

2023 FIRST® Robotics Competition

AprilTag Images and User Guide

1 APRILTAGS AND TEAM ELEMENTS

1.1 Overview

This document contains printable images for the 8 AprilTag markers included on the 2023 Playing Field as well as some instructions on how to print these tags, verify that they have printed correctly, and apply them to team-version field elements. AprilTag stickers and polycarbonate plates are also being made available by AndyMark, the drawing below can be used to locate these plates on team version field elements.

The included tag images should print with appropriate minimum white margins for AprilTag detection on either Letter or A4 paper. Note that the targets on the official field have additional white space, see FE-00081 in the Official Drawings package for more details.

1.2 Printing tags

To print the tags, it is recommended, though not necessarily required, to download the document and print using a standalone PDF reader as browsers often re-scale the document and add URLs or other information to the printout. Make sure you set the settings to print at “Actual size”, “Scale: 100%” or similar option in your application. You can verify that the tag has printed at the correct size by measuring the black box on the printed tag to ensure it is a 6 in. x 6 in. square (~15.24cm x 15.24cm)

1.3 Applying tags to team field elements

You can apply the printed paper tags directly to the team versions of the field elements. Make sure that the tags remain flat when applied; on the double-substation this will likely require mounting the tag to cardboard, hardboard, or other similar backing to support the tag.

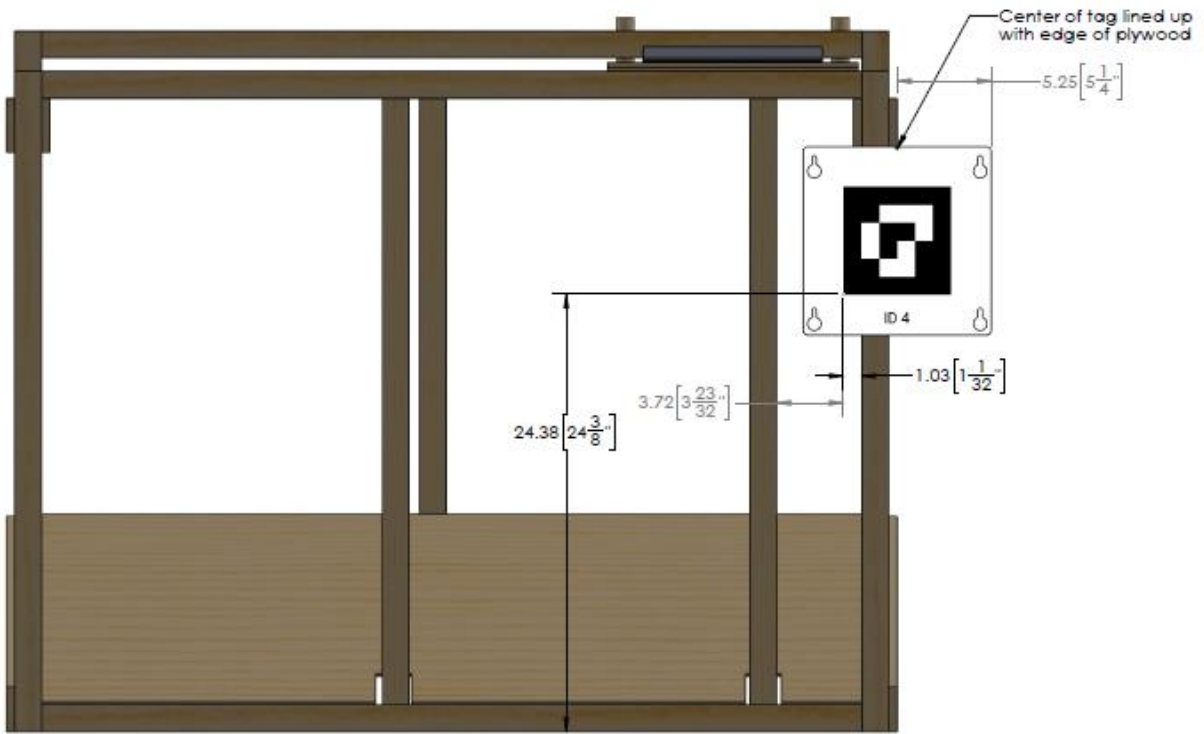
The drawings on the next page show the appropriate measurements for locating the targets on your team field elements. These drawings show a visual of the official target plates but provide measurements to the black square on each tag in order to be valid regardless of the paper size used. You may end up with extra paper overhanging the field elements, if desired you can trim or fold this, making sure to maintain a minimum of 1 in of white space around the entire border of the black box on the tag (i.e. minimum tag size is 8 in x 8 in.).

