FIRST® GAME CHANGERS™ powered by Star Wars: Force for Change

2020-2021 FIRST® Tech Challenge

Forum Answered Questions - Remote
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Billie Jean
Administrator
Join Date: Nov 2013 Posts: 214

General Robot Rules
09-22-2020, 10:52 AM
Answers to questions about General Robot Rules.

Tags: None

Stuck

10-20-2020, 08:31 PM
This reply by Broadway Joe has been deleted by Broadway Joe

10-20-2020, 08:29 PM

Broadway Joe
Game Design Committee Member
Join Date: Sep 2010 Posts: 944

Launching Distance
10-20-2020, 08:29 PM

Originally posted by FTC12533
Rule <RG08> in Game Manual Part 1 states that “Teams must only launch the elements with enough velocity to score”, and that if a robot is deemed to be launching with too much velocity, they should be re-inspected and that “Robots must then show that a launched scoring element cannot travel in the air more than a 16 ft. (4.88 m) distance or more than 5 ft. (1.52 m) in elevation”. Noting that this game requires the rings to be launched in the launch zone, this means that some positions on the field, when being shot from, will be in violation of the 16ft rule (as shown in https://www.reddit.com/r/FTC/comment...me_renders_of/).

Q1: Noting that this game requires rings to be launched with high velocity and spin, does the rule limit the construction of the robot so that it could not possibly launch further than 16 feet?

Q2: In addition, with many teams competing in remote events, where inspection will be just an honesty check, to what extent will <RG08> be enforced this season?

A1: If a Referee feels the Robot is Launching rings in excess of the requirement, then Teams must demonstrate that the Robot as configured, cannot Launch Rings exceeding the limits imposed by <RG08>.

A2: There will be no checks of Robots that compete in Remote events. We are relying on Teams to be honest and to follow all the Rules. At traditional events, Rule <RG08>, along with all the other rules will be strictly enforced.
Commercial Off the Shelf Components

09-22-2020, 10:53 AM

Answers to questions about Commercial Off the Shelf Components.

Tags: None

#1

10-26-2020, 02:21 PM

PITTSCO Motor 385

Q:

Originally posted by FTC10095
Is a PITSCO Motor 385 an allowed DC motor? We were not sure if this is considered a Tetrix motor (listed as legal under the rules).

A: No, this is not a legal motor.

Last edited by Billie Jean; 10-29-2020, 02:36 PM.

#2
Billie Jean
Administrator

Miscellaneous Robot Electrical Parts and Materials
09-22-2020, 11:40 AM

Answers to questions about Miscellaneous Robot Electrical Parts and Materials.

Tags: None

#1

Pierluigi Collina
Game Design Committee Member

10-13-2020, 01:27 PM

Originally posted by FTC14470
Subject: Interconnect Only PCB

Question: Hello!

I believe this is allowed based on previously asked questions, but wanted to make sure. Is a custom PCB that has no electrical components on it besides connectors that is used strictly to connect things like motors, encoder, sensors, etc. allowed?

A similar question is asked here: https://www.firstinspires.org/sites/...-questions.pdf
(use ctrl + f and type "pcb" to find it)

Answer: Yes. Be sure to have a circuit diagram for the PCB and be prepared to discuss/describe/explain the PCB to inspectors at your events (if attending Traditional Events)
Originally posted by FTC8397

**Subject: Robot Controller Phone LED Light**

**Question:** Game manual part 1 <RE13> neither explicitly allows nor disallows use of the camera flashlight. It can be helpful with computer vision tasks. Rulings regarding its use in prior seasons have been:

2017-18 -- allowed
2018-19 -- initially disallowed, then allowed
2019-20 -- allowed

Will use of the camera flashlight be allowed for the 2020-21 season?

Thank you.

**Answer:** Yes, the LED built in to the robot controller phone may be used as a light source.
Motors and Servos

09-22-2020, 11:40 AM

Answers to questions about Motors and Servos.

Tags: None

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Pierluigi Collina
Game Design Committee Member

11-10-2020, 01:09 PM

Originally posted by FTC9999

Subject: Servo Power Module Device Limits

**Question:** Section 7.2.1 [Robot Technology Definitions] of Game Manual Part 1 defines a **REV Servo Power Module** as

"An electronic device that boosts the power supplied to 3-wire servos. A REV Servo Power Module has 6 input servo ports and 6 matching output ports. It draws power from a 12V source and provides 6V power to each output servo port. A REV Servo Power Module can provide up to 15A of current across all output servo ports for a total of 90 Watts of power per module."

