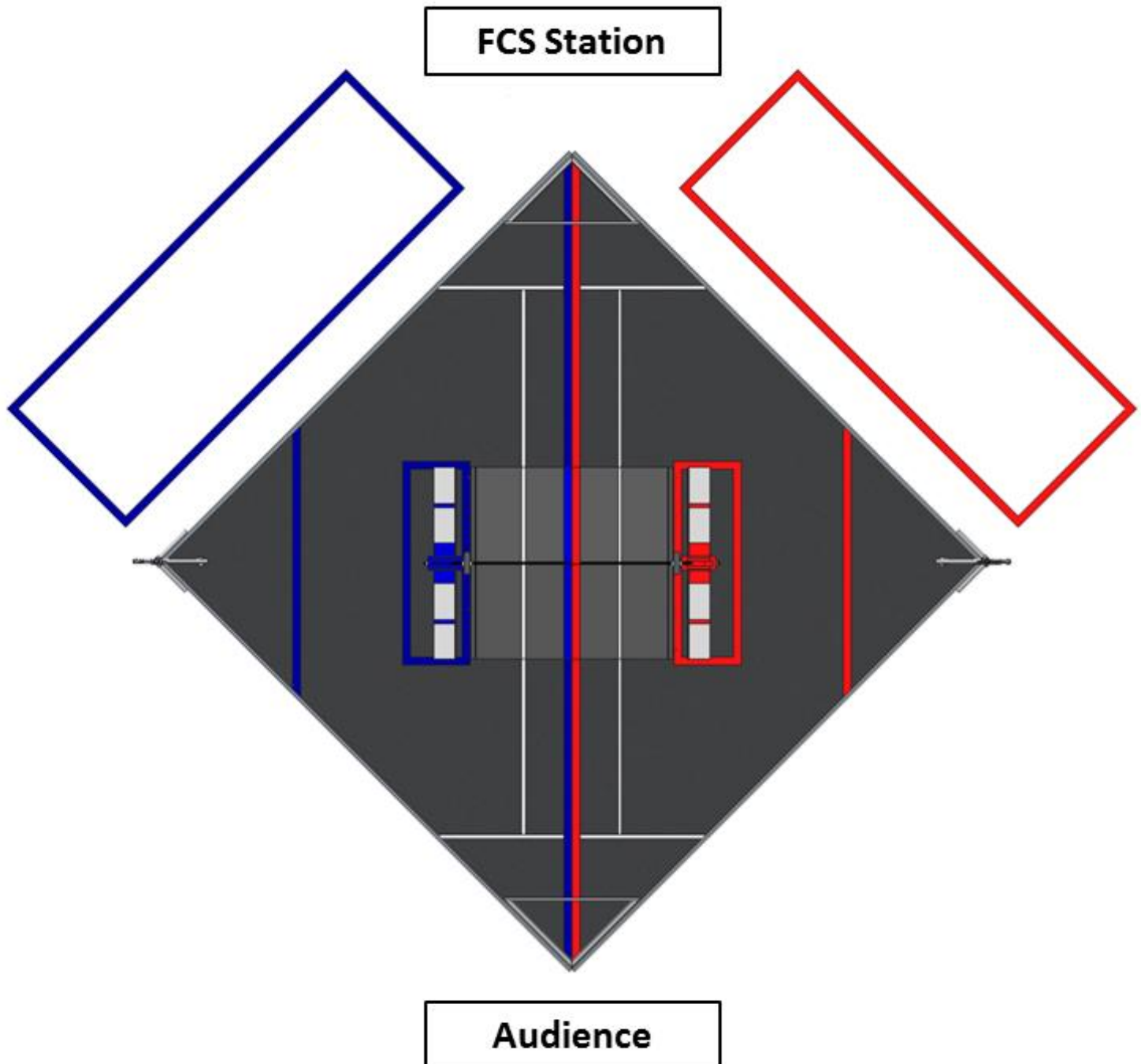


- A. Lay the tiles with the smooth surface facing up.
- B. **Critical Mandatory Step: Trim all outer tabs from the Soft Tiles.**
- C. Note that there are several FTC Playing Field wall designs. The wall designs fall into two categories: 1) symmetrical inside and outside surfaces; and 2) smooth on one side and an open cavity on the other side. The smooth/non-cavity sides should face towards the inside of the Playing Field as shown in the illustration. If the wall has a cavity, it should be oriented so that it faces outside the Playing Field. **Follow the set-up instructions supplied with your Field for details.**