If you wish to be able to swap tags on field elements, it’s recommended to apply all tags to cardboard, hardboard, or similar plate which can attach to the field element using hook and loop, screws, or other fasteners. This will result in significantly less reflections than using a sheet protector or similar plastic sleeve for the paper and will ensure the target stays flat.

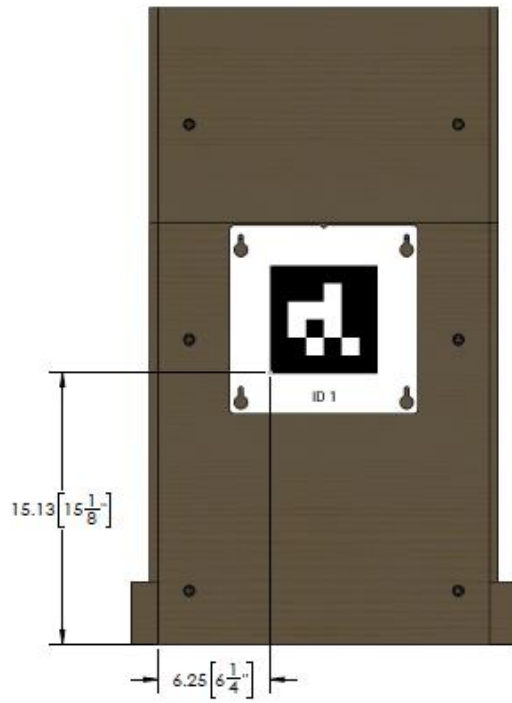
A reminder on the location of the various IDs on the field:

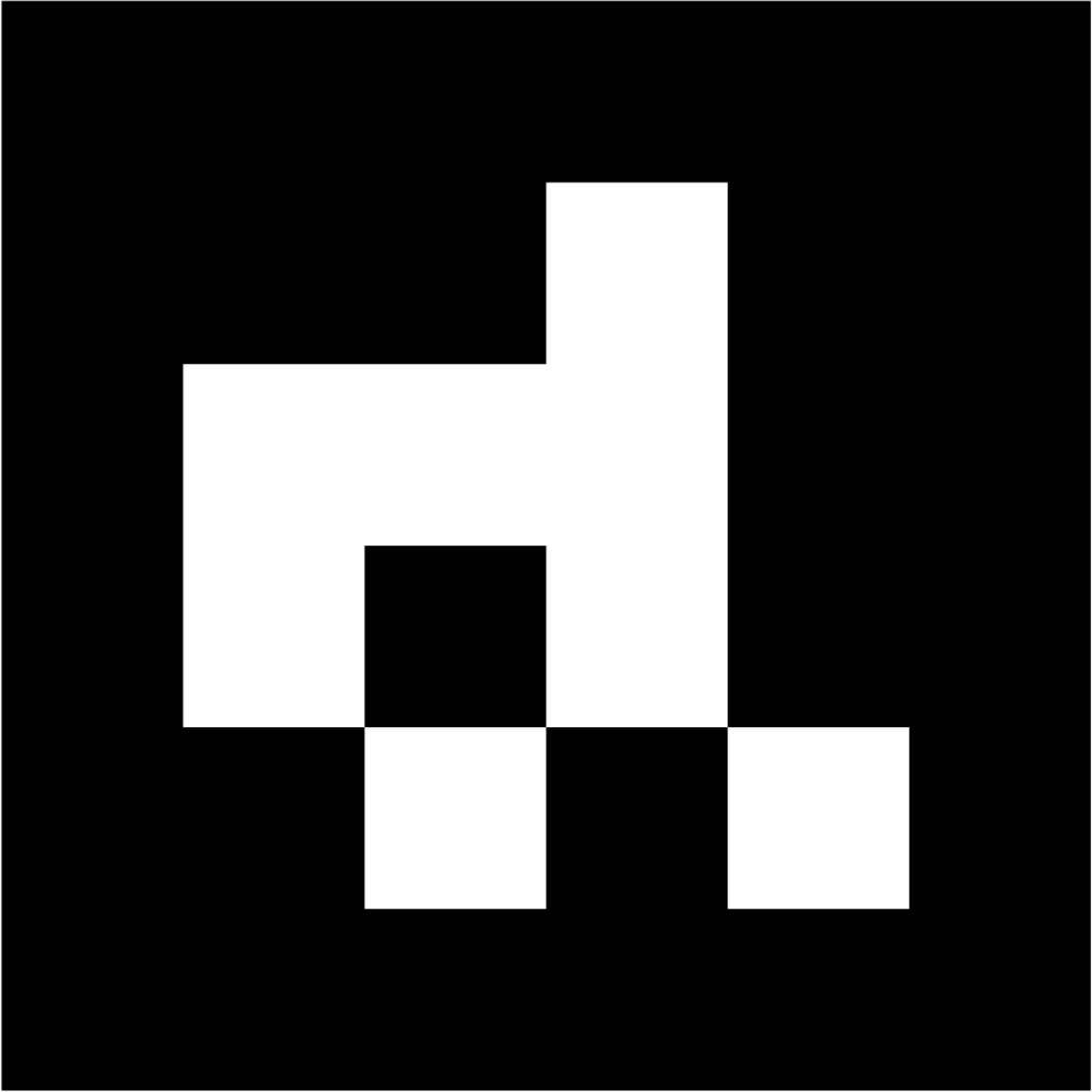
- Red Alliance Community (right to left) – IDs 1, 2, 3
- Blue Alliance Double Substation – ID 4
- Red Alliance Double Substation – ID 5
- Blue Alliance Community (right to left) – IDs 6, 7, 8