The stall current of the VEX EDR 393 is rated as 3.6 amps at 7.2 volts (or 3 amps at 6 volts), but when connected to the VEX "Motor Controller 29" the stall current is limited to 3 amps at 8.5 volts (or **2.2 amps at 6 volts**).

The stall current of the goBILDA 2000-0025-0002 (25-2) servo is rated as 3 amps at 7.4 volts and **2.5 amps at 6 volts**. Thus, teams are allowed to power six (6) goBILDA 25-2 servos from a single REV Servo Power Module (SPM).

Even though teams are allowed to power six (6) goBILDA 25-2 servos
per SPM, and even though the VEX 29/393 draws less current at stall than the goBILDA 25-2, teams are only allowed to power two (2) VEX 29/393s per SPM.

Like most teams, after the season is over our competition bot becomes an outreach bot. Since the SPM can safely power six (6) VEX 29/393s we reduce the number of SPMs on the bot from the 5 to 7 required for competition to at most 2 SPMs as allowed by the specifications. We use the 4 to 5 SPMs recovered from the previous season’s bot on next season’s competition bot so that the team need not have to purchase any more SPMs than necessary in the long run.

Nevertheless, in the interests of reducing congestion, debugging complexity, and points of failure on a competition bot, we request that the restriction of two (2) VEX 29/393s per SPM be removed. As with any other servo, the SPM’s over-current shutdown feature will safely inform teams in the event the team miscalculates the max current draw of the mix of servos, VEX and non-VEX, connected to any given SPM.

Answer: Thank you for the thoughtful analysis. We do not plan to make any changes to the Servo Power Module limits for this season.
Forums
Control System

Billie Jean
Administrator

Join Date: Nov 2013
Posts: 214

09-22-2020, 11:41 AM
Answers to questions about the Control System.

Tags: None

Stuck

Control System

Pierluigi Collina
Game Design
Committee Member

Join Date: Sep 2010
Posts: 1087

10-13-2020, 01:31 PM
Originally posted by FTC12533

Subject: External Mechanisms Attached to Gamepads

Question: Are external attachments to legal controllers, such as this 3D printed joystick that snaps onto an XBox 360 controller legal? This attachment does not directly modify the controller in any way.

Answer: Yes.

10-29-2020, 06:58 PM
Originally posted by FTC12533

Subject: 3rd-Party Gamepads & Gamepad Modifications

Question 1: Is a modified PS4 controller, such as those from:
Question 2: Is this officially sold PS4 back button: https://direct.playstation.com/en-us...4aAuebEALw_wcB legal?

Question 3: Are purely aesthetic button and shell mods legal?

Answer 1: No

Answer 2: No. Only the controller is allowed.

Answer 3: Modifications that do not require the disassembly of the Gamepad would be acceptable (painting, stickers, etc)
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**Billie Jean**  
Administrator  
Join Date: Nov 2013  
Posts: 214

**Sensors**  
09-22-2020, 11:41 AM

Answers to questions about Sensors.

Tags: None

**Pierluigi Collina**  
Game Design  
Committee Member  
Join Date: Sep 2010  
Posts: 1087

10-13-2020, 01:24 PM

Originaly posted by FTC16626

**Subject: Intel T265 RealSense Camera w/ 3rd Party VSLAM Library**

**Question:** According to a reply by the GDC last season, the T265 was ruled legal as it is and can function solely as a UVC camera.  
https://ftcforum.firstinspires.org//...5207#post75207

Just as a quick summary, the Intel Realsense T265 camera performs VSLAM (Visual Simultaneous Localization and Mapping) allowing one to localize and get relative pose. It is not directly programmable and all the processing is done onboard.

Since then, a member of the FRC community has ported his T265 wrapper from FRC for FTC use (https://github.com/pietroglyph/ftc265). The camera transmits the pose data through UVC. The T265 still functions like a webcam. So no external USB/other connection is made. It just uses the same USB connection as any other webcam and transmits the same UVC data. It should be legal by all FTC standards.

Just wanted to re-establish legality on the Intel RealSense T265 for this season and clarify if extracting pose data from the UVC stream is legal. Essentially, are we allowed to use the T265 and that library specifically in competition for localization?
Answer: Yes. Make sure to pay attention to power needs ... the T265 likely needs to be plugged into a powered USB hub.

Note that in general, ruling from prior years do not automatically apply to the current season. It is always a good idea to ask via the Forum if/when there are questions about component legality.

Originally posted by FTC8813

Subject: Microcontroller as Sensor

Question: An ATTiny85 works great as a hardware pulse counter. This can chip can be made non-programmable. We want to use the ATTiny85 as a voltage sensor for the signal coming from an encoder. In this way, we will have a sensor (encoder) connected to a sensor (voltage sensor). The ATTiny will be set as non-programmable. Is this allowed on a robot?

