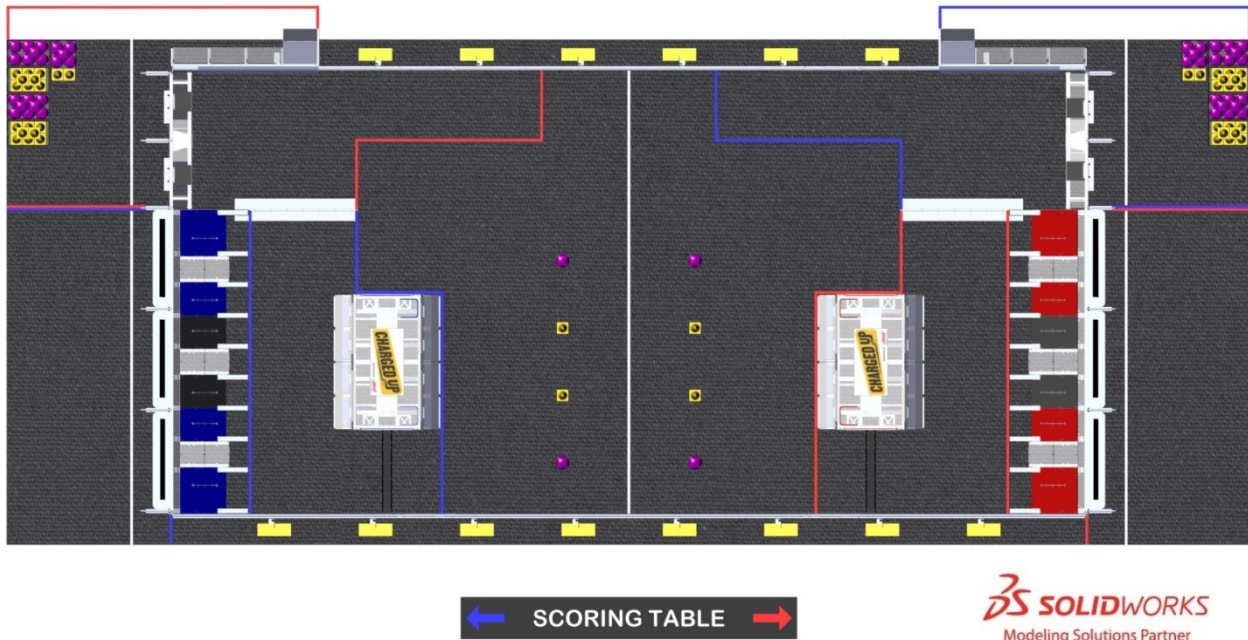


6 MATCH PLAY

During CHARGED UP, 2 ALLIANCES (an ALLIANCE is a cooperative of up to 4 FIRST Robotics Competition teams) play MATCHES, set up and implemented per the details described below.

6.1 Setup

Figure 6-1 MATCH setup



6.1.1 GAME PIECES

54 CONES and 44 CUBES, divided evenly between the 2 ALLIANCES, are staged as follows:

- A. each ALLIANCE may preload 1 CONE or 1 CUBE in each ROBOT such that it is fully supported by that ROBOT,
- B. each ALLIANCE may stage 4 GAME PIECES of their choice, 1 per any of the STAGING MARKS between their COMMUNITY and the CENTER LINE, such that each GAME PIECE covers or surrounds the center of its STAGING MARK (as viewed from above) comparable to staging in Figure 6-1,
 - a. If no team decision, CUBES will be placed on the 2 outer marks and CONES will be placed on the 2 inner marks, and
- C. depending on decisions made in A and B remaining CONES (quantity 20 to 27) and CUBES (quantity 15 to 22) are staged in each of the corresponding ALLIANCE SUBSTATION AREAS.

6.1.2 ROBOTS

Each DRIVE TEAM stages their ROBOT such that its BUMPERS are fully contained within their COMMUNITY and per the criteria outline in H309.