2 APRILTAG TEAM FIELD ELEMENT DRAWING

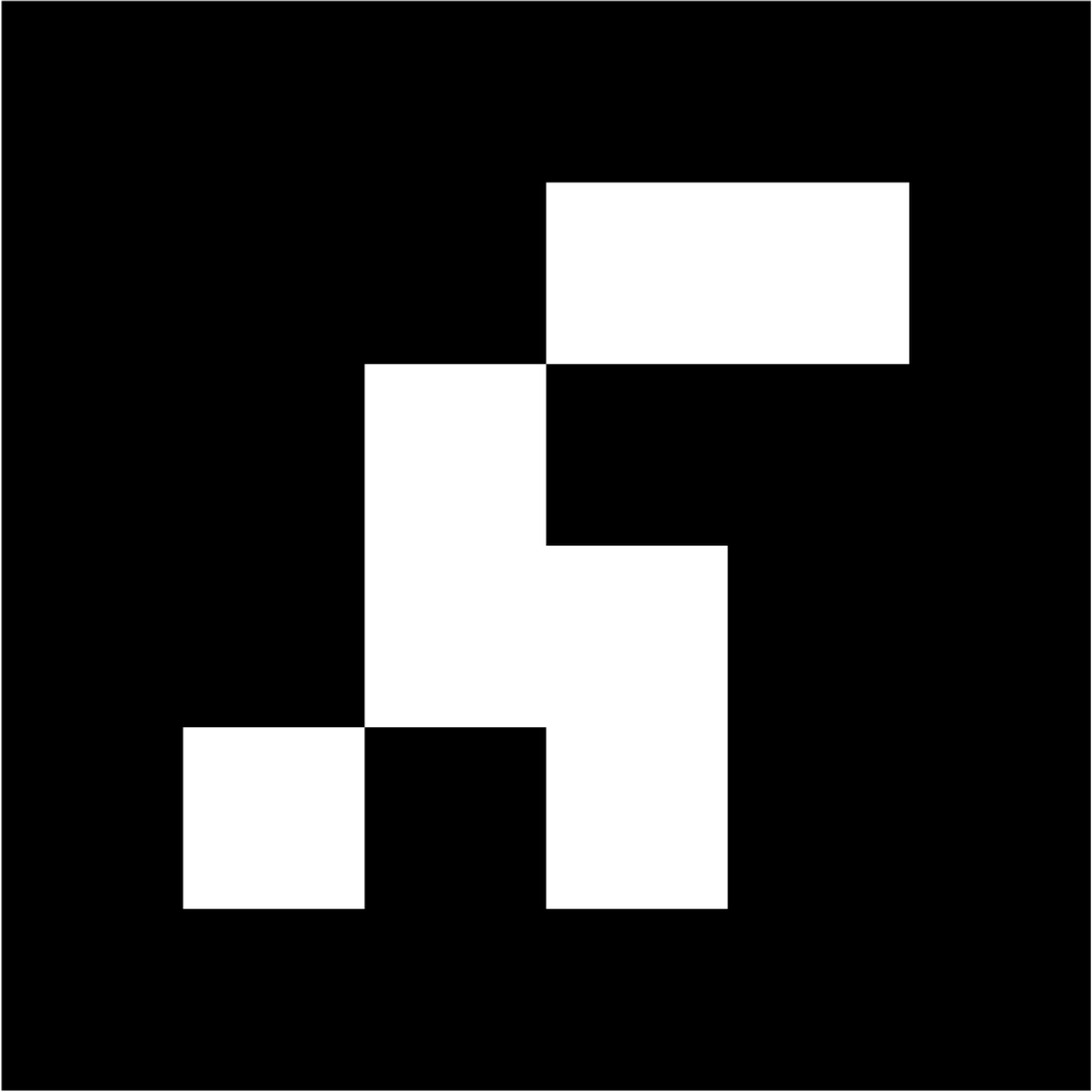


Measurements made to bottom left corner of black portion of AprilTag.