Answer: No. The ATtiny85 is inherently a programmable system and must be programmed at least once before it can be used. The limit on programmability is not a question of can it still be programmed, but rather of was it ever capable of being user programmed.
Billie Jean
Administrator

Gameplay – All Match Periods
09-22-2020, 11:53 AM

Answers to questions about Gameplay – All Match Periods.

Tags: None

Stuck

Air Jordan
Game Design Committee Member

11-02-2020, 10:11 AM

Originally posted by FTC9999

Subject: Rings that Exit the Playing Field Boundary, Impact an Object, and Bounces Back Into the Playing Field Boundary

Question: Are Rings that come to rest inside the Playing Field Boundary after bouncing off an object outside the Playing Field Boundary, such as the garage wall, eligible to be scored?

Answer: Yes

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Pre-Match
09-22-2020, 11:52 AM

Answers to questions about Pre-Match setup.

Tags: None

Stuck
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Original posted by FTC12533

Subject: Pre-Loading a Wobble Goal - Is Completely Supported by the Robot Allowed?

In Game Manual 2, rule 4.5.1, it states that the robot needs to pre-load the wobble goal at the start of the match. Looking at the definition of “pre-load”, it says that the robot only needs to be touching the game element. However, I feel like it is unclear on whether or not the wobble goal needs to also be in contact with the ground.

**Question 1:** Does the wobble goal need to be touching the ground at the beginning of the match?

**Question 2:** Can it be completely supported by the robot?

**Answer 1:** No
**Answer 2:** Yes

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**Air Jordan**
Game Design Committee Member

Join Date: Sep 2010
Posts: 550

**10-23-2020, 02:17 PM**

Originally posted by **FTC12789**

Subject: Section 4.5.1 Pre-Match - Placement of the Three Rings that are not Used During the Autonomous Period

Section 4.5.1 does a great job of describing the setup for a Remote match for the Robot, Wobble Goals, Starter Stack Rings, and YOUR Robot's pre-load Rings. However, there is no mention of your "Ghost Partner's" Rings - the Rings that WOULD have been optionally pre-loaded onto your partner's Robot if you actually had a partner playing. Your partner's Wobble Goal is specifically mentioned and accounted for, but nothing about what happens to their optional Pre-Load Rings. Without mention of these Rings, it seems that there are only seven (7) total Rings available for play during the Driver-Controlled period in Remote play - the three (3) you may optionally pre-load, plus the four (4) that randomly get configured for the Starter Stack. However, under the definition of Game Element in Section 4.4, it lists a quantity of 10 Rings.

**Question:** Do the three (3) Rings that your "Ghost Partner" would have optionally pre-loaded get placed in the Low Goal during Pre-Match setup along with any Rings not pre-loaded onto YOUR Robot or used in the random Starter Stack? This seems to be the only means to account for the disparity in Rings between sections 4.4 and 4.5.1.

**Answer:** Yes. Thank you for identifying this pre-Match setup step that is missing from the Game Manual Part 2 - Remote Events. A future release of the Game Manual will include instructions for the three Rings referenced in the question.

---

Air Jordan
Game Design Committee Member

Join Date: Sep 2010
Posts: 550

**11-04-2020, 06:20 PM**

Originally posted by **FTC12533**

Subject: Operation of Motors and Servos during Pre-Match Setup

**Question 1:** Are robots allowed to have motors and servos powered during initialization in order to fit within the 18 inch cube starting size requirement?

**Question 2:** Are teams allowed to manually operate motors and servos with the gamepad (such as pressing a button to activate a motor PID loop or move a servo) during the initialization period, in order to grasp game elements and/or ensure robot mechanisms are within the 18x18x18” sizing cube, provided that manual control would cease before randomization?

**Answer 1:** Yes, provided that the Robot is motionless while the Robot and Driver Station are in the required hands-off state before the start of the Match.

**Answer 2:** Yes
Billie Jean
Administrator

Join Date: Nov 2013
Posts: 214

Autonomous Period
09-22-2020, 11:52 AM

Answers to questions about the Autonomous Period.

Tags: None

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Air Jordan
Game Design Committee Member

Join Date: Sep 2010
Posts: 550

09-29-2020, 09:38 PM

Originaly posted by FTC2901
Subject: Ring Returns to the Playing Field After it Impacts a Power Shot Target

Question: During the Autonomous period, after the robot uses a ring to shoot down a power shot target, if that ring bounces back onto the playing field, is the robot allowed to shoot that ring again?