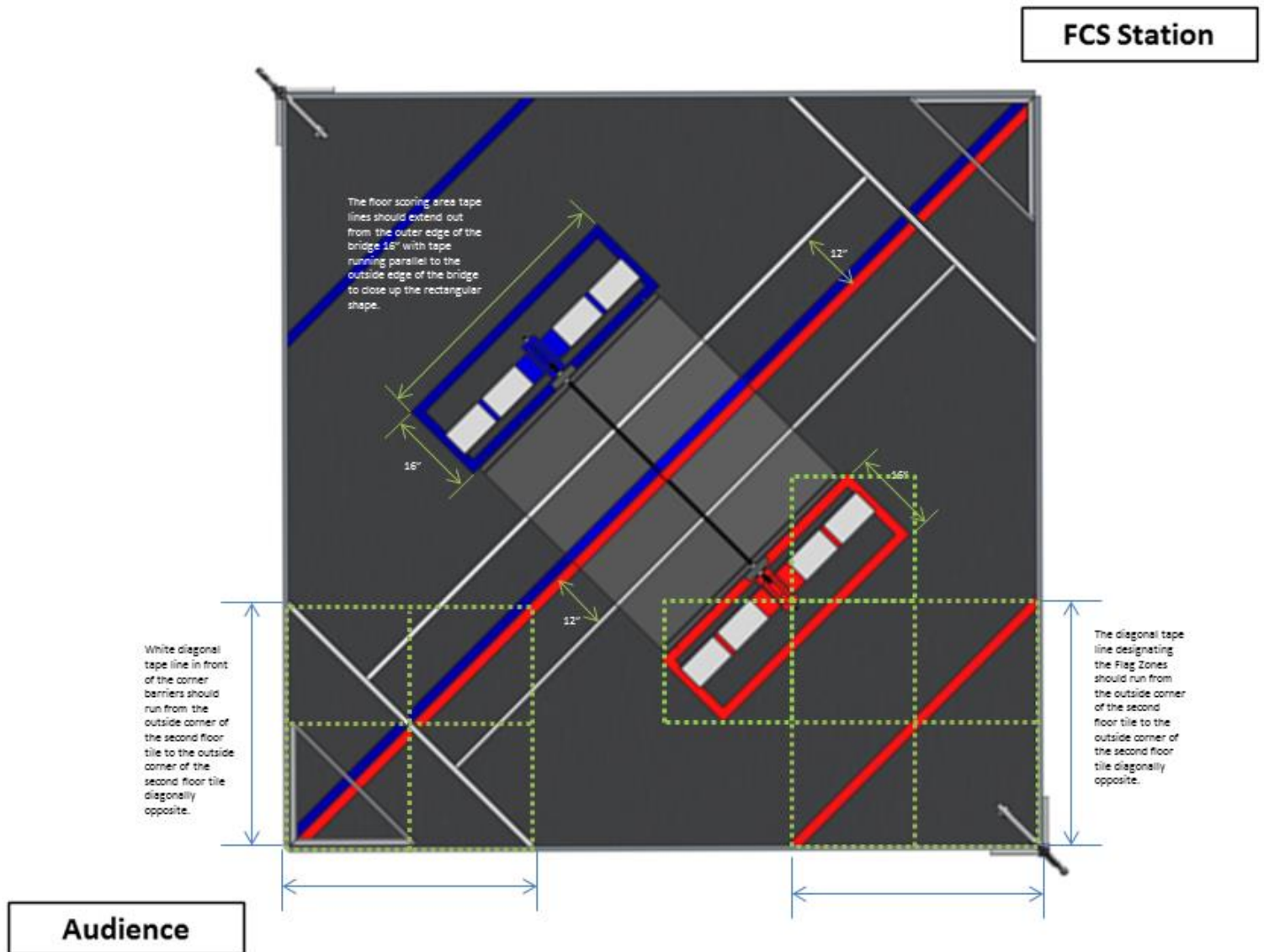
## 2.1 Orientation of the Field with Respect to Audience

Before you begin to set up your Field perimeter, take a look at where the audience will be seated during a Match. The Field perimeter should be oriented so that from the perspective of the audience, the Blue Alliance will be located to the left of the Field and the Red Alliance will be located to the right of the Field.

The diagram below shows how the Field should be oriented with respect to the audience's perspective.



## 2.2 Tape Placement



The figure above illustrates the placement of the tape on the Field. Further steps will be given for the tape's location.

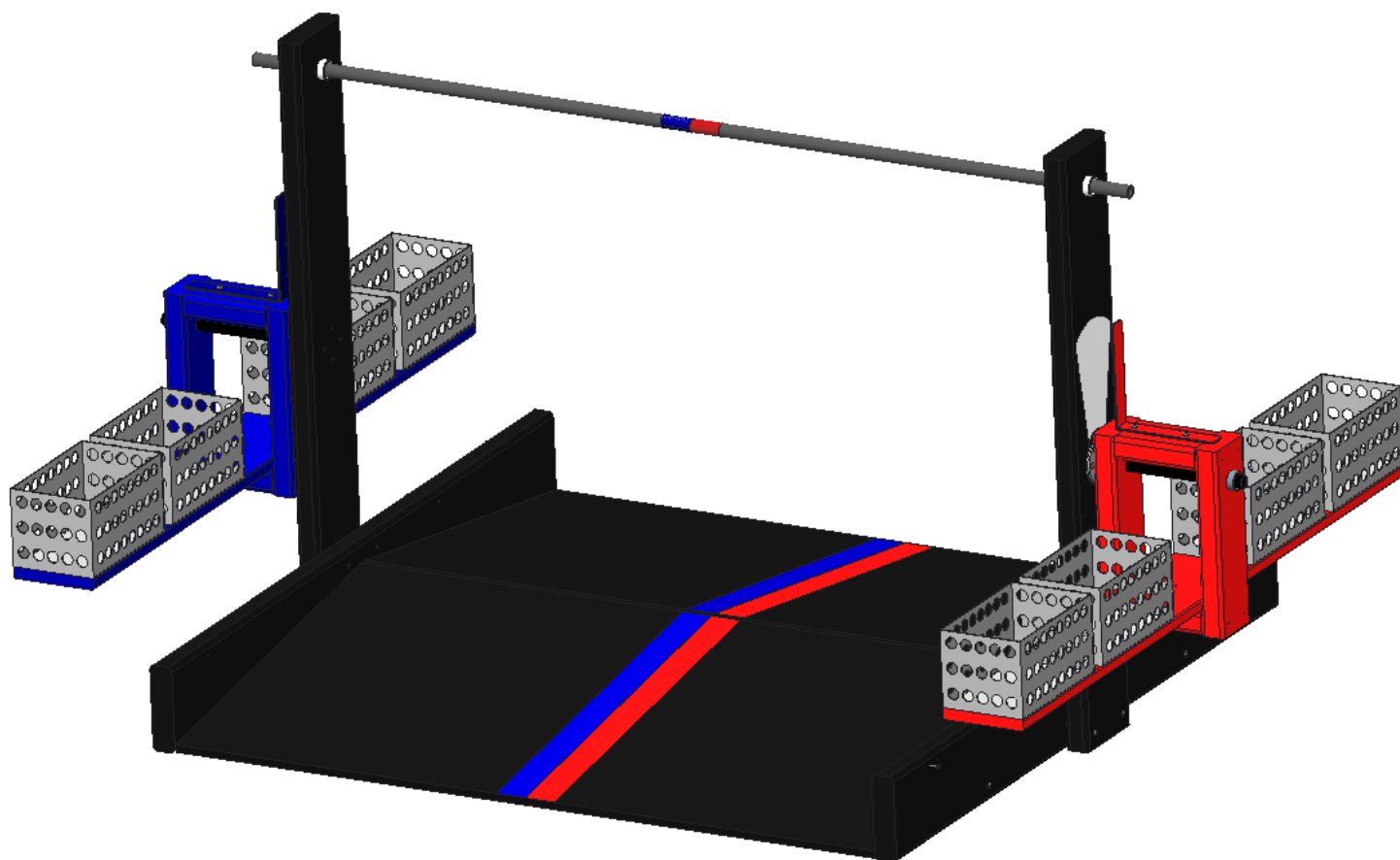
The white Block Zone tape line in front of the corner barrier should extend from the far corner of the second floor tile to the opposite second floor tile's far corner.

