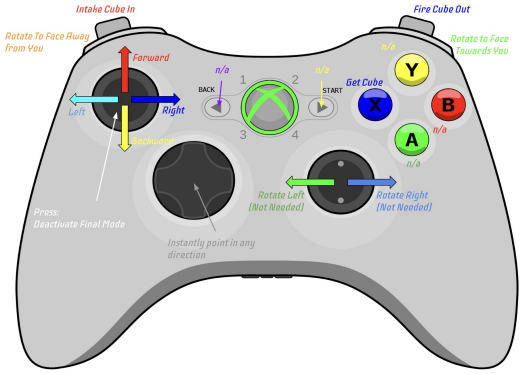

Robotics 2023 Programming Plan

Version L2

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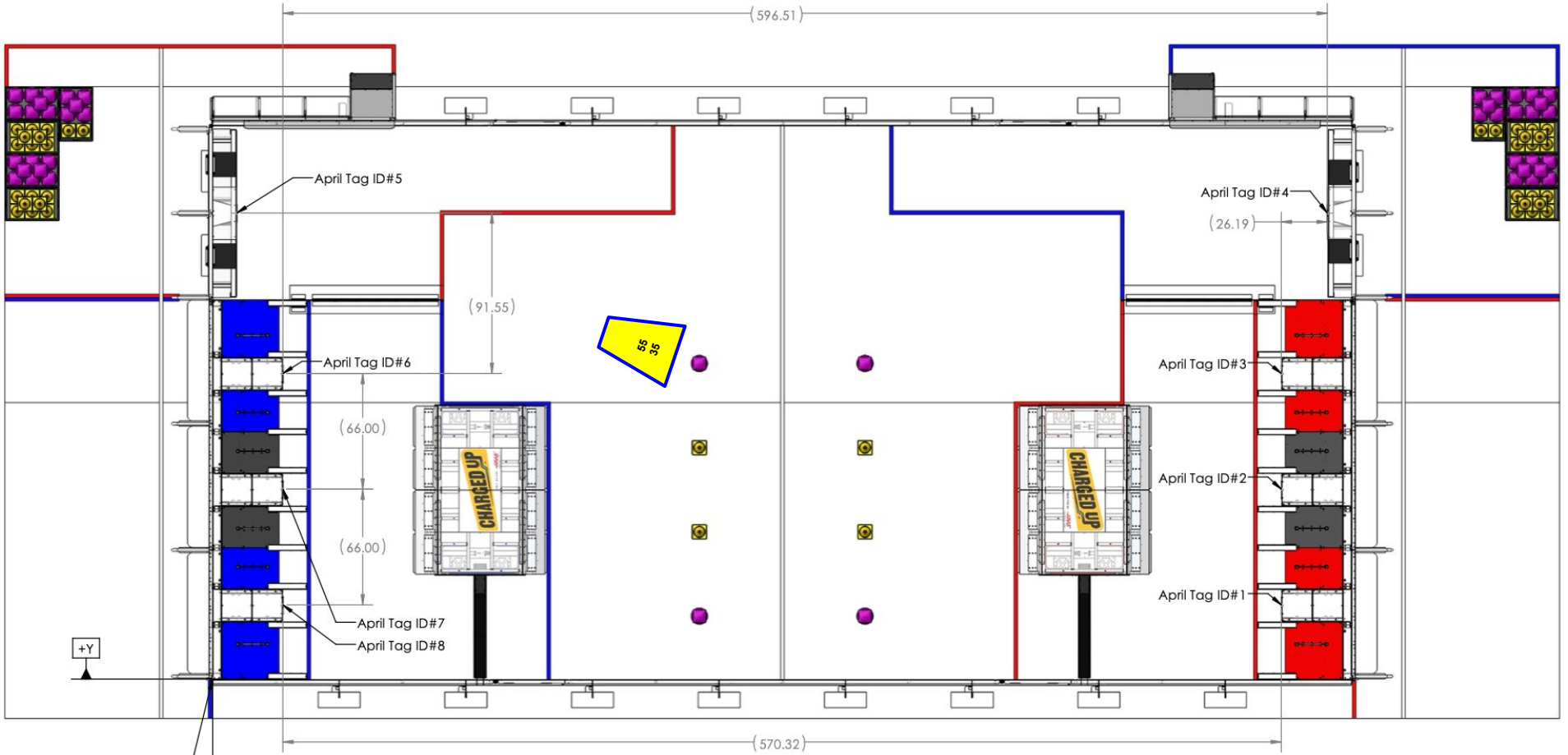