In order of placement matters to either or both ALLIANCES, the ALLIANCE must notify the Head REFEREE during setup for that MATCH. Upon notification, the Head REFEREE will require ALLIANCES to alternate placement of all ROBOTS. In a Qualification MATCH, ROBOTS are placed in the following order:

1. red DRIVER STATION 1 ROBOT
2. blue DRIVER STATION 1 ROBOT
3. red DRIVER STATION 2 ROBOT
4. blue DRIVER STATION 2 ROBOT
5. red DRIVER STATION 3 ROBOT
6. blue DRIVER STATION 3 ROBOT

In a Playoff MATCH, a similar pattern is applied with the lower seeded ALLIANCE placing first and alternating placement afterwards.

6.1.3 Humans

Humans stage for the MATCH as follows:

- A. DRIVERS and COACHES stage inside their ALLIANCE AREA and behind the STARTING LINE.
- B. HUMAN PLAYERS stage behind the STARTING LINE in either their SUBSTATION AREA or ALLIANCE AREA.
- C. TECHNICIANS stage in the event-designated area near the FIELD.

6.2 Autonomous Period

The first phase of each MATCH is 15 seconds long and called the Autonomous Period (AUTO). During AUTO, ROBOTS operate without any DRIVE TEAM control or input. ROBOTS attempt to score GAME PIECES on GRIDS, exit their ALLIANCE'S COMMUNITY, retrieve additional GAME PIECES, and DOCK on and/or ENGAGE with their CHARGE STATION before the end of the phase. There is a 3 second delay between AUTO and TELEOP for scoring purposes as described in [Section 6.4 Scoring](#).

6.3 Teleoperated Period

The second phase of each MATCH is the remaining two minutes and fifteen seconds (2:15) and called the Teleoperated Period (TELEOP). During this phase, DRIVERS remotely operate ROBOTS to retrieve and score GAME PIECES.

The final thirty (0:30) seconds of the TELEOP stage is the ENDGAME, during which ROBOTS attempt to PARK, DOCK on, and/or ENGAGE with their ALLIANCE'S CHARGE STATION or continue to score GAME PIECES.

6.4 Scoring

ALLIANCES are rewarded for accomplishing various actions through the course of a MATCH, including demonstrating MOBILITY, scoring GAME PIECES on GRIDS, completing LINKS, DOCKING on and/or ENGAGING with their CHARGE STATION, PARKING, and winning or tying MATCHES.

Rewards are granted either via MATCH points or Ranking Points (sometimes abbreviated to RP, which increase the measure used to rank teams in the Qualification Tournament). Such actions, their criteria for completion, and their point values are listed throughout this section.

All scores are assessed and updated throughout the MATCH, except as follows:

- A. assessment of CHARGE STATION scoring occurs 3 seconds after the ARENA timer displays 0 following AUTO
- B. GAME PIECES scored in the GRID continues for up to 3 seconds after the ARENA timer displays 0 following AUTO.
- C. assessment of PARKING and CHARGE STATION scoring occurs 3 seconds after the ARENA timer displays 0 following TELEOP
- D. GAME PIECES scored in the GRID continues for up to 3 seconds after the ARENA timer displays 0 following TELEOP.

If a GAME PIECE scored in AUTO gets removed from its NODE during TELEOP, the AUTO points are removed. If a GAME PIECE is scored in that NODE again, the AUTO points associated with the original scored GAME PIECE are restored.

All points are evaluated and scored by human volunteers. Teams are encouraged to make sure that it is obvious and unambiguous that a ROBOT or GAME PIECE has met the criteria.