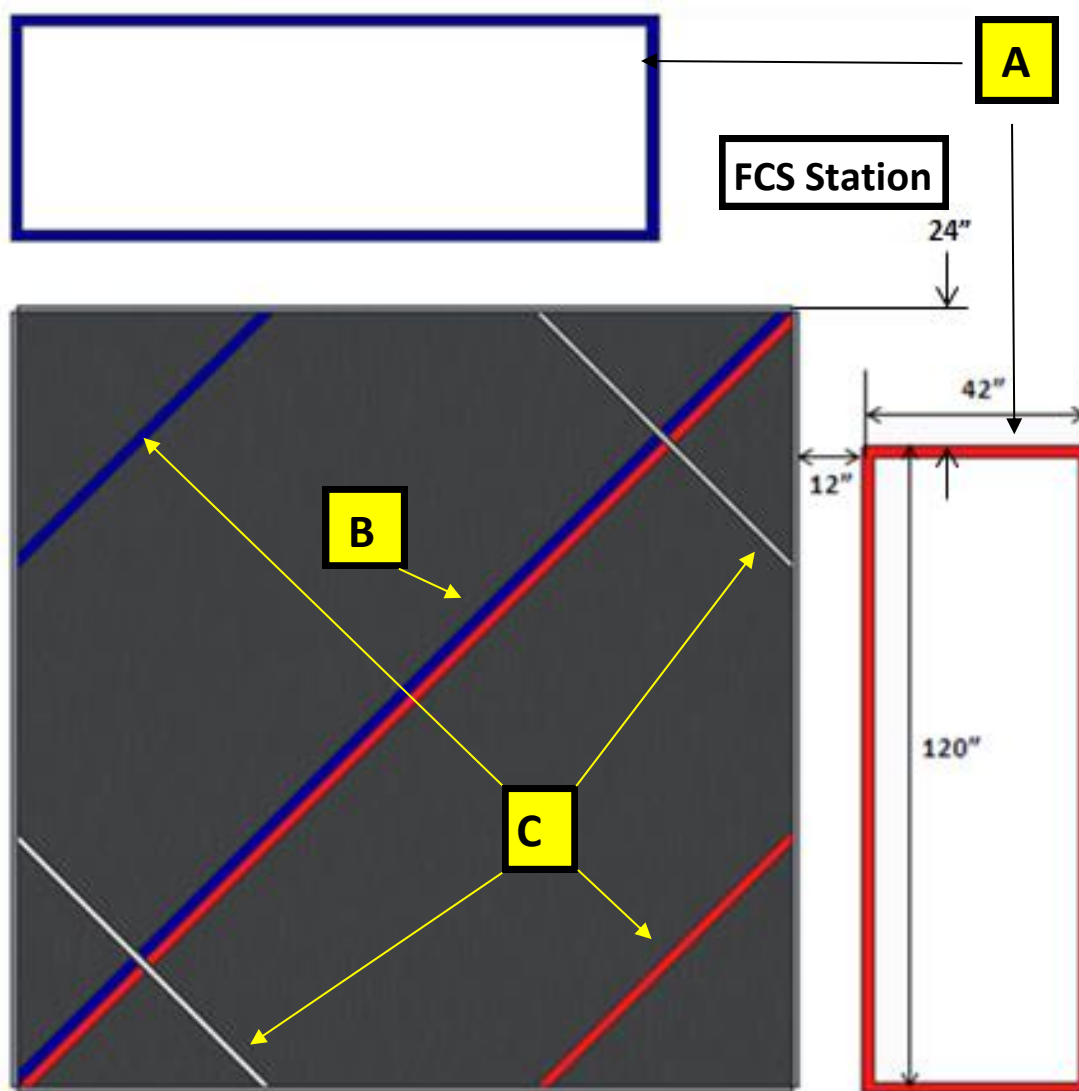
The red or blue Flag Zone tape lines also extend from the far corner of the second floor tile to the opposite second floor tile's far corner.

Also note that there should be 2" bands of blue and red gaffer's tape on the pull-up bar, directly above the corresponding blue and red tape strips along the ramp surfaces.



Place a 2" band of blue or red gaffer's tape on the pull-up bar, directly above the corresponding blue and red tape strips along the ramp surfaces.

