

January 11, 2010

TEAM UPDATE #1

GENERAL NOTICES

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Classmate Image Notice:

The Issue

The restoration procedure used for both the 2010 and 2011 Classmate PC's creates a 5GB partition on the Classmate's hard drive which is used only during the imaging process. Once imaging is complete, this hard drive space is unavailable to the user.

Solution

There are two possible courses of action:

1. OPTION 1: Do nothing. The issue only affects the available hard drive space on the Classmate PC. This is the recommended option for teams who only intend to use their Classmate PC as a Driver Station. There is sufficient space remaining on the hard drive if updates are issued for the Driver Station software.
2. OPTION 2: Download the updated installation files posted on the Control System section of the [2011 Kit of Parts Website](#) and follow the procedure for replacing the files. This option is best for teams who use their Classmate PC for robot code development, or for teams that choose to access the unused hard drive space.

Section 1 – Introduction

Various typographical errors (duplicate words, missing trademark symbols, incorrect section references, etc.) were corrected. Please refer to **Section 1.7, Revision History**, for details.

Content was changed as follows:

DEPLOYMENT – the act of positioning a MINIBOT on a TOWER. DEPLOYMENT starts when the MINIBOT breaks the vertical projection of the TOWER BASE circumference during the END GAME. **DEPLOYMENT ends when the HOSTBOT is no longer in contact with the MINIBOT.** (Related form, DEPLOY, verb)

ROBOT – the composite electromechanical assembly designed and built by a FRC team to perform specific tasks when competing in the 2011 competition *LOGO MOTION*. The ROBOT must include all the basic systems required to be an active participant in the game – power, communications, control, mobility, and actuation. The ROBOT implementation must obviously follow a design approach intended to play the 2011 FRC game (e.g. a box of unassembled parts placed on the FIELD, or a ROBOT designed to play a different game, would not satisfy this definition). The ROBOT includes both the HOSTBOT and **the one** MINIBOT (ROBOT = HOSTBOT + MINIBOT).

A revision history of the document has been added as **Section 1.7**.

Section 2 – The Arena

No changes.

Section 3 – The Game

Various typographical errors (misspellings, missing trademark symbols, etc.) were corrected. Please refer to **Section 3.4, Revision History**, for details.

Content was changed as follows:

<G19> After DEPLOYMENT, MINIBOTS must remain completely autonomous and move up the POST solely through electric energy provided after DEPLOYMENT by the permitted, unaltered battery and converted to mechanical energy by the permitted unaltered motors (and associated, appropriate circuitry).

Violation: The TOWER on which the MINIBOT is DEPLOYED is disabled. If the MINIBOT is ~~not-deployed~~ DEPLOYED on something other than a TOWER, then the ALLIANCE'S TOWER upon which the highest RACE SCORE was earned will be discounted.

<G19> means that HOSTBOTS are not allowed to launch the MINIBOT up the pole at the TARGET, or otherwise contribute to the vertical movement of the MINIBOT. Energy for vertical movement may not be stored in the MINIBOT before DEPLOYMENT (except that which is contained within the battery and excluding incidental kinetic energy stored in the motors or wheels, but NOT, for example, in a flywheel).

<G65> The PEG SCORE is the sum of points determined by the positions of the GAME PIECES on each SCORING GRID. A LOGO PIECES HANGING in front of an UBERTUBE doubles the points for that SCORING PEG. The table below gives the value for each ~~GAME~~ LOGO PIECE HANGING on a SCORING PEG.

LOGO PIECE:	Alone	Over UBERTUBE
Not HANGING	0 points	0 points
HANGING on bottom ROW	1 point	2 points
HANGING on middle ROW	2 points	4 points
HANGING on top ROW	3 points	6 points

Note that an UBERTUBE acts only as a modifier and carries no point value of its own after the AUTONOMOUS PERIOD.

<G66> If three LOGO PIECES form a LOGO, the assigned points from the SCORING PEGS PEG SCORE in that row of that SCORING GRID are given as an additional LOGO BONUS, effectively doubling the score of the row.

A revision history of the document has been added as **Section 3.4**.

Section 4 – The Robot

Various typographical errors (section references, missing trademark symbols, etc.) were corrected. Please refer to **Section 4.1, Revision History**, for details.