6.4.1 GRID Scoring

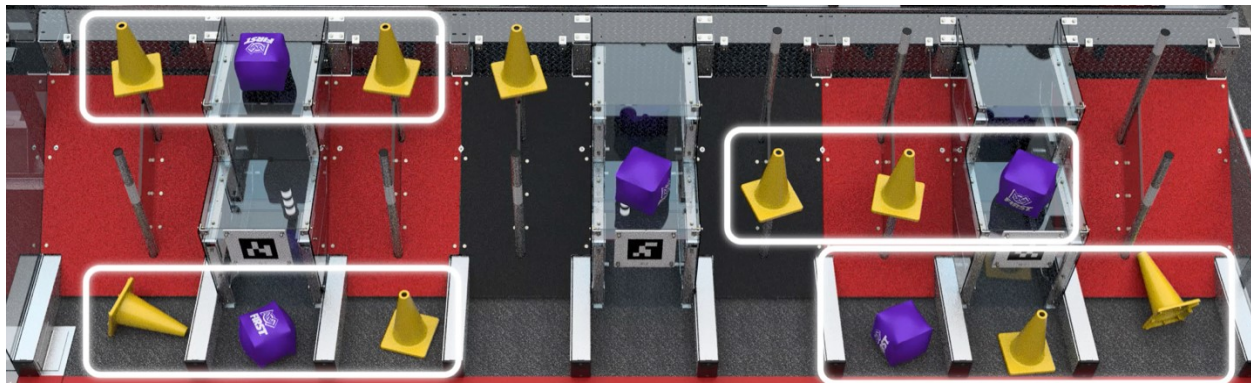
ALLIANCES earn points by scoring GAME PIECES in NODES on their GRIDS. All GAME PIECES scored on the same ROW are worth equal value, as described in Table 6-2.

Table 6-1 GAME PIECE Scoring Criteria

ROW	GAME PIECE	Scoring Criteria
Bottom	CONE or CUBE	Touching FIELD carpet and/or BARRIER in only 1 HYBRID NODE and fully contained in GRIDS.
Middle or Top	CONE	The top of the CONE NODE is contained within the volume defined by the conical surface of the CONE
Middle or Top	CUBE	partially or completely (regardless of inflation state) supported by a CUBE NODE.

An ALLIANCE earns 1 LINK if 3 adjacent NODES in a ROW contains a scored GAME PIECE. A scored GAME PIECE only contributes towards 1 LINK at a time. LINKS are assessed in a manner that optimizes the number of LINKS awarded to an ALLIANCE.

Figure 6-2 LINK examples



To be considered scored, a GAME PIECE may not be supported directly or transitively by an ALLIANCE ROBOT.

Only 1 GAME PIECE is counted per NODE.

6.4.2 CHARGE STATION Scoring

A ROBOT earns points for its ALLIANCE by DOCKING on or ENGAGING with their CHARGE STATION, as outlined in Table 6-2.

A ROBOT is DOCKED if it is contacting only the CHARGE STATION and/or other items also directly or transitively fully supported by the CHARGE STATION.

A ROBOT is ENGAGED if both of the following criteria are met:

- A. the CHARGE STATION is LEVEL, and
- B. all ALLIANCE ROBOTS contacting the CHARGE STATION are DOCKED.

6.4.3 Point Values

Point values for tasks in CHARGED UP are detailed in Table 6-2.

Table 6-2 CHARGED UP points

Award	Awarded for...	AUTO	TELEOP	Qual.	Playoff
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		
SUSTAINABILITY BONUS	At least 5 LINKS scored.			1 Ranking Point	

Award	Awarded for...	AUTO	TELEOP	Qual.	Playoff
COOPERTITION BONUS	At least 3 GAME PIECES scored on each ALLIANCE'S CO-OP GRID	The SUSTAINABILITY BONUS threshold is reduced to 4 LINKS for both ALLIANCES			
ACTIVATION BONUS	At least 26 total CHARGE STATION points earned in AUTO and/or ENDGAME.			1 Ranking Point	
Tie	Completing a MATCH with the same number of MATCH points as your opponent.			1 Ranking Point	
Win	Completing a MATCH with more MATCH points than your opponent.			2 Ranking Points	

An ALLIANCE can earn up to 4 Ranking Points (RP) per Qualification MATCH, as described in Table 6-2. There are no Ranking Points in Playoff MATCHES.