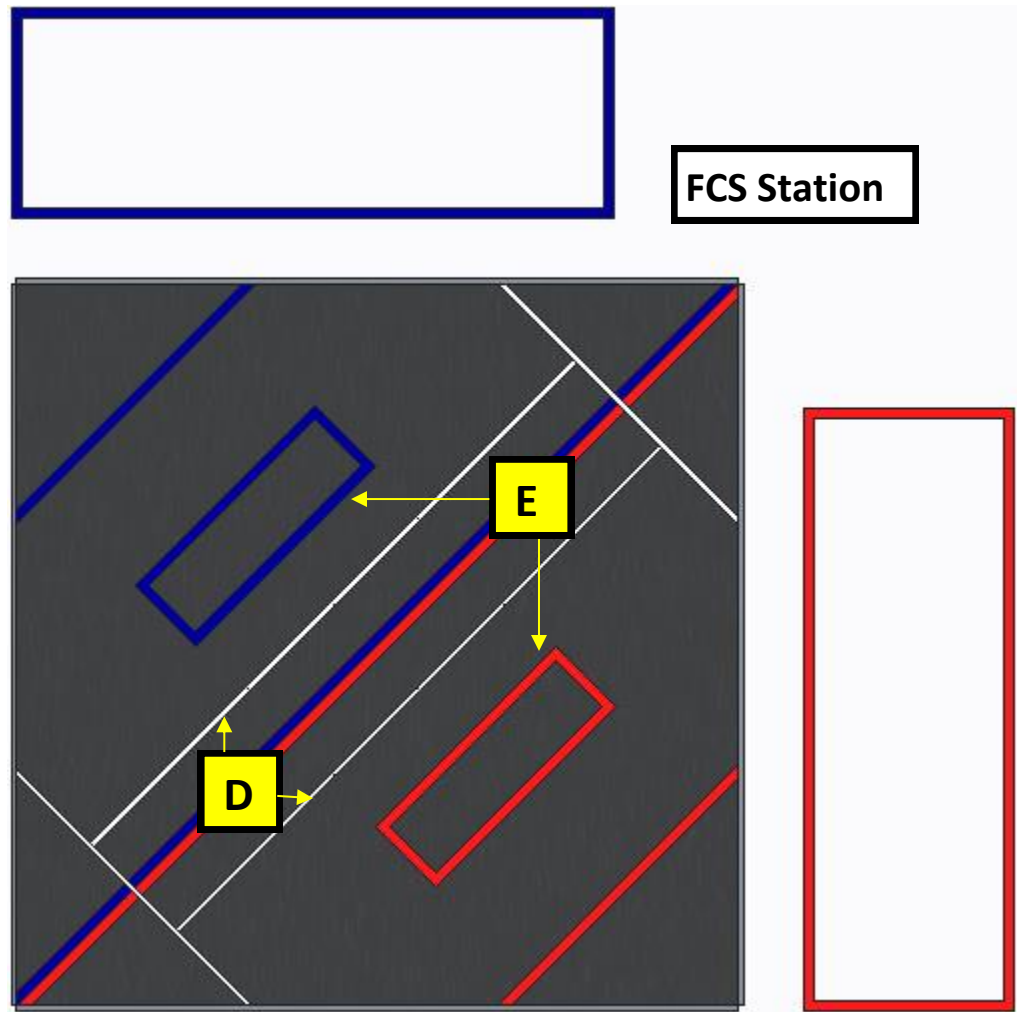




## AUDIENCE

- Use 2" red and blue gaffer's tape to mark the Alliance stations on the floor outside the Playing Field as shown above.
- Use 2" red and blue gaffer's tape to make two lines all the way across the Playing Field.
- Use 2" red and blue gaffer's tape to mark off the top left and bottom right corners of the Playing Field. Use 1" white gaffer's tape to mark off the other two corners (overlapping the red and white strips that were applied in step B). Refer to the figure on page 5 for the placement of the tape.

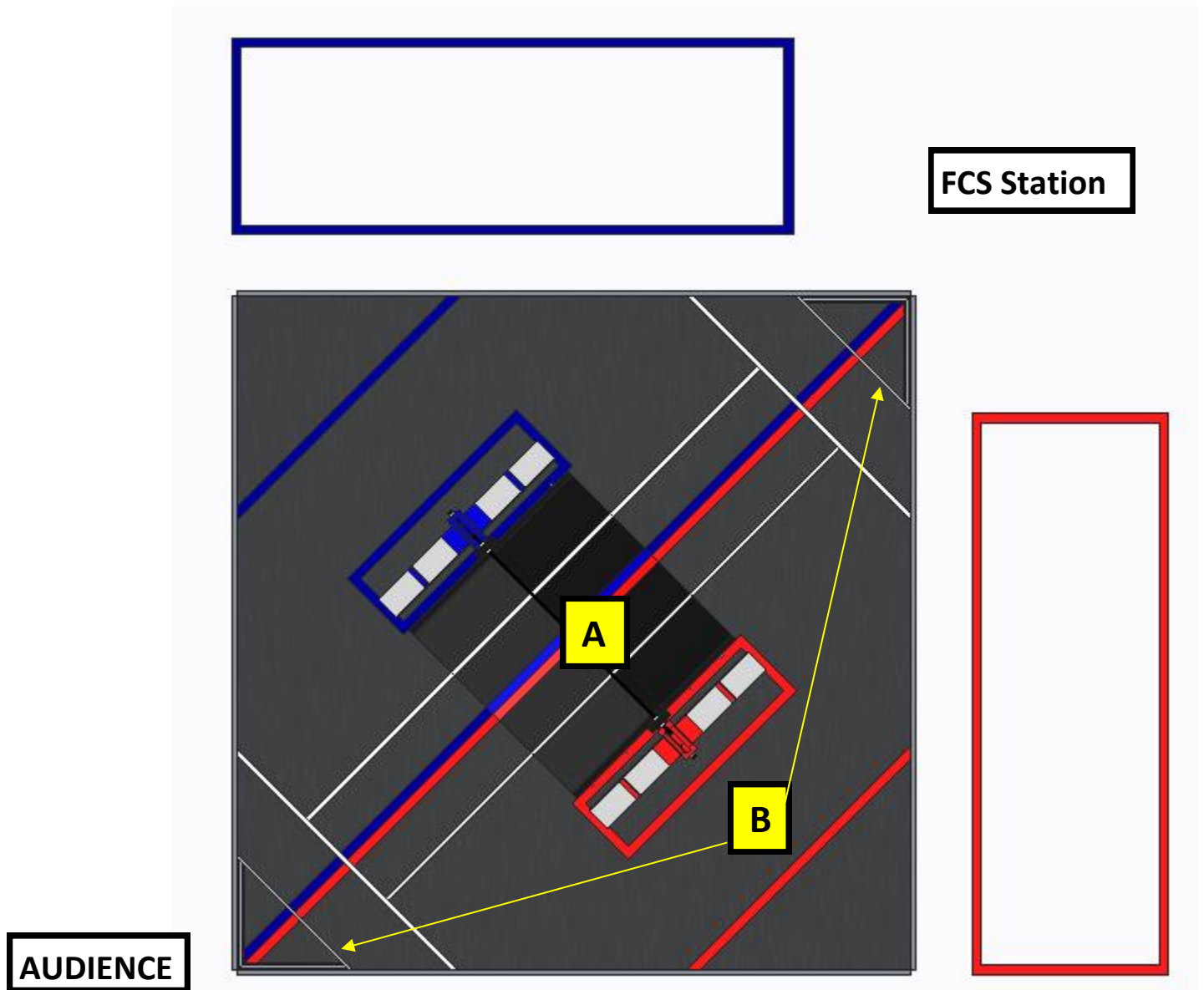
**Note:** *The Alliance stations are shorter than the perimeter to allow for space for the FCS Station.*