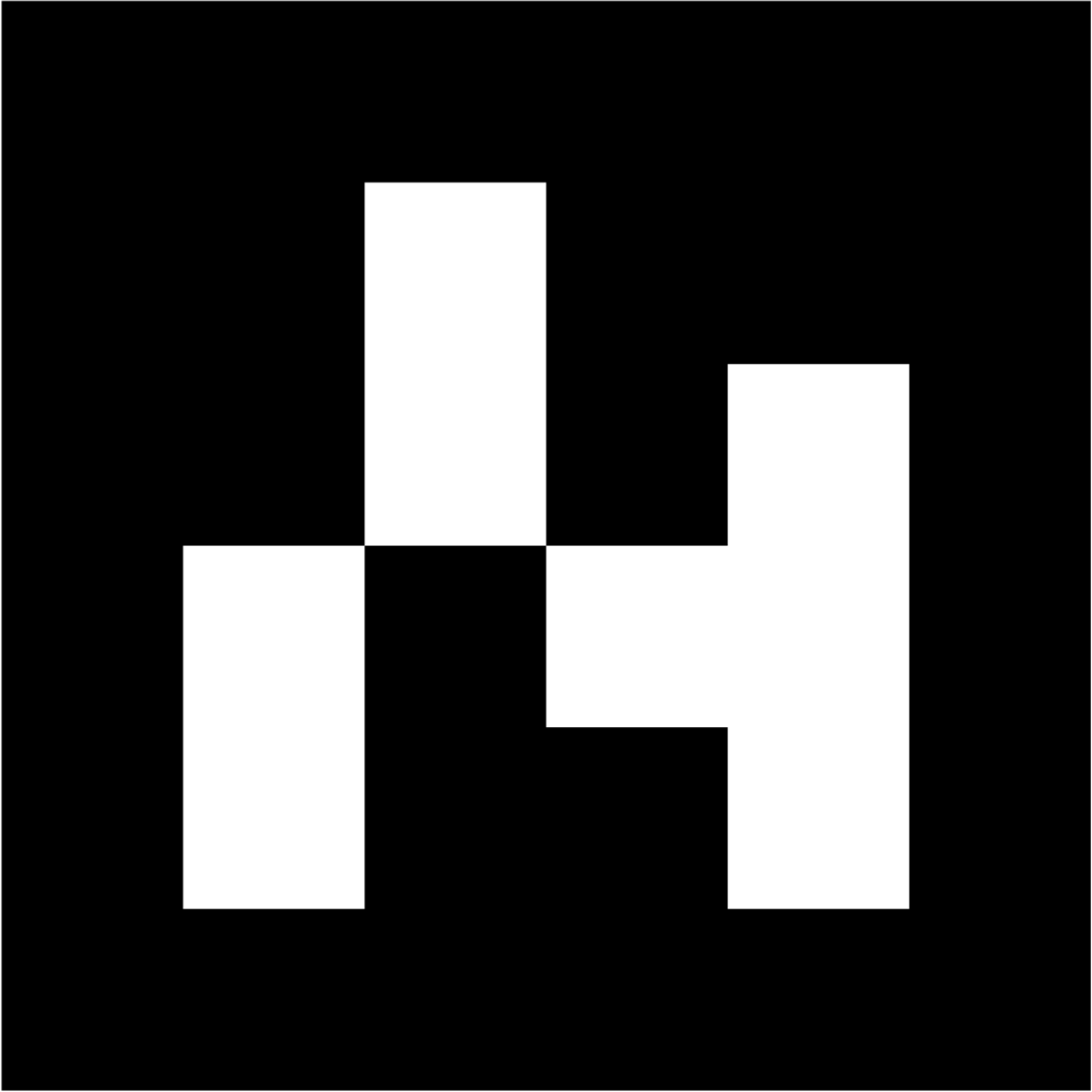