Answer: Yes

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Air Jordan
Game Design Committee Member

Join Date: Sep 2010
Posts: 550

09-29-2020, 09:44 PM

Originaly posted by FTC2901
Subject: Are Rings in the Starter Stack Eligible to be Scored during the Autonomous Period?
**Question:** During the Autonomous period, can the robot use rings from the Starter Stack to either shoot down Power Shot Targets for points or to score in the Tower Goal?

**Answer:** Yes. Keep in mind that the Ring Control/Possession limits described in rule <GS6> apply to all periods of gameplay.

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**Question:** During the Autonomous period, can the robot use rings from the Starter Stack to either shoot down Power Shot Targets for points or to score in the Tower Goal?

**Answer:** Yes. Keep in mind that the Ring Control/Possession limits described in rule <GS6> apply to all periods of gameplay.

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**Air Jordan**  
Game Design Committee Member

**Join Date:** Sep 2010  
**Posts:** 550

**10-28-2020, 12:48 PM**  

*Originally posted by FTC2901*

**Subject:** <G20> Parked at End of the Period - Unpowered Flywheel Motion

**Question:** Is it alright for a flywheel to continue on unpowered motion between the Autonomous and Driver-Controlled periods?

**Answer:** Yes

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**Air Jordan**  
Game Design Committee Member

**Join Date:** Sep 2010  
**Posts:** 550

**11-10-2020, 09:12 PM**  

*Originally posted by FTC8397*

**Subject:** Wobble Goal Target Zone Scoring - Playing Field Wall/Foam Tile Gap

Two of the three target zones (for a given Alliance Color), are located adjacent to at least one playing field wall. On most fields there is a gap of a millimeter or so between the floor tiles and the playing field wall. So a literal interpretation of the Game Manual Part 2 definition of “Completely In”, would indicate that a wobble goal that contacts the perimeter wall is (in most cases) not completely in its target zone. We are uncertain whether it is intended that this strict interpretation be applied. The question below assumes a field that includes an allowed COTS playing field perimeter wall and tiles, and assembled according to the field setup guide.

**Question:** If a wobble goal abuts the perimeter wall (and for that reason may extend a few millimeters beyond the vertical plane of the wall-adjacent tape), but is otherwise located completely within its target zone, should it be considered completely inside of the target zone for scoring purposes?

**Answer:** Yes, in this scenario, the Playing Field Wall marks the border of the Target Zone Goal Area.
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Billie Jean
Administrator

Join Date: Nov 2013
Posts: 214

09-22-2020, 11:52 AM

Driver-Controlled Period

Answers to questions about the Driver-Controlled Period.

Tags: None

Air Jordan
Game Design Committee Member

Join Date: Sep 2010
Posts: 550

09-29-2020, 09:15 PM

Originally posted by FTC13474
Subject: Ring Stuck in the Return Rack Question: During the Driver-Controlled Period, if a ring is placed by the Human Player in the Return Rack AND it gets stuck (does not fall out of playing field side), is the Human Player allowed to reach into the Return Rack to retrieve the stuck ring and attempt to return it again?

Answer: Yes

Air Jordan
Game Design Committee Member

Join Date: Sep 2010
Posts: 550

09-29-2020, 09:33 PM

Originally posted by FTC13474
Subject: <G27> Removing Game Elements from the Playing Field and <G16> Human Player Station - Returning Rings to the Playing Field

Question: For Remote Events, what will occur with the Rings that go
**Answer:** The answer that you seek is found by reading rules <G27> and <G16> in the Game Manual Part 2 - Remote Events. Field Personnel and the Human Player may return Rings from outside the Playing Field back into the Playing Field.

Rule <G27> states that Rings that go outside the Playing Field Boundary will be returned to the Playing Field by Field Personnel at the earliest safe and convenient opportunity at a non-Scoring location approximately where it left the field. The intent of this rule is to apply to Rings that exit the Playing Field and are out of reach by the Human Player Station.

Rule <G16> allows the Human Player to leave the Human Player Station to retrieve Rings. The Human Player shall use the Return Rack to introduce Rings into the Playing Field.
End Game

09-22-2020, 11:51 AM

Answers to questions about the End Game.

Tags: None

Stuck

Billie Jean
Administrator

Join Date: Nov 2013
Posts: 214

End Game

10-18-2020, 11:29 PM

Originally posted by FTC9999

Subject: Wobble Goal and Wobble Goal Ring Scoring

Game Manual Part 2 - Remote Events, Section 4.5.4 End Game, 1) Wobble Goal Delivery says: b) Drop Zone - Each Wobble Goal placed over a Barrier and Supported by the Drop Zone at the End of the Match earns twenty (20) points ...