## AUDIENCE

- D. Use 1" white gaffer's tape to make two lines that are parallel with the lines from C and 1' away from the middle of those two lines, as shown above. Refer to the figure on page 5 for further guidance.
- E. Use 2" red and blue gaffer's tape to mark off the floor scoring area. The figure on page 5 shows the locations of the corners of the floor scoring area boxes.

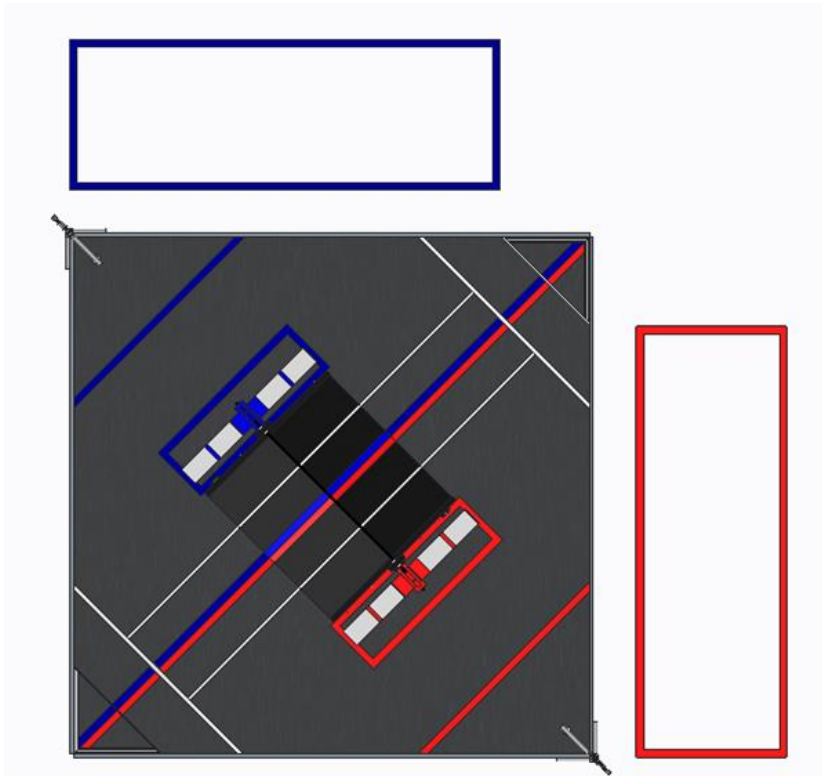
### 3 Set up Center Assembly and Corner Barrier



- A. To place the center assembly, simply move it into position so that it is centered between the two floor scoring areas. No further fastening to the playing field is necessary.
- B. The two corner barriers go in the corners nearest the FCS Station and the audience. They also need no further fastening to the Playing Field.

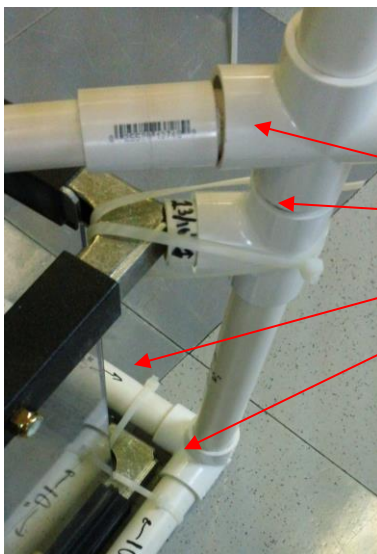
**Note:** If the center assembly is not put together, refer to the *Build Guide* for instructions on assembling it.

## 4 Set up and Secure the Flags



Place each Flag upright in the corner with its corresponding Alliance station. Fasten in place to the Playing Field perimeter wall with zip ties. Refer to the figure below for the recommended fastening process.

Note: Before starting a Match, the Flags should be lowered so that the bottom of the Flag assembly coincides with the bottom of the lowest black band on the flagpole. This black band denotes the starting position of the Flag.



**Note: 4 zip ties were used for fastening the Flag**

## 5 Important Warning Regarding Flag Assemblies

With the release of version 1.3 of the *Build Guide* the flag crank handle assembly is now cemented directly to the lift shaft assembly. There is no longer a built-in safety mechanism to prevent a robot from over-tensioning a flag assembly. This could occur if a robot goes out of control and keeps turning the crank handle, even though the flag has reached its topmost limit on the pole.

When properly built, the flag lift assembly can withstand some over-tensioning by a robot. However, even a relatively small amount of over-tensioning could result in damage to the assembly. During the *End Game* the referees and FCS operator should monitor the flag lift attentively. If an over-tensioning event occurs, the following steps should be taken:

- The out-of-control robot should be disabled immediately (using the FCS or by doing a hard stop with the power switch) to prevent field damage.
- The field area and the area surrounding the flag assembly should be cleared.
- A designated adult (with safety glasses) can attempt to relieve tension in the flag lift by manually turning the flag crank.
  - The adult should be mindful that the crank handle could slip and release the tension in the pole suddenly; causing the crank handle to spin rapidly and the flag pole to snap back into place.
  - The adult should stay clear of the plane that the flag pole might travel through upon a sudden release of tension.
- Once the tension has been safely released, the flag lift assembly should be inspected for damage.
  - The PVC flag pole should be checked for plastic deformation and breaks.
  - The nylon twine should be inspected to see if the over-tensioning caused it to fray (due to friction with the eyelets).
  - The eyelets should be inspected to make sure they are not bent and that they are still securely fastened to the PVC flag pole.