Content was changed as follows:

<R11> During the MATCH, the ROBOT may not exceed the volume constraints of either STARTING or PLAYING CONFIGURATIONS (note: these limits are defined in reference to the ROBOT, not the FIELD).

	Maximum Horizontal Dimensions	Maximum Height	Maximum Weight
STARTING CONFIGURATION	28" x 38" (71.12cm x 96.52cm) rectangular space	60" (152.40cm)	120 pounds (54.43Kg)
PLAYING CONFIGURATION	60"84" (213.4cm) diameter vertical right cylindrical volume	N/A	

<R45> Motors specifically permitted on 2011 FRC ROBOTS include:

- C. one or two additional 2½" CIM motors (part #FR801-001 and/or M4-R0062-12, AM802-001A, and/or PMR25R-45F-1003) in addition to those provided in the KOP. This means that up to four, and no more, 2½" CIM motors can be used on the ROBOT,

<R92> The following items are the only permitted materials for use on the MINIBOTS:

- | | |
|---|---|
| <ul style="list-style-type: none"> A. TETRIX components that are not in violation of any other rules, B. no more than two motors (PN W739083), C. exactly one 12V rechargeable NiMH battery pack identical to those supplied in the FTC kit of parts (PN W739057) D. No more than one HiTechnic DC motor controllers, | <ul style="list-style-type: none"> E. No more than one NXT controller with the Bluetooth functionality disabled, F. Polycarbonate, G. Polycarbonate glue, H. Aluminum sheet, 90° angle, u-channel, tube, bar, I. rivets, J. non-metallic rope or cord, K. wire nuts, |
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- L. cable ties,
- M. limit switches,
- N. no more than two common household light switches,
- O. wire of appropriate gauge (see Rule <R40>),
- P. non-slip pad,
- Q. PVC or CPVC pipe,
- R. PVC cement or cleaner,
- S. Mechanical hardware (i.e. screws, bolts, etc) ,
- T. Loctite or similar thread-locking product,
- U. Rubber bands,
- V. Surgical tubing,
- W. Electrical tape and shrink tubing,
- X. PWM extension cables,
- Y. Universal security clips to hold the PWM connectors together,
- Z. Hook and loop fastener (may not be used as tape),
- AA. Magnets, and
- BB. NXT compatible sensors and related connectors/cables.

A Blue Box has been added to **Section 4.3.15**:

MINIBOT use is independent of the ROBOT inspection. For example, any FTC team can bring a MINIBOT to an event, get it inspected, and if legal, that MINIBOT can compete with any FRC ROBOT (that has passed ROBOT inspection). There are legal HOSTBOTS and legal MINIBOTS; they are independent of each other regarding inspection.

A revision history of the document has been added as **Section 4.1**.

Section 5 – The Tournament

No changes.

Kit of Parts

The **2011 Kit of Parts Checklist, Rev A** has been updated to include the following corrections:

- The quantity of the iglide bearing (provided in the igus bag), PN MTI-10, has been changed from 8 to 4 (it should have been 4, 8 was a typo). Please note that if teams have already submitted their Replacement Parts Request (thank you for doing that already!) and they reported 4 of these bearings missing, these items will be automatically removed from the list as you received the correct number of bearings.
- The part number for the CIM motor was changed from FR801-001 to AM802-001A.
- The quantity of the reflective material sample (provided in the Small Parts Bag in the Black Tote), PN GP010, has been changed from 3 x 1' pieces to 1 x 3' piece. Please note that if teams have already submitted their Replacement Parts Request (thank you for doing that already!) and they reported 2 of these pieces missing, these items will be automatically removed from the list as you received the one 3' piece.

- The quantity of the 2 x 2 x 10mm key (provided in the AndyMark box), PN am-1121, has been changed from 4 to 2. Please note that if teams have already submitted their Replacement Parts Request (thank you for doing that already!) and they reported 2 of these keys missing, these items will be automatically removed from the list as the corrective actions for this issue are listed below.

Please see the message from AndyMark below for more information about the machine key referenced above.

ISSUE:

AndyMark has incorrectly packed only 1 machine key (am-1121, 2x2x10 machine key) within each CIMple box. While this allows an FRC team to use 1 motor on the CIMple Box, this gearbox is designed to use 2 CIM Motors (more motors available at AndyMark, item am-0255). The CIMple Boxes were packed with gears, screws, and retaining rings for 2 CIM Motors, but were erroneously only packed with 1 of these machine keys.