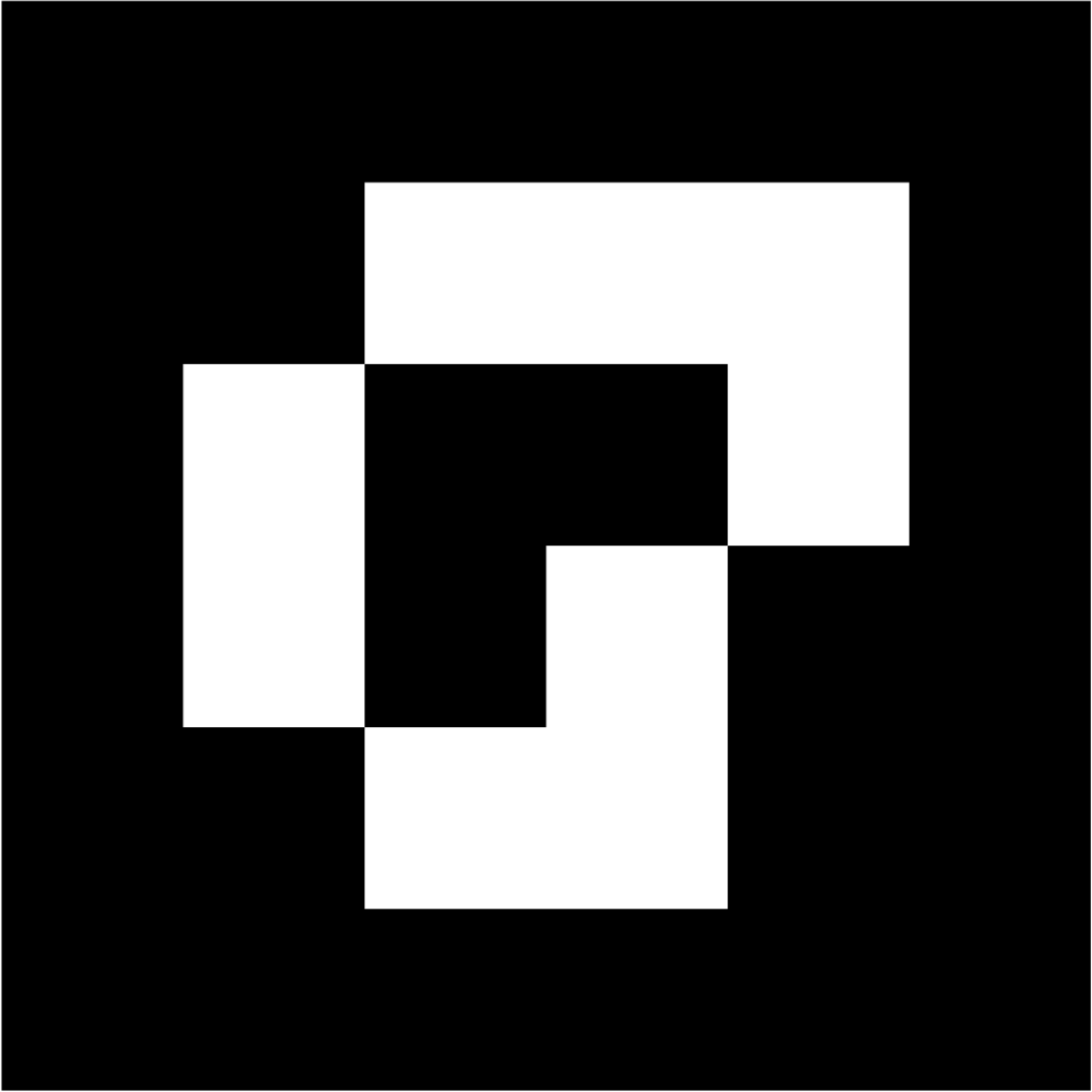
ID 1



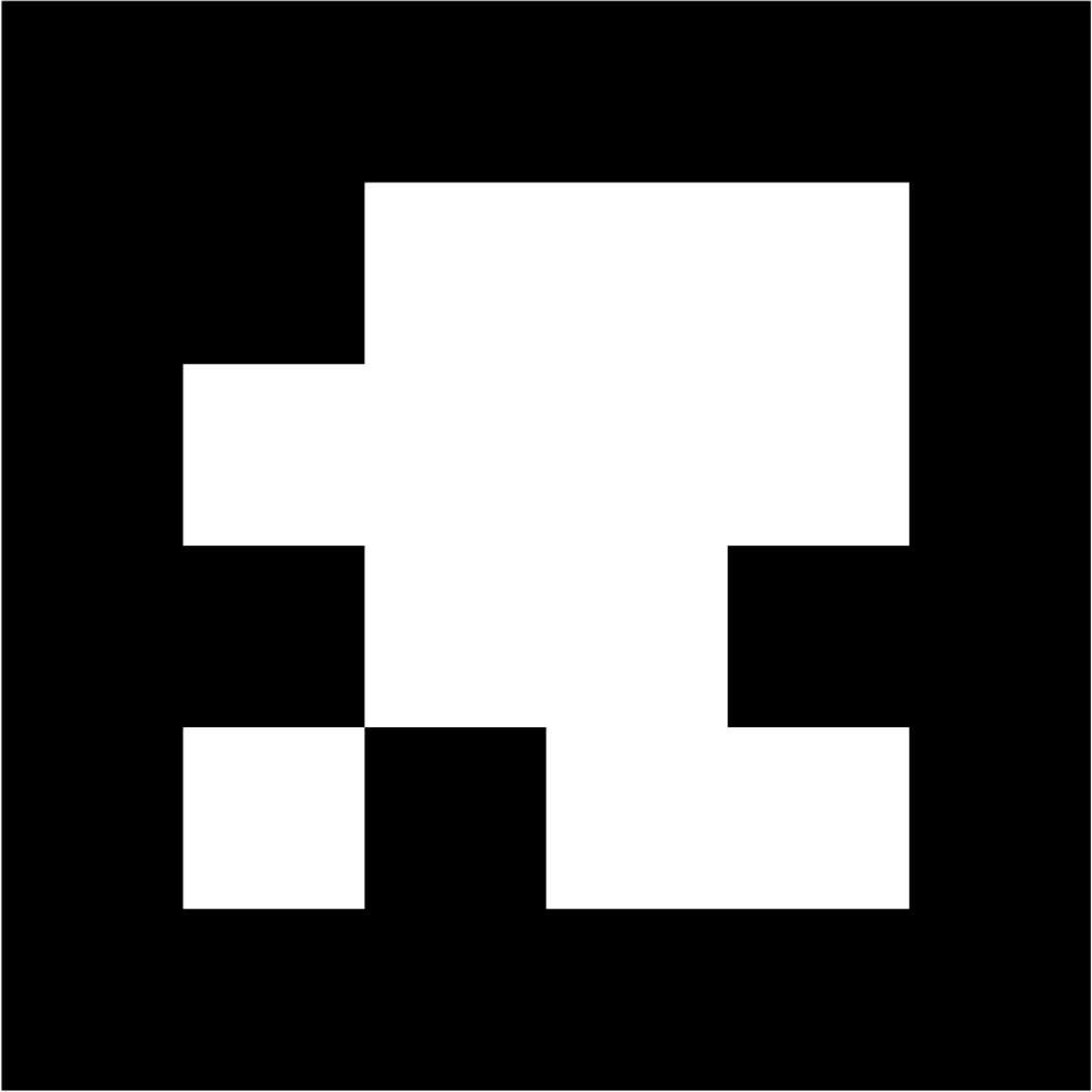