Also, the flag assembly should be inspected regularly at the start of the day (before any matches occur), during mid-day (after lunch), and at the end of the day (before disassembly). The twine should be checked to see if it is fraying and the eyelets should be examined to make sure they are securely fastened to the pole.



## 6 IR Beacon Setup

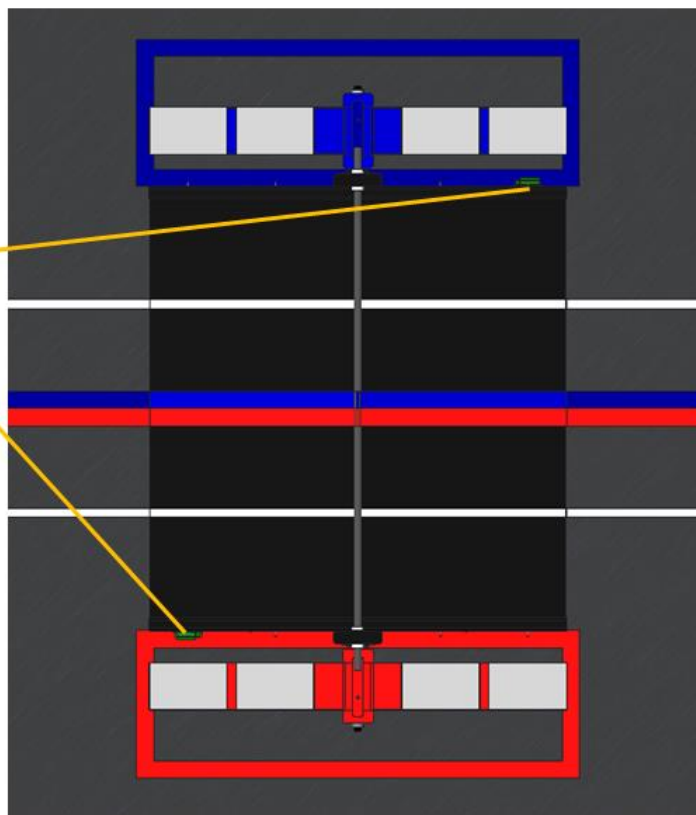
### 6.1 IR Beacon Placement

**IMPORTANT:** IR beacons are placed **LAST**, after all Robots have been placed on the Field. The position of the beacons will change randomly from Match to Match. The beacon mounts are labeled “1” through “4” with position “1” always on the left most side of the outer sidewall.

Note the location of the beacons in the illustration below. Both of the beacons are in the “1” position for the Blue and Red Alliances.

Also, make sure the LED lights of each beacon sit at the critical height of 2.75” above the Soft Tile floor.

Beacons are placed in the #1 position along each sidewall



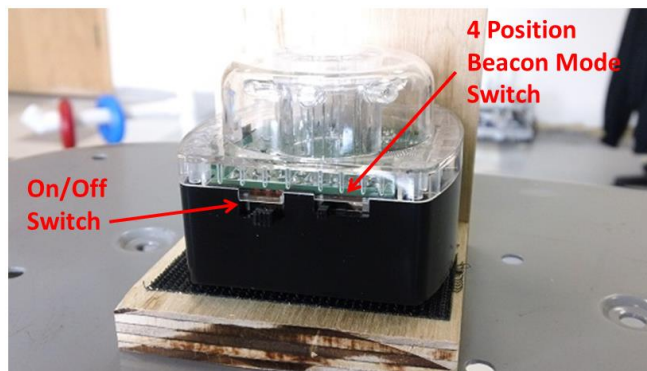
Note: 9V battery life for the IR beacons is about 4 hours<sup>1</sup>. Be sure to have enough batteries on hand at your Event to ensure consistent performance from the beacons throughout the Tournament.

<sup>1</sup> The battery performance specified is for the older style IR beacon (HiTechnic #FTCBCN). Note that the battery life expectancy for a newer style beacon (HiTechnic # HBK2100) might differ from the expectancy of the older style of beacon. Test your beacon prior to your first scheduled Event to get a better idea of what its expected battery life will be.



## 6.2 New IR Beacon Settings

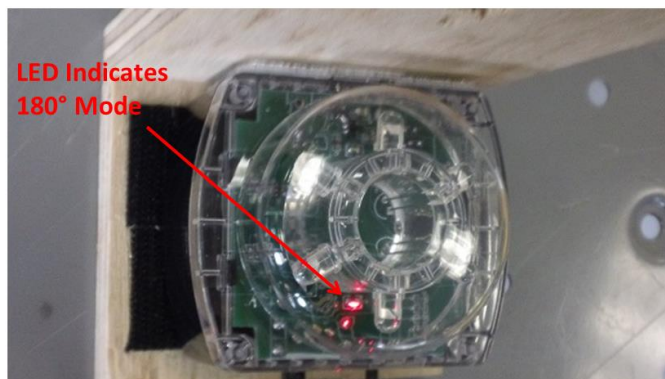
For the 2013-2014 season, Hitechnic has introduced a new style of IR Beacon (#HBK2100) that can be used for this season's game. This new style of beacon is a 360° beacon that can run in either 1.2 kHz or 0.6 kHz mode. On the front of the beacon there are two switches (see image below).