CORRECTIVE ACTIONS:

1. AndyMark will begin packing 2 machine keys into each FIRST Choice kit packed as of noon on Jan. 11th. FIRST Choice orders numbered 15160 and beyond will include a small ziplock bag containing these machine keys.
 2. Teams can email "sales@andymark.com" and request 2 machine keys to be sent to their address. They need to provide their shipping address and contact name within the email. These parts will be sent out via US Postal service.
 3. Teams can email "sales@andymark.com" and request 2 machine keys to be included with their team's AndyMark order. They simply need to include their 5-digit order number, and/or the name of the person who made their team's order. We will then include 2 machine keys with their existing order. Teams can also request these machine keys in the comment area of their order.
 4. For a quick fix, teams can use a segment (1/4-3/8" long) of a nail that is 0.070-0.079" in diameter as a substitute for this machine key.
- Please note that the blue inflatable squares shipped in the Kits of Parts are a darker blue than those that will be used on the field during competition and sold by AndyMark (which will be closer to the blue in the *FIRST* logo). The material, shape, size, and all other dimensions are identical.

January 14, 2010

TEAM UPDATE #2

GENERAL NOTICES

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Note to teams:

We want to remind you that *FIRST* Choice closes on Sunday at 8pm ET. Please make sure you make your selection before the deadline in order to collect your three additional kit items. For more information and details, visit

<http://www.usfirst.org/roboticsprograms/frc/content.aspx?id=18619>.

Section 1 – Introduction & Section 2 – The Game

No change.

Section 3 – The Game

Section 3 – The Game, Rev B has been updated to include the following edits:

<G21> HOSTBOTS may only DEPLOY MINIBOTS onto their ALLIANCE'S TOWERS and entirely below the DEPLOYMENT LINE.

Violation: RED CARD

<G22> HOSTBOTS may not contact their ALLIANCE'S MINIBOT once any part of it has climbed above the DEPLOYMENT LINE. *Violation: TOWER is disabled*

Section 4 – The Robot

Section 4 – The Robot, Rev B has been updated to include the following edits (including fixing the bullet letters in Rule <R66>):

<R66> In addition to the items included in the KOP, pneumatic system items specifically permitted on 2011 FRC ROBOTS include the following items. All included items must be "off the shelf" COTS pneumatic devices rated by their manufacturers for working pressure of at least 125psi and burst pressure of 250psi, and used in their original, unaltered condition (except as required for assembly with other components).

- A. Pneumatic pressure vent plug valves functionally equivalent to those provided in the KOP,
- B. Solenoid valves with a maximum 1/8" NPT port diameter, and a maximum Cv of 0.32 (if non-KOP valves are used, the team will be required to provide part documentation validating that the valves meet these constraints).
- C. than 125psi rating mandated above are permitted, however if employed, an additional pressure relief valve must be added to the low pressure side of the main regulator. The additional relief valve must be set to a lower pressure than the maximum pressure rating for the solenoid valve.

- D. Additional 0.160" inside diameter pneumatic tubing functionally equivalent to that provided in the KOP, with the pressure rating clearly factory-printed on the exterior of the tubing,
- E. Pressure transducers, pressure gauges, and connecting fittings,
- F. Pressure regulators with a maximum bypass pressure of no more than 60psi,
- G. For the purposes of the FRC, a device that creates a vacuum is not considered to be a pneumatic device and are not subject to the pneumatic rules (although they must still satisfy all other appropriate rules). These include, but are not limited to; venturi-type vacuum generators and off-the-shelf vacuum devices (as long as they are powered by provided or permitted motors).
- H. For the purposes of the FRC, closed-loop COTS pneumatic (gas) shocks are not considered pneumatic devices, and are not subject to the pneumatic rules (although they must still satisfy all other appropriate rules).
- I. For the purposes of the FRC, air-filled (pneumatic) wheels are not considered pneumatic devices, and are not subject to the pneumatic rules (although they must still satisfy all other appropriate rules).
- J. **Pneumatic cylinders.**
- K. **Pneumatic storage tanks.**

<R91> The MINIBOT may not exceed a 12" x 12" x 12" volume and weigh no more than 15 lbs.