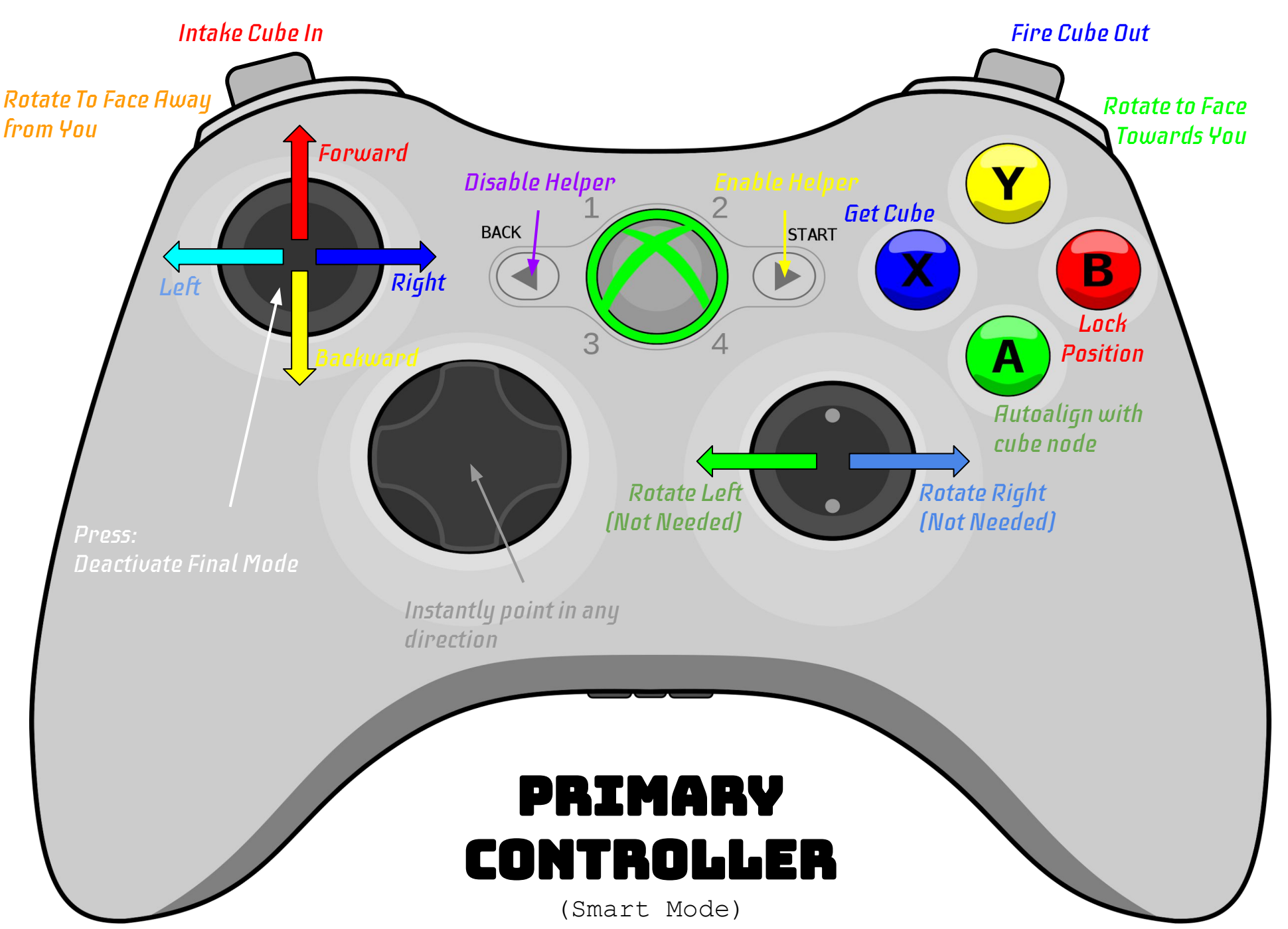
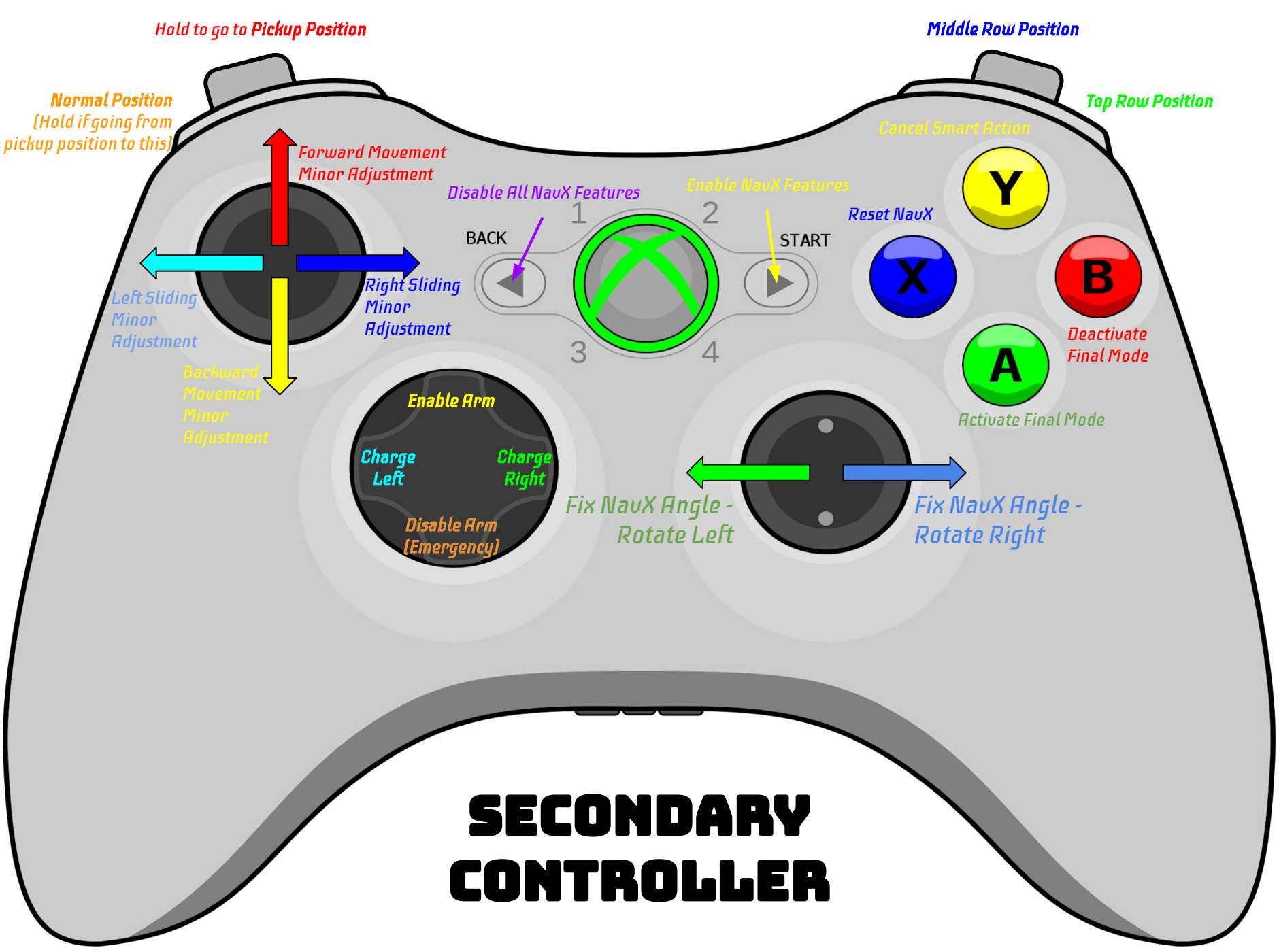