The switch on the left is an on/off switch, with the off position being the rightmost position. The switch on the right is a four position switch that is used to control the beacon mode:

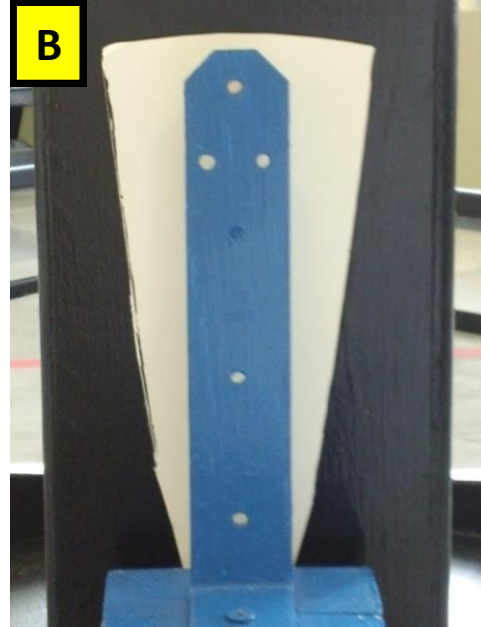
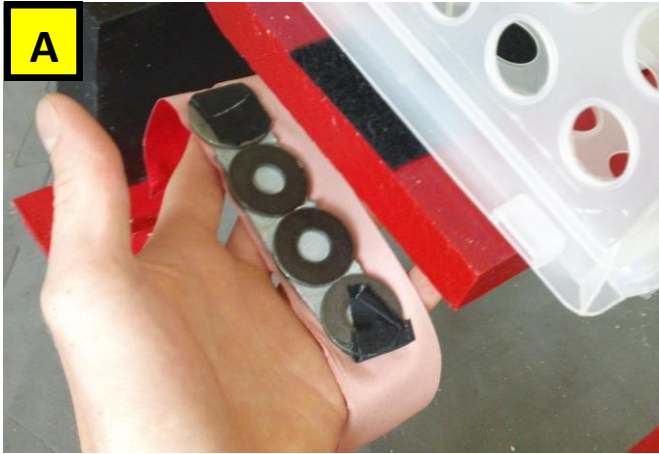
- The leftmost position puts the beacon in 180° mode (only half of the IR LEDs are active) and in 1.2 KHz mode (the IR LEDs flash at this frequency).
- The second position from the left puts the beacon in 360° mode (all of the IR LEDs are active) and in 1.2 KHz mode.
- The third position from the left puts the beacon in 180° mode and in 0.6 KHz mode.
- The rightmost position puts the beacon in 360° mode and in 0.6 KHz mode.

For this season's game the four position switch should be set so the beacon is running in 1.2 KHz mode (the two leftmost positions). This is the same frequency mode that the older style beacons (#FTCBNCN) use. You can run the beacon in either 180° (leftmost) or 360° mode (second to left). If you run your beacon in 180° mode, then make sure the active side of the beacon is facing outward towards the playing field (and away from the back of the wooden hanger). There are red LEDs on the printed circuit board of the new IR beacon. A lit red LED indicates that a side of the beacon is active. In 180° mode only one of the LEDs will be lit. In 360° mode both red LEDs will be lit.





## 7 Ensuring Balance Arm is Level and Centered



- A. As stated in the *Build Guide*, it is important to ensure that each unloaded balance arm is level. If a balance arm is not level, use gaffer's tape and steel fender washers to make the unloaded arm level. An arm is considered level when the indicator points vertically straight up.
- B. The boundaries of the white background for the balance indicator should already be cut so that the indicator stays within its boundaries when there is a difference of two blocks placed in the outermost baskets of the arm. The indicator should go out of its boundaries when there is a difference of three or more blocks in the outermost baskets.

## 8 Critical Dimensions

Note that Field construction may vary from venue to venue. This section provides critical dimensions for the components of this year's Game. Note that the allowable variation in critical dimensions is +/- 1" (2.54 cm).

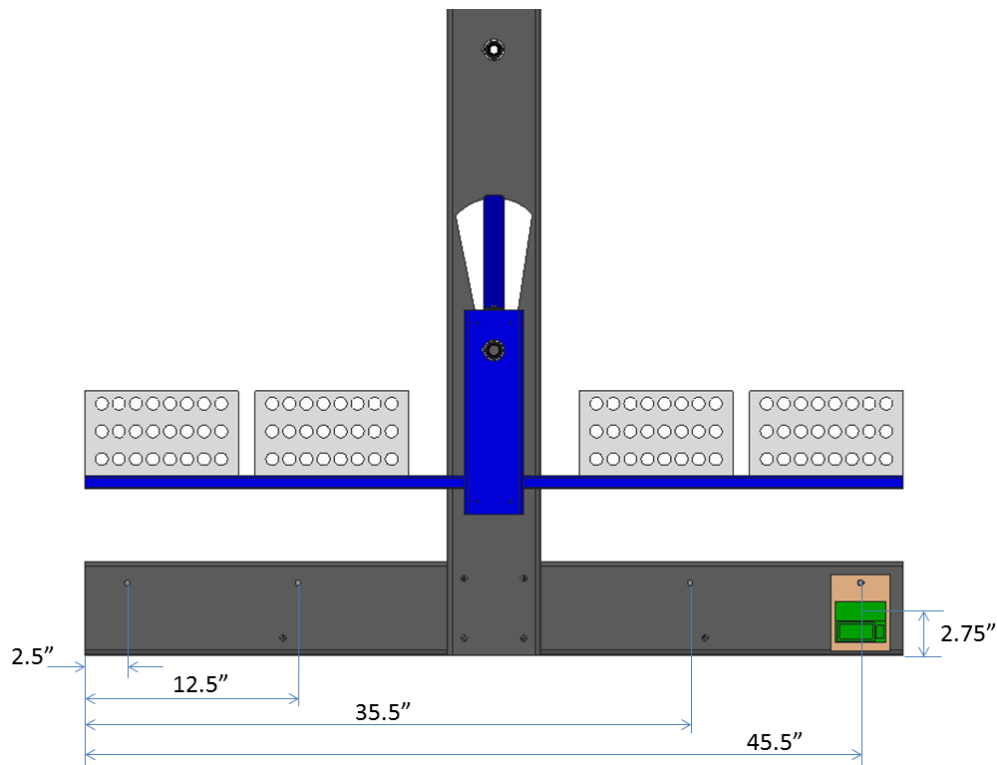
### 8.1 Pendulum Goal Dimensions

The crate used for the pendulum goal that is specified in the *Bill of Materials* has the dimensions of 9" x 7-7/8" x 6-1/8" (22.9cm x 20.0cm x 15.6cm). If this particular crate (Sterilite Mini Crate) is unavailable, a substitute crate should have a length of 9" (22.9cm) or smaller, with a recommended minimum length of 8" (20.32cm). The width of a substitute crate should be within the range of 6.875" to 8.875" (17.46cm to 22.54cm). The height of a substitute crate should be within the range of 5.125" to 7.125" (13.02cm to 18.1cm).