MINIBOTS will be inspected for the volume constraint by being placed in a five-sided box with internal dimensions of 12" x 12" x 12". If the lid (the sixth side of the cube) does not seat properly, the MINIBOT does not pass this part of the MINIBOT inspection.

<R92-O> **electrical hookup** wire of appropriate gauge (~~see Rule <R40>~~),

Section 5 – The Tournament

No change.

Kit of Parts

The **2011 Kit of Parts Checklist, Rev B** has been updated to include the following edits:

- The spelling of "Separate" has been corrected.

January 18, 2010

TEAM UPDATE #3

GENERAL NOTICES

Servo usage/inspection clarification:

If teams wish to use servos on their ROBOT, per Rule <R45-B>, the burden of proof is on the team to show the inspector that the servo has a maximum power rating of 4W. Teams should use the most conservative specifications provided when using inputs to the power equation.

While the Maximum Power for DC motors is calculated as:

$$\text{Max Power} = \left(\frac{1}{2} \times \text{Stall Torque}\right) \times \left(\frac{1}{2} \times \text{No Load Speed}\right)$$

the servo industry rates servos using:

$$\text{Servo Max Power Rating} = (\text{Stall Torque}) \times (\text{No Load Speed})$$

This "Servo Max Power Rating" formula should be used to evaluate servos.

As an example, the Hitec HS-322 servo has the following relevant specifications:

Speed (4.8V/6.0V):	0.19 / 0.15 sec @ 60 deg.
Torque oz./in. (4.8V/6.0V):	42 / 51
Torque kg./cm. (4.8V/6.0V):	3.0 / 3.7

The Servo Max Power Rating calculation is:

$$\text{Servo Max Power Rating} = \text{Torque} \times \text{Speed} \times \text{unit conversion factor}$$

$$\text{Torque} = 3.7 \frac{\text{kg}}{\text{cm}} = 0.36 \text{ Nm}$$

$$\text{RPM} = 0.15\text{s} @ 60^\circ = 66.7\text{RPM}$$

$$0.36\text{Nm} \times 66.7\text{RPM} \times 0.1047 = 2.5\text{W}$$

This calculation, plus documentation from the manufacturer that details this servo is rated for 2.5W, indicate that the Hitec HS-322 is a permitted servo.

Section 1 – Introduction

Section 1 – Introduction, Rev B was updated to include the following edit:

DEPLOYMENT – the act of positioning a MINIBOT on a TOWER. DEPLOYMENT starts when the MINIBOT breaks the vertical projection of the TOWER BASE circumference during the ~~END-GAME~~. DEPLOYMENT ends when the HOSTBOT is no longer in contact with the MINIBOT. (Related form, DEPLOY, verb)

KIT OF PARTS (KOP) – the collection of items listed in the **2011 Kit of Parts Checklist** provided on the FIRST website at <http://www.usfirst.org/frc/competitionmanual> and the items listed on the **FIRST Choice list** (http://www.usfirst.org/uploadedFiles/Robotics_Programs/FRC/Game_and_Season_Info/Email)

Section 2 – The Arena

Section 2 – The Arena, Rev A was updated to include the following edits:

2.2.2. FIELD Markings

The FIELD is divided into several regions by 3-inch wide colored gaffers tape attached to the carpet. The regions are known as “ZONES” and “LANES.” The color of the ZONES and LANES are indicated by the color of the gaffers tape used to mark them on the carpet (Pro Gaff Tape, “red”, and “electric blue”)...

There is one ZONE for each ALLIANCE, located immediately in front of the ALLIANCE WALL for that ALLIANCE. The ZONE is approximately 18 feet wide and 7 feet deep. There is a 2-inch wide yellow CAUTION LINE located 4 feet in front of the ZONE (Pro Gaff Tape, “yellow”)...

TRACKING LINES are marked on the carpet with 2-inch wide grey gaffers tape (Pro Gaff Tape, “grey”)...

2.2.5 The TOWERS

The BASE rests on a 48-inch by 76-inch floor protector made of 3/16-inch HDPE. The floor protector is velcroed to the FIELD surface, and covered with a piece of similar carpet. The edges of the floor protector cover are taped to the FIELD carpet (Pro Gaff Tape, “black”, 2-inch)...