PRIMARY CONTROLLER

(Smart Mode)


Hold to go to Pickup Position
Middle Row Position
Normal Position
(Hold if going from pickup position to this)
Top Row Position
Cancel Smart Action
Forward Movement Minor Adjustment
Disable All NavX Features
Enable NavX Features
Reset NavX
BACK
START
1
2
3
4
Y
X
B
A
Left Sliding Minor Adjustment
Right Sliding Minor Adjustment
Backward Movement Minor Adjustment
Deactivate Final Mode
Activate Final Mode
Enable Arm
Charge Left
Charge Right
Disable Arm (Emergency)
Fix NavX Angle - Rotate Left
Fix NavX Angle - Rotate Right
SECONDARY CONTROLLER

THINGS THAT COULD GO WRONG AND HOW TO SOLVE THEM

Problem	Solution
Wheel on robot is not pointed in the right direction.	The person with the secondary controller can also use the SmartDashboard on the computer. They will see values that say "A offset", "B offset", and so on. These values can be edited to adjust each of the wheels' angles on the robot. "A" is the front-left wheel, and the rest of the wheels continue clockwise around the robot from "A". Later on, replace the CANCoder and/or the rotation magnet that pairs with it, or you will see this issue again. Set the new CANCoder to absolute position with the Phoenix Tuner, restart the robot, find the new rotational offset for this wheel, and then enter it into the actual robot programming where Weswerve is added to robot.java.
Wheel on the robot is spinning in reverse.	Add 180 to the reversed wheel's offset value. See the solution above for more information on adjusting a wheel's offset value.
Robot goes crazy, runs away, or gets stuck in a smart feature.	Whether intentionally or unintentionally, a smart feature may have been activated. Cancel a smart action by pressing Y on the secondary controller.
Robot is spinning very fast in one direction.	The NavX came unplugged or stopped working. You will have to work without the NavX. Press B on the secondary controller to disable all navx features. Notify the driver that they are now in car mode, not headless mode.
Robot gets off course or points slowly in the wrong direction.	This is the most likely issue to occur. The NavX yaw value is slowly drifting. The person with the secondary controller should use the horizontal axis of their right stick to rotate the robot back on course. (Left = Rotate counterclockwise; Right = Rotate Clockwise)
Robot is skippy because battery is very low.	Drive the robot much slower. Do not accelerate or decelerate quickly. Press the down button in the POV on the secondary controller to disable any arm movement or lifting power. Also try disabling all navx features by pressing BACK on the secondary controller. You can also majorly slow the robot down by enabling final mode early (A on secondary controller).