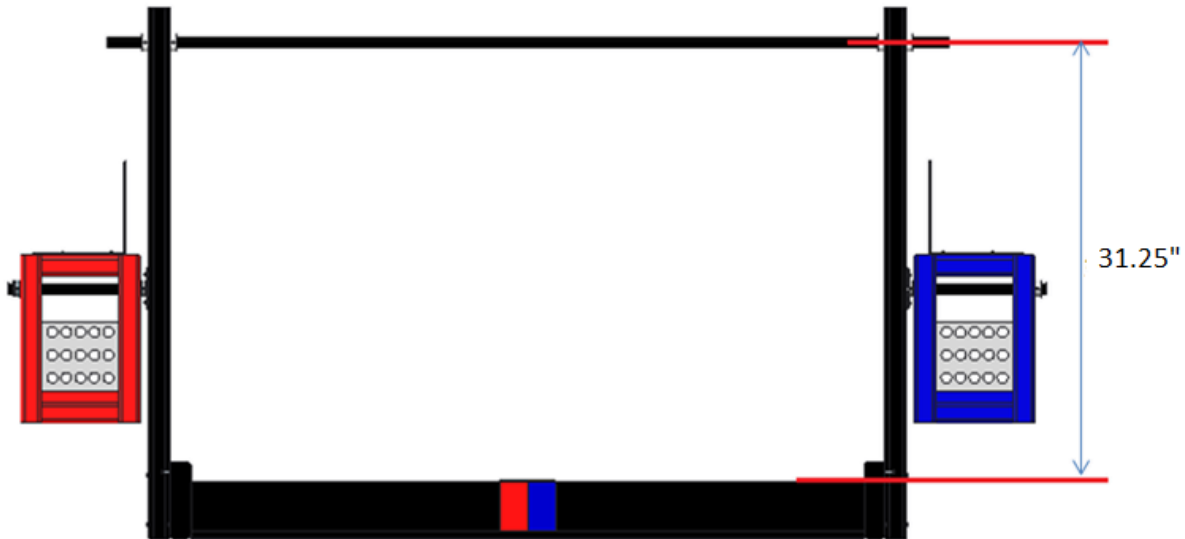
### 8.3 IR Beacon Mount Dimensions

The IR beacons are hung from wood screws that are installed along the sidewall of the bridge. The critical dimensions for a sidewall are depicted in the image below.



### 8.4 Pull-Up Bar Dimension

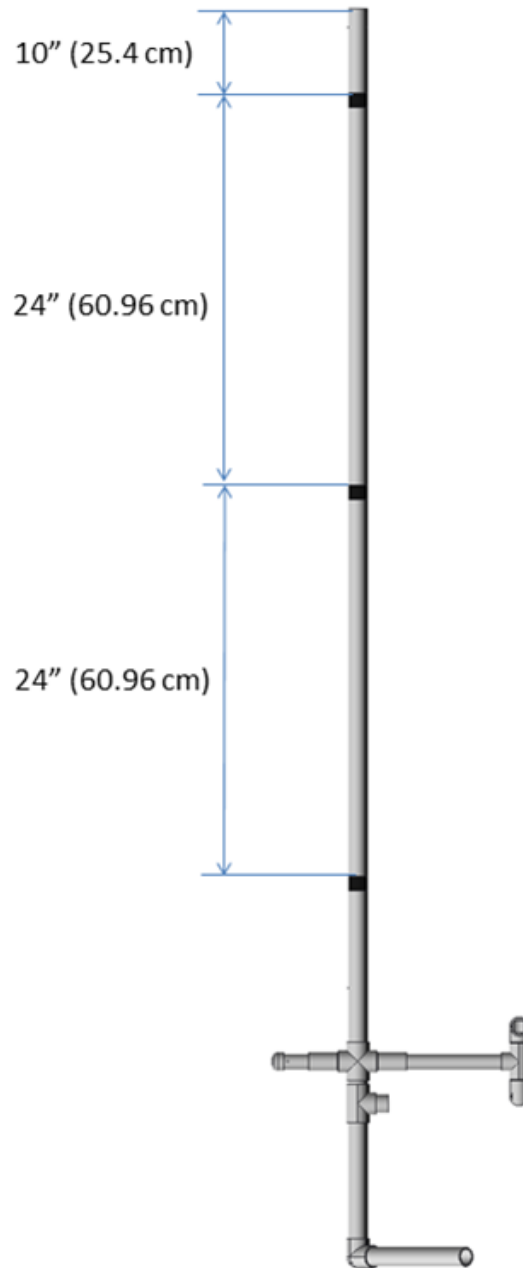
The height of the pull-up bar from the top of the ramp is shown in the following diagram. The critical dimension, as measured from the centerline of the pull-up bar, is 31.25" (79.38cm) above the peak of the ramp.



## 8.5 Flagpole Dimensions

### 8.5.1 Critical Dimensions for Pole Markings

There are three 1" (2.54cm) wide bands around the flagpole of each corner Flag assembly. The bottom-most band indicates the start position of the Flag. The middle band indicates the first level of bonus. The top band indicates the second (i.e., highest) level of bonus. The critical dimensions of the bands are listed below.



### 8.5.2 Critical Dimensions for Crank

The center of the crank should sit 12" (30.5cm) above the top surface of the Soft Tiles (F2) of the perimeter interior. The face of the crank should extend 11.5" (29.2cm) from the center of the flagpole.

Note that the illustration below and to the right shows the crank parallel to the floor. When you build your actual Flag lift assembly, the crank will droop slightly (i.e., the shaft crank will point at a slight angle downwards from horizontal) due to the oversized fit of the cross joint. This is normal for the Flag lift assembly.

The critical dimension of the height of the crank above the Soft Tile floor includes this drooping effect (i.e., the crank rests closer to the floor due to the oversized cross joint).