2.2.6 The ALLIANCE STATIONS

The ALLIANCE STATION extends back eight feet from the ALLIANCE WALL, and across the 18-foot wide center section of the wall. The ALLIANCE STATION includes the three identical PLAYER STATIONS. The STARTING LINE is marked on the floor four feet back from the ALLIANCE WALL, and extends across the width of the ALLIANCE STATION. The ALLIANCE STATION includes the area behind the STARTING LINE. All boundaries for the ALLIANCE STATIONS are marked on the carpet with white tape (Pro Gaff Tape, “white”, 2-inch)...

The POST is constructed from a piece of 1.5” Steel Electrical Metal Tubing (EMT) with a nominal outer diameter of 1.74”. 1.75-inch diameter (O.D.) steel pipe.

Section 3 – The Game

Section 3 – The Game, Rev C was updated to include the following edit:

<G07> Items other than the ROBOTS and the GAME PIECES ~~UBERTUBES~~ shall not be placed on the FIELD prior to or during the MATCH.

Violation: PENALTY and YELLOW CARD

Section 4 – The Robot

Section 4 – The Robot, Rev C was updated to include the following edit:

<R20> The following items are *excluded* from the total cost calculation:

- A. all items provided in the 2011 KOP,
- B. the cost of any non-functional decorations,
- C. the cost of individual fasteners, adhesives, or lubricants, unless any one component exceeds \$1.00,

- D. the costs of SPARE PARTS. A SPARE PART used as a direct replacement for a failed or defective ROBOT part (either KOP item or non-KOP item) that has already been included in the cost accounting is covered by the accounting for the original part, and
- E. all costs for the construction of the OPERATOR CONSOLE.

F. all costs for the MINIBOT.

<R40> All active PD Board branch circuits shall be wired with appropriately sized wire:

Application	Minimum wire size
40A circuit	12 AWG (2.052mm)
30A circuit	14 AWG (1.628mm)
20A circuit	18 AWG (1.024mm)
between the PD Board and the Analog and/or Solenoid Breakouts if a common power feed is used	18 AWG (1.024mm)
between the PD Board and the Analog and/or Solenoid Breakouts if individual power feeds are used	20 AWG (0.8128mm)
between the PD Board and the cRIO-FRC	20 AWG (0.8128mm)
between the PD Board and the radio	20 AWG (0.8128mm)
pneumatic valves	24 AWG (0.5106mm)

The branch circuit may include intermediate elements such as COTS connectors, splices, COTS flexible/rolling/sliding contacts, and COTS slips rings, as long as the entire electrical pathway is via appropriately gauged conductors.

<R92> The following items are the only permitted materials for use on the MINIBOTS:

- | | |
|---|--|
| <ul style="list-style-type: none"> A. TETRIX components that are not in violation of any other rules, B. no more than two motors (PN W739083/W739023) and an unlimited number of Tetrrix servos, C. exactly no more than one 12V rechargeable NiMH battery pack identical to those supplied in the FTC kit of parts (PN W739057) D. No more than one HiTechnic DC motor controllers, E. No more than one NXT controller with the Bluetooth functionality disabled, F. Polycarbonate, G. Polycarbonate glue, H. Aluminum sheet, 90° angle, u-channel, tube, bar, I. rivets, J. non-metallic rope or cord, K. wire nuts, | <ul style="list-style-type: none"> L. cable ties, M. limit switches, N. no more than two common household light switches, O. electrical hookup wire, P. non-slip pad, Q. PVC or CPVC pipe, R. PVC cement or cleaner, S. Mechanical hardware fasteners (i.e. e.g. screws, bolts, etc), T. Loctite or similar thread-locking product, U. Rubber bands, V. Surgical tubing, W. Electrical tape and shrink tubing, X. PWM extension cables, Y. Universal security clips to hold the PWM connectors together, Z. Hook and loop fastener (may not be used as tape), |
|---|--|

AA. Magnets, and

BB. NXT compatible sensors and related connectors/cables.

Tetrix components are defined by those that are included in this catalog: http://www.tetrixrobotics.com/Building_System/Downloads/default.aspx?moid=533. To get information about how/where to purchase components, please refer to the **Where to get more** document posted at www.usfirst.org/frc/kitofparts.

Please note that the Rule <R92> only allows Tetrix components. While Tetrix components are a subset of FTC components, it is essential to realize that not all FTC parts are Tetrix parts. As such, not all FTC parts are permitted on the MINIBOT. Please be sure to vet your components against the above list before constructing your MINIBOT.