Statement 1: Thus, the Drop Zone achievement is not possible in the case where the "Playing Field Boundary" is a taped line.

Statement 2: Nevertheless, each ring Completely Supported by a Wobble Goal or another Ring Completely Supported by a Wobble Goal earns five (5) points. A ring could be BOTH Inside the Drop Zone AND Inside the Playing Field yet still earn 5 points for the "Wobble Goal Rings" achievement.

Question 1a: In the case where the "Playing Field Boundary" is a wall, one or more of the rings could be in contact with a wall, but would otherwise be Completely Supported by a Wobble Goal or another Ring Completely Supported by a Wobble Goal. How would a ring that is in contact with a wall be scored?
**Response to Statement 1:** The Wobble Goal Delivery to the Drop Zone task requires placing the Wobble Goal over a Barrier. A Team using a taped Playing Field Boundary must add a physical Barrier to the Playing Field Boundary if the Wobble Goal Delivery to the Drop Zone task is part of the Team's Scoring strategy. See the definition of Barrier in section 4.4 of the Game Manual Part 2 - Remote Events. The DIY Field Element Guide published on the FIRST Tech Challenge website contains instructions for building a legal Barrier using cardboard and tape.

**Response to Statement 2:** The End Game Wobble Goal Ring task description in the Game Manual Part 2 clearly states that "any Wobble Goal location and orientation are allowed for this achievement."

**Answer to Question 1a:** A Ring contacting a Playing Field Boundary wall is eligible to be counted as Scored for the End Game Wobble Goal Ring achievement if it satisfies the Scoring requirements. For example, to count as Scored, the Ring must be Completely Supported by a Wobble Goal or another Ring that is Completely Supported by a Wobble Goal. Keep in mind that a Ring Supported by a Playing Field Boundary wall is not able to be Completely Supported by a Wobble Goal and therefore has zero Score value.

**Answer to Question 1b:** If the Ring contacting the Playing Field Border wall is Completely Supported by the Wobble Goal (i.e., it is not Supported by the Playing Field Boundary wall), additional Rings that it supports are eligible for the End Game Wobble Goal Ring achievement.

**Question 1b:** How would a ring that is in contact with a ring that is in contact with a wall be scored?

**Answer:** The Robot actions described in the question are not starting the Wobble Goal Delivery End Game task early. A Possessed Wobble Goal that is Outside the Launch Zone or In a Target Zone when the End Game Period starts is eligible for the End Game Wobble Goal Delivery tasks.
Air Jordan  
Game Design  
Committee Member  

Join Date: Sep 2010  
Posts: 550  

Subject: May a Robot move a Wobble Goal Into a Target Zone or to Outside the Launch Zone Any Time up Until the Start of the End Game Period?  

Question: The End Game rules state that a wobble goal in a target zone or NOT in the launch zone is eligible for scoring during the end game. If our robot scores the wobble goal that we preload during autonomous, can we move the other wobble goal at any time before the end game? In other words, can it also be moved during autonomous? Can it be transported across the launch line during driver-controlled (before the start of the end game) in order to be eligible for scoring during the end game?  

Answer: Yes to all three questions.
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Billie Jean  Administrator
Join Date: Nov 2013  Posts: 214

Competition Rules 09-22-2020, 01:10 PM
Answers to questions about Competition Rules.

Tags: None

Stuck  Edit  Quote  Flag  Like 0

Billie Jean  Administrator 11-02-2020, 10:45 AM

Originally posted by FTC9978
Subject: Remote Field Size

Q: Is it required that we use a half field for a remote league meet? (12 x 8)

A: Remote fields must be 12ft x 8ft to be competition legal.

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Billie Jean  Administrator 11-02-2020, 10:49 AM

Originally posted by FTC9978
Subject: Red or Blue Remote Field

Q: Does it matter which half field we use for a remote league meet, Red or Blue?
Stuck

Field Setup
09-22-2020, 01:21 PM

Answers to questions about Field Setup and Assembly.

Tags: None

Big Red Machine
Game Design Committee Member
10-21-2020, 12:16 AM

Originally posted by FTC7253

Subject: Double wobble target in single team remote auton

Q: Are both wobble targets to be placed on the field and available for scoring in auton for single team remote events? Meaning a single team can deliver the initially "possessed" wobble target and then the wobble target located on the other same-alliance start line?

A: Yes, both wobble goals should be placed on the field and available for scoring.

Big Red Machine
Game Design Committee Member
10-29-2020, 12:09 PM

Originally posted by FTC12762

Subject: Using net for remote field?