Firehawks 9098 - MockingJay 101

Everything you need to know about our robot!

Why MockingJay?

The name "MockingJay" aligns with our team's identity and this year's game theme. The MockingJay is a fictional creature from the Hunger Games series. It is a songbird which ties into the musical theme of the game and its depiction as a firebird in the movie and book series.

Match Strategy:

- Scoring both Speaker and Amp and aim to get the ranking points
- Amplifying the Amp to score speaker and get maximum points
- Climb solo or in harmony with another robot

What can we do?

- Accurate Amp and Speaker scoring
- Climbs both alone or in Harmony with another robot

Mechanical:

- Base - 29.5" x 30"
- Total weight - 89.7Ibs
- Tank drive - running on four NEO motors
- Roller intake - ground pickup from under the bumpers
- The intake-shooter is composed of 8 Flywheels (4 top 4 bottom) for the shooter, able to shoot at the speaker from different positions around the field, and 40 2" compliant wheels (20 top 20 bottom) for the intake
- An arm with one pivot point to easily and reliably score in the Amp and speaker from far away
- Two single-stage climbers with specially designed hooks to grip the chain and climb with other robots without sliding
- Beam break to detect the note in the intake
- LED lights to signal to the drive team - note in intake, tracking Amp and Speaker April Tags, climbing (each colour mean different things)
- Heartbeat LED lights to indicate the robot is alive and ready to go
- Two cameras, one at the front and one at the back. Used for tracking notes and detecting April tags at the Speaker and the Amp

Vision

- 2 cameras (one is mounted on the front of the robot and the other is mounted on the back).
- The front-facing camera, which is located on the intake, is used for tracking and intaking notes (using GRIP Pipeline).
- The back-facing camera, which is located on the arm structure, is used to detect April tags for robot positioning on the field (using PhotonVision).

LED Lights

- The LEDs are used to indicate when the robot is executing different tasks (note tracking, speaker tracking, amp tracking, intake loaded, etc.).
- Change depending on the Alliance (Blue for blue alliance and Red for red alliance)
- Heartbeat when the robot is turned on to indicate the robot is alive and all systems go

Autonomous

- Our autonomous routines use the cameras in order to track notes and detect April tags.
- Uses an auto-shooting feature that determines the arm angle and the shooter speed needed to score in the speaker from our field position.
- **Our Autos**

    - **Source-Side Subwoofer**
        - **3-Piece Auto**: Pre-loaded note (#1), first source-side centre-line note (#2), second source-side centre-line note (#3)
        - **2-Piece Auto**: Pre-loaded note (#1), source-side note (#2)
        - **1-Piece Auto**: Pre-loaded note (#1) and then leave the zone.

    - **Center Subwoofer**
        - **4-Piece Auto**: Pre-loaded note (#1), middle note (#2), amp-side note (#3), source-side note (#4)
        - **4-Piece Auto**: Pre-loaded note (#1), amp-side note (#2), middle note (#3), source-side note (#4)
        - **3-Piece Auto**: Pre-loaded note (#1), middle note (#2), source-side note (#3)

    - **Amp-Side Subwoofer**
        - **4-Piece Auto**: Pre-loaded note (#1), amp-side note (#2), first amp-side centre-line note (#3), second amp-side centre-line note (#4)
        - **3-Piece Auto**:Pre-loaded note (#1), first amp-side centre-line note (#2), second amp-side centre-line note (#3)
        - **3-Piece Auto**: Pre-loaded note (#1), amp-side note (#2), first amp-side centre-line note (#3)

- **3-Piece Auto**: Pre-loaded note (#1), amp-side note (#2), second amp-side centre-line note (#3)
- **1-Piece Auto**: Pre-loaded note (#1) and then leave the zone after 12s delay.

'Endgame' - Climb

- The robot can climb by controlling each climber separately in order to stay balanced.
- Uses a balancing sensor to determine if we are off balance and displays this information on the LEDs (if the robot is tilted towards its side, the LEDs on that side will light up, indicating that the robot is off balance).
- The robot also has the ability to auto-climb and level itself on the chain.