AUTONOMI SYSTEM

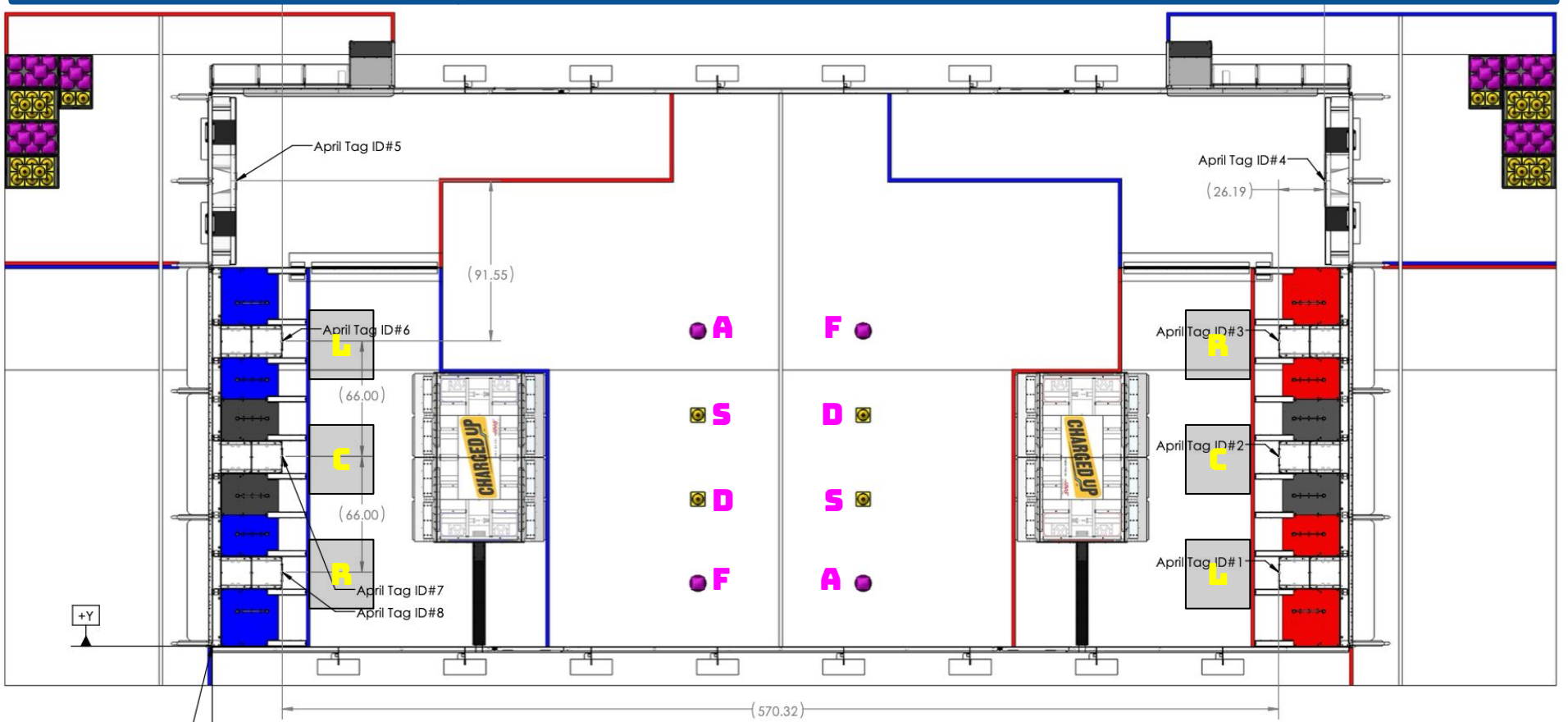
Selection 1: Dropdown

CHARGE UP!
- YES
- NO

Selection 2: Dropdown

STARTING POSITION
- LEFT
- CENTER
- RIGHT

The first selection is simple: No matter where you start the robot, it will know where the charge station is and it will go to it and balance when it detects that the remaining autonomous time is below 5 seconds. The second selection will complicate the robot's path: If you start in the center, the robot will go around the charge station in the direction toward your driver station. So if you are in station 1, the robot will go left around the charge station. If you are in station 3, the robot will go right around the charge station. If you are in station 2, the robot will go whichever way is over the bump. No matter what is selected, after the robot passes the charging station it will stop, rotate 180 degrees, and grab the nearest game piece. It may collect and score several game pieces during autonomous. The preloaded game piece will be scored in the top row while the collected game pieces will always be scored in the highest available place in the grid nearest to the robot.



GENERAL STRATEGY

Award	Awarded for...	AUTO	TELEOP
MOBILITY	each ROBOT whose BUMPERS have completely left its COMMUNITY at any point during AUTO	3	
GAME PIECES	scored on a bottom ROW	3	2
	scored on a middle ROW	4	3
	scored on a top ROW	6	5
LINK	3 adjacent NODES in a ROW contain scored GAME PIECES.		5
DOCKED and not ENGAGED	Each ROBOT (1 ROBOT max in AUTO)	8	6
DOCKED and ENGAGED	Each ROBOT (1 ROBOT max in AUTO)	12	10
PARK	Each ROBOT whose BUMPERS are completely contained within its COMMUNITY but does not meet the criteria for DOCKED.		2

ROBOT SETUP

Because the robot needs to know some things about its position when it is first turned on, the robot has been programmed to think that it is starting with the following criteria met:

- Robot is directly facing the grid.
- Robot is perfectly horizontally aligned with and pressed up against a cube node.
- Shuffleboard options are properly selected in accordance with the team's plans.
- The winch rope is pulled tightly around the pulley.
- There are 10 inches between the top of the cylinders that hold the acme rods in place and the bottom of where the acme rod goes into the arm.
- Robot has been preloaded with cube.

TELEOP

Always go for the nearest game piece. Picking up off the ground is best for our robot. When you are in front of the game piece, simply press a button, drive to the grid, and score the game piece. Repeat this as quickly as possible. When there are about 40 seconds left, push any game pieces that are not in a hybrid node into one. Then balance with as many robots as possible.

AUTONOMOUS

When discussing the plan with other teams, make sure that other robots will not be in our robot's path. Additionally, take leadership over the charge station; if other teams want to go on it but they say they are "testing" it or saying "it might work this time", politely dissuade them – not only are the charge station points at risk, but so is the activation bonus ranking point.