The use of glues/cements may not be allowed in the pits at tournaments based on site-specific rules.

Please note that the FTC Samantha module is not considered a TETRIX component and is not permitted on the MINIBOT.

Section 5 – The Tournament

No change.

Kit of Parts

No change.

January 21, 2010

TEAM UPDATE #4

GENERAL NOTICES

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No change.

Section 1 – Introduction

No change.

Section 2 – The Arena

Team Drawings:

The Team Drawings have been updated to correct the length of the peg. Also, the older revision of TE11004 has been removed from the drawing package.

Section 3 – The Game

Section 3, The Game, Rev D has been updated to incorporate the following edits:

<G32> Neither ROBOTS, HOSTBOTS, nor MINIBOTS may break the planes of the vertically projected borders of the opponent's ZONES, including a GAME PIECE in their POSSESSION. Momentary incursions by a POSSESSED GAME PIECE will not be penalized if they do not make contact with anything in the ZONE.

<G39> ROBOTS and FEEDERS may not SCORE on opponent's PEGS or de-score opponent's GAME PIECES.

<G49> ROBOTS may not attempt to POSSESS a GAME PIECE that is being POSSESSED by an opponent another ROBOT.

<G67> was updated to correct the misspelling of MINIBOT.

Section 4 – The Robot

Section 4, The Robot, Rev D has been updated to incorporate the following edits:

<R49> ROBOTS must be controlled via the programmable National Instruments cRIO-FRC (National Instruments part number 780406-01). Other controllers shall not be used.

As long as the CAN bus is wired legally so that the heartbeat from the cRIO is maintained, the closed loop control features of the Jaguar motor controller may be used. (That is, commands originating from the cRIO to configure, enable, and specify an operating point for all Jaguar closed loop modes fit the intent of <R49>.)

<R92-H> Raw aluminum sheet, 90° angle, u-channel, tube, bar, that is not sold in pre-perforated or pre-punched form.

A note about the edit to R92-H:

The original intent of R92-H was to allow teams to use raw aluminum. We appreciate that the intent was not clear in the original verbiage, and for that, our apologies.

Throughout the process, and especially in public statements, we have been transparent and unambiguous that the minibot is an opportunity for *FIRST* to prominently feature and reflect support for our family of programs. This is a golden opportunity to show that support, and we have taken advantage of it. We were clear in our comments at kickoff that we are using this competition, in part, to support FTC and FLL. There is no secret plan; it is a wide open plan. Supporting *FIRST* means supporting FTC and FLL and their kits.

Section 5 – The Tournament & The Kit of Parts

No change.

January 25, 2011

TEAM UPDATE #5

GENERAL NOTICES

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No changes.

Section 1 – Introduction

Section 1 – Introduction, Rev C has been updated to include the following edits:

BUMPER – an assembly designed to attach to the exterior of the HOSTBOT and constructed as specified in **Section 3.4 4.3.2, Bumper Rules**.

HANGING – a GAME PIECE is HANGING when it is fully supported by a PEG through its center hole and released by the POSSESSING ROBOT. Once a GAME PIECE has been released by the POSSESSING ROBOT (even momentarily) and is HANGING (e.g. it is fully supported by the PEG), it is considered to be HANGING until the end of the match. If a GAME PIECE on the floor is preventing a GAME PIECE that has been hung on a bottom PEG from becoming fully supported (that is, if the floor GAME PIECE was not there, the hung GAME PIECE would be scored) then that GAME PIECE will still be counted as scored.

MINIBOT – an autonomous vehicle designed and built to perform specific tasks when competing in the 2011 competition *LOGO MOTION*. The MINIBOT must obviously follow a design approach intended to play the 2011 FRC END GAME and must be compliant with all MINIBOT rules defined in **Section 4.34.14**.

Section 2 – The Arena

Section 2 – The Arena, Rev B has been updated to include the following edits:

2.2.8 The PLAYER STATIONS

Attached to the ALLIANCE WALL are three aluminum shelves to support the OPERATOR CONSOLES for the three TEAMS on the ALLIANCE. The support shelf measures approximately 60 inches wide by 12 inches deep. There is a 4-1/2-foot long by two-inch wide strip of Velcro tape (“loop” side) along the center of the support shelf that may be used to secure the OPERATOR CONSOLES to controls the ROBOT. Each setup location includes a competition cable (to provide Ethernet connectivity) that attaches to the Ethernet Port of the OPERATOR CONSOLE. The cable provides communications with the ROBOT.