ID 2



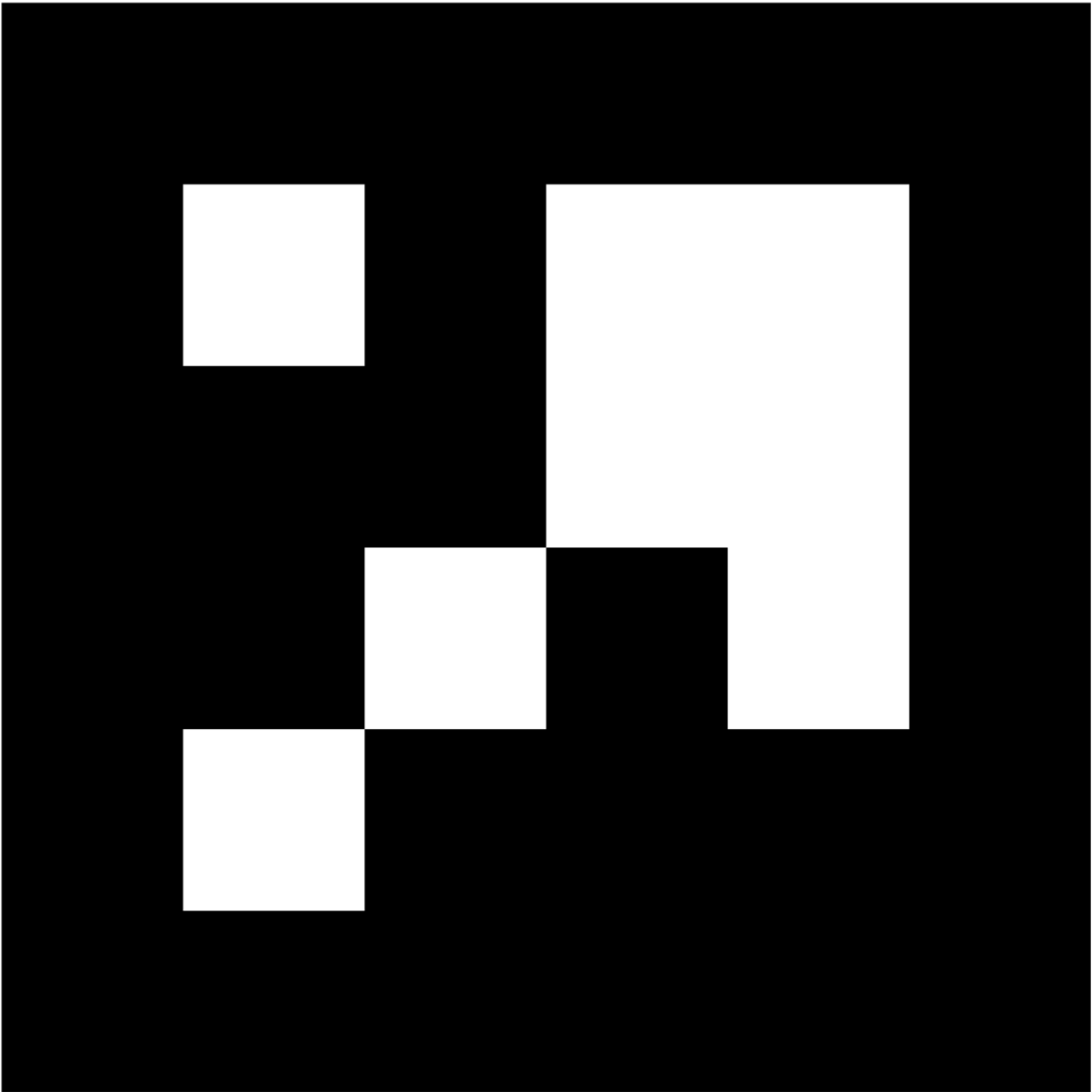