6.5 Rule Violations

Upon any instance of a rule violation, unless otherwise noted, 1 or more of the penalties listed in Table 6-3 are assessed.

Table 6-3 Rule violations

Penalty	Description
FOUL	a credit of 5 points towards the opponent's MATCH point total
TECH FOUL	a credit of 12 points toward the opponent's MATCH point total
YELLOW CARD	a warning issued by the Head REFEREE for egregious ROBOT or team member behavior or rule violations. A subsequent YELLOW CARD within the same tournament phase results in a RED CARD.
RED CARD	a penalty assessed for egregious ROBOT or team member behavior or rule violations which results in a team being DISQUALIFIED for the MATCH.
DISABLED	the state in which a ROBOT is commanded to deactivate all outputs, rendering the ROBOT inoperable for the remainder of the MATCH.
DISQUALIFIED	the state of a team in which they receive 0 MATCH points and 0 Ranking Points in a Qualification MATCH or causes their ALLIANCE to receive 0 MATCH points in a Playoff MATCH

FIRST Robotics Competition uses 3 words in the context of how rules and violations are assessed in deliberate ways. These words provide general guidance to describe benchmarks to be used across the program. It is not the intent for REFEREES to provide a count during the time periods.

- MOMENTARY describes rule violations that happen for fewer than approximately 3 seconds.
- CONTINUOUS describes rule violations that happen for more than approximately 10 seconds.
- REPEATED describes rule violations that happen more than once within a MATCH.

See [Section 11.2.2 YELLOW and RED CARDS](#) for additional details.

6.5.1 Violation Details

There are several styles of violation wording used in this manual. Below are some example violations and a clarification of the way the violation would be assessed. The examples shown do not represent all possible violations, but rather a representative set of combinations.

Table 6-4 Violation examples

Example Violation	Expanded Interpretation
FOUL	Upon violation, a FOUL is assessed against the violating ALLIANCE.
TECH FOUL and YELLOW CARD	Upon violation, a TECH FOUL is assessed against the violating ALLIANCE. After the MATCH, the Head REFEREE presents the violating team with a YELLOW CARD.
FOUL per additional GAME PIECES. If egregious, YELLOW CARD	Upon violation, a number of FOULS are assessed against the violating ALLIANCE equal to the number of additional GAME PIECES beyond the permitted quantity. Additionally, if the REFEREES determine that the action was egregious, the Head REFEREE presents the violating team with a YELLOW CARD after the MATCH.
TECH FOUL, plus an additional TECH FOUL for every 5 seconds in which the situation is not corrected	Upon violation, a TECH FOUL is assessed against the violating ALLIANCE and the REFEREE begins to count. Their count continues until the criteria to discontinue the count are met, and for each 5 seconds within that time, an additional TECH FOUL is assessed against the violating ALLIANCE. A ROBOT in violation of this type of rule for 15 seconds receives a total of 4 TECH FOULS (assuming no other rules were being simultaneously violated).
RED CARD for the ALLIANCE	After the MATCH, the Head REFEREE presents the violating ALLIANCE with a RED CARD in the following fashion: <ol style="list-style-type: none"> In a PLAYOFF MATCH, a single RED CARD is assessed to the ALLIANCE. In all other scenarios, each team on the ALLIANCE is issued a RED CARD.

6.6 DRIVE TEAM

A DRIVE TEAM is a set of up to 5 people from the same FIRST Robotics Competition team responsible for team performance for a specific MATCH. There are 4 specific roles on a DRIVE TEAM which ALLIANCES can use to assist ROBOTS with CHARGED UP. Only 1 of the 5 DRIVE TEAM members is permitted to be a non-STUDENT.