ID 3



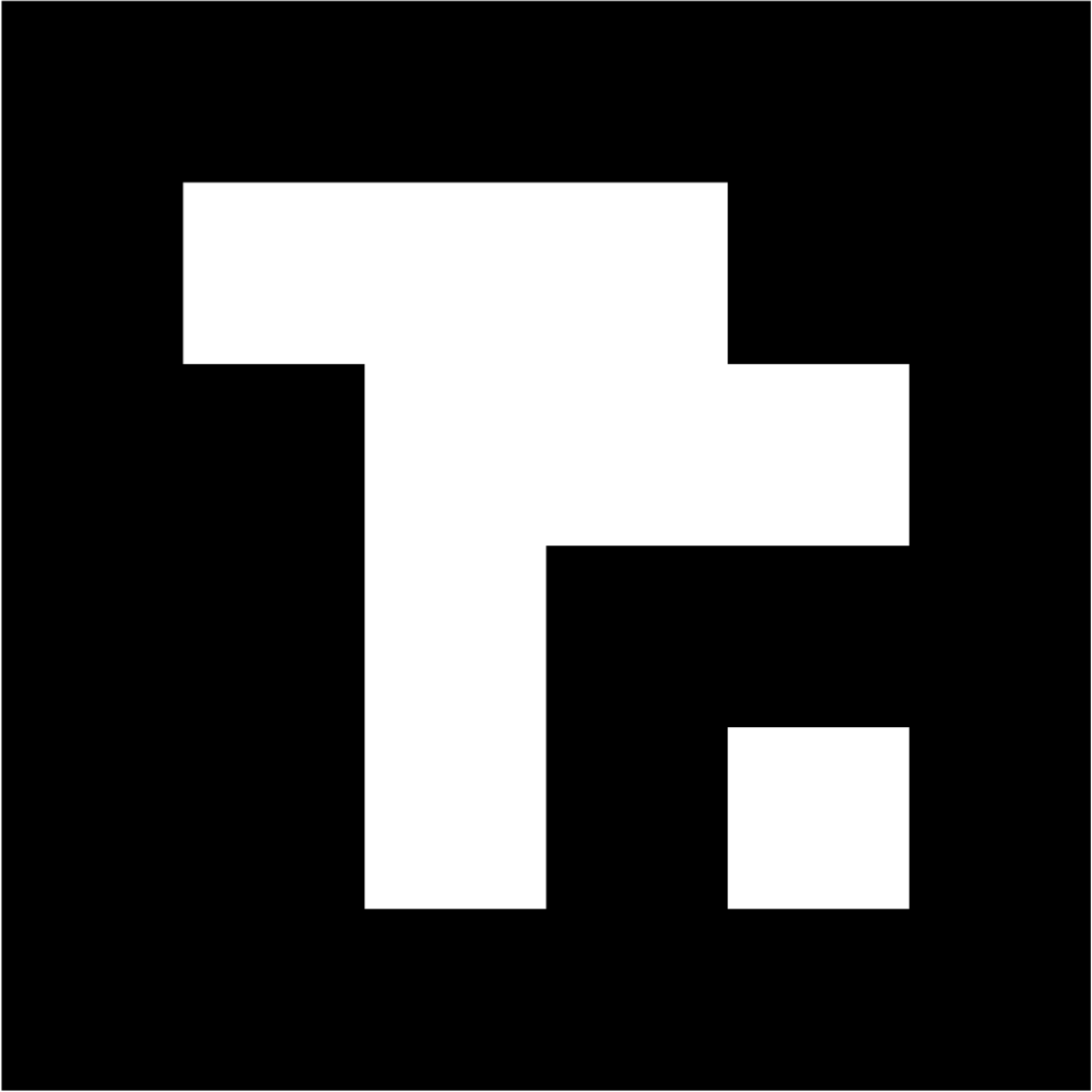
ID 4



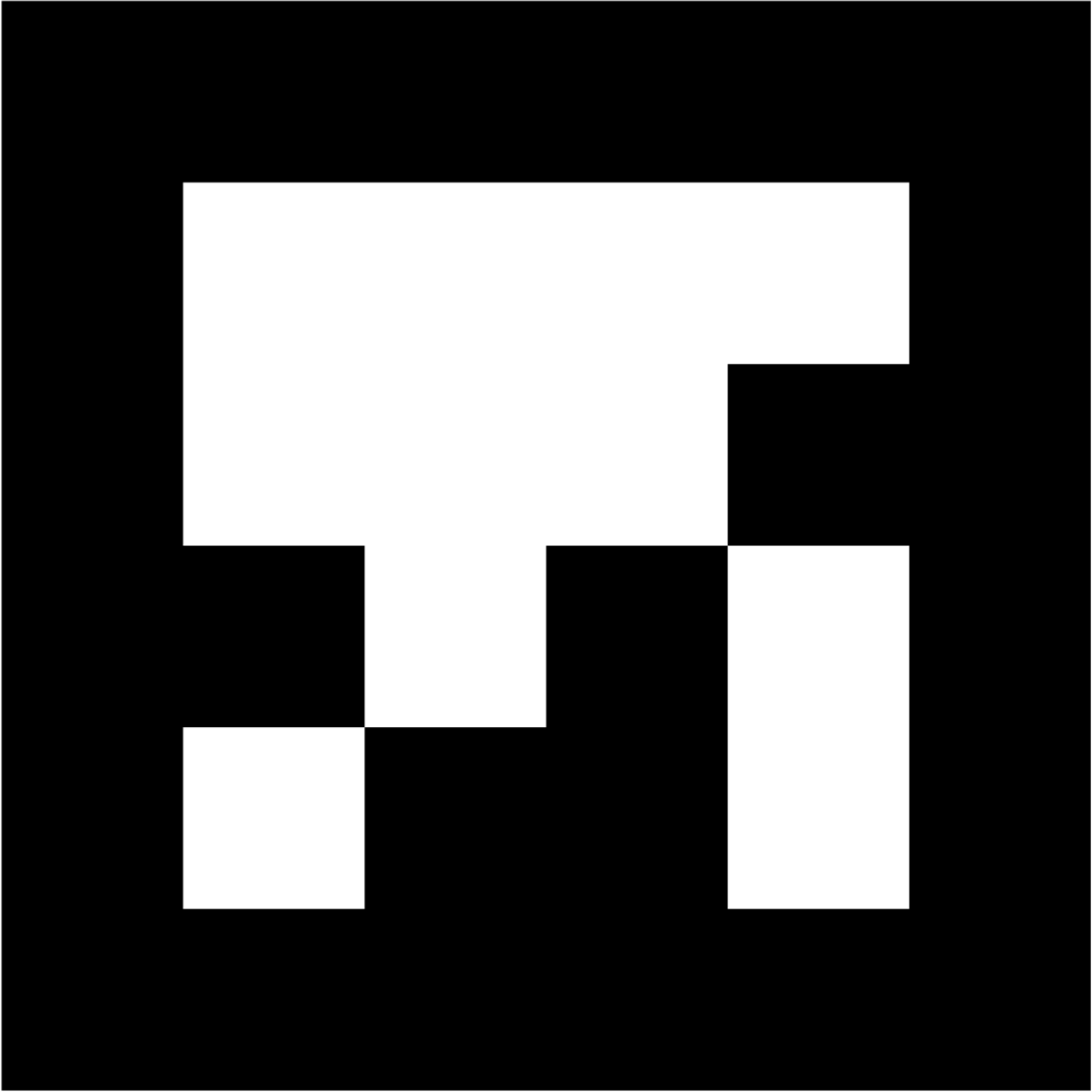
ID 5



ID 6



ID 7



ID 8