The intent of the definition of DRIVE TEAM and DRIVE TEAM related rules is that, barring extenuating circumstances, the DRIVE TEAM consists of people who arrived at the event affiliated with that team and are responsible for their team's and ROBOT'S performance at the event (this means a person may be affiliated with more than 1 team). The intent is not to allow teams to "adopt" members of other teams for strategic advantage for the loaning team, borrowing team, and/or

their ALLIANCE (e.g. an ALLIANCE CAPTAIN believes 1 of their DRIVERS has more experience than a DRIVER on their first pick, and the teams agree the first pick team will “adopt” that DRIVER and make them a member of their DRIVE TEAM for Playoffs).

The definition isn’t stricter for 2 main reasons. First, to avoid additional bureaucratic burden on teams and event volunteers (e.g. requiring that teams submit official rosters that Queuing must check before allowing a DRIVE TEAM into the ARENA). Second, to provide space for exceptional circumstances that give teams the opportunity to display *Gracious Professionalism* (e.g. a bus is delayed, a COACH has no DRIVERS, and their pit neighbors agree to help by loaning DRIVERS as temporary members of the team until their bus arrives).

Table 6-5 DRIVE TEAM roles

Role	Description	Max./ DRIVE TEAM	Criteria
COACH	a guide or advisor	1	any team member, must wear “COACH” button
TECHNICIAN	a resource for ROBOT troubleshooting, setup, and removal from the FIELD	1	any team member, must wear “TECHNICIAN” button
DRIVER	an operator and controller of the ROBOT	3	STUDENT, must wear a “DRIVE TEAM” button
HUMAN PLAYER	a GAME PIECE manager		

A STUDENT is a person who has not completed high-school, secondary school, or the comparable level as of September 1 prior to Kickoff.

The TECHNICIAN provides teams with a technical resource for pre-MATCH setup, ROBOT connectivity, OPERATOR CONSOLE troubleshooting, and post-MATCH removal of the ROBOT. Some pre-MATCH responsibilities for the TECHNICIAN may include, but are not limited to:

- location of the ROBOT radio, its power connection, and understanding of its indicator lights,
- location of the roboRIO and understanding of its indicator lights,
- username and password for the OPERATOR CONSOLE,
- restarting the Driver Station and Dashboard software on the OPERATOR CONSOLE,
- changing the bandwidth utilization (e.g. camera resolution, frame rate, etc.),
- changing a battery, or
- charging pneumatics.

While the TECHNICIAN may be the primary technical member of the DRIVE TEAM, all members of the DRIVE TEAM are encouraged to have knowledge of the

basic functionality of the ROBOT, such as the location and operation of the main circuit breaker, connecting and resetting joysticks or gamepads from the OPERATOR CONSOLE, and removing the ROBOT from the FIELD.

6.7 Other Logistics

GAME PIECES that leave the FIELD are placed back into the FIELD approximately at the point of exit by FIELD STAFF (REFEREES, *FIRST* Technical Advisors (FTAs), or other staff working around the FIELD) at the earliest safe opportunity.

Note that ROBOTS may not deliberately cause GAME PIECES to leave the FIELD (see [G401](#)).

An ARENA FAULT is not called for MATCHES that accidentally begin with damaged GAME PIECES. Damaged GAME PIECES are not replaced until the next ARENA reset period. DRIVE TEAMS should alert the FIELD STAFF to any missing or damaged GAME PIECES prior to the start of the MATCH.

Once the MATCH is over and the Head REFEREE determines that the FIELD is safe for FIELD STAFF and DRIVE TEAMS, they or their designee change the LED lights to green and DRIVE TEAMS may retrieve their ROBOT.

In addition to the 2 minutes and 30 seconds (2:30) of game play, each MATCH also has pre- and post-MATCH time to reset the ARENA. During ARENA reset, the ARENA is cleared of ROBOTS and OPERATOR CONSOLES from the MATCH that just ended, ROBOTS and OPERATOR CONSOLES for the subsequent MATCH are loaded into the ARENA by DRIVE TEAMS, and FIELD STAFF reset ARENA elements.