Once plugged in to the Field Management System via the Ethernet cable provided, the ports that the teams will be able to access on the playing field are as follows:

- TCP 1180: This port is typically used for camera data from the cRIO to the DS when the camera is connected to port 2 on the cRIO. This port is bidirectional on the field.
- UDP 1130: Dashboard-to-Robot control data, directional
- UDP 1140: Robot-to-Dashboard status data, directional
- HTTP 80: Camera connected via switch on the robot, bidirectional
- HTTP 443: Camera connected via switch on the robot, bidirectional

All these ports are open on the playing field, so a team can use them as they wish if they do not employ them as outlined above (i.e. TCP 1180 can be used to pass data back and forth between the robot and the DS if the team chooses not to use the camera on port 2).

Each setup location also includes a power adaptor cable that may be used to power the Classmate laptops that were provided to teams in 2010 and 2011. Emergency Stop (E-Stop) buttons for each TEAM are located on the left end of each PLAYER STATION shelf. ARENA components (including team number displays, competition arena hardware, alliance lights, control hardware cabinets and clock displays) are also located above the PLAYER STATIONS and below the shelf.

Section 3 – The Game

Section 3 – The Game, Rev E has been updated to include the following edits:

<G19> MINIBOTS must remain completely autonomous and move up the POST solely through electric energy provided after **the start of** DEPLOYMENT by the permitted, unaltered battery and converted to mechanical energy by the permitted unaltered motors (and associated, appropriate circuitry).

<G21> HOSTBOTS may ~~only~~ DEPLOY MINIBOTS **only** onto their ALLIANCE'S TOWERS and entirely below the DEPLOYMENT LINE.

Section 4 – The Robot

Section 4 – The Robot, Rev E has been updated to include the following edits:

<R14> When a ROBOT is in its STARTING CONFIGURATION, no part of the ROBOT shall extend outside the vertical projection of the FRAME PERIMETER **(with the exception of minor protrusions such as bolt heads, fastener ends, rivets, etc).**

In Rule <R22> the textbox has been enlarged to show all intended text:

Please note that this means that FABRICATED ITEMS from ROBOTS entered in previous *FIRST* competitions may not be used on ROBOTS in the 2011 FRC.

Before the formal start of the Robot Build Season, teams are encouraged to think as much as they please about their ROBOTS. They may develop prototypes, create proof-of-concept models, and conduct design exercises. Teams may gather all the raw stock materials and COTS COMPONENTS they want.

Example: A TEAM designs and builds a two-speed shifting transmission during the fall as a training exercise. When designing their competition ROBOT, they utilize all the design principles they learned. To optimize the transmission design for their ROBOT, they improve the transmission gear ratios and reduce the size, and build two new transmissions, and place them on the ROBOT. All parts of this process are permitted activities.

Example: The same TEAM realizes that the transmission designed and built in the fall perfectly fits their need for a transmission to drive the ROBOT arm. They build an exact copy of the transmission from the original design plans, and bolt it to the ROBOT. This would be prohibited, as the transmission – although fabricated during the competition season – was built from detailed designs developed prior to kick-off.

Example: A TEAM developed an omni-directional drive system for the 2010 competition. Over the summer of 2010 they refined and improved the control software (written in C) to add more precision and capabilities. They decided to use a similar system for the 2011 competition. They copied large sections of unmodified code over into the control software of the new ROBOT (also written in C). This would be a violation of the schedule constraint, and would not be allowed.

Example: The same TEAM decides to use the LabView as their software environment for 2011. Following kickoff, they use the previously-developed C code as a reference for the algorithms and calculations required to implement their omni-directional control solution. Because they developed new LabView code as they ported over their algorithms, this would be permitted.

Example: A different team develops a similar solution during the fall, and plans to use the developed software on their competition ROBOT. After completing the software, they post it in a generally accessible public forum and make the code available to all teams. Because they have made their software generally available (per the Blue Box in the definition of COTS, it is considered COTS software and they can use it on their ROBOT.

<R33> Teams may bring a maximum of 30 pounds of custom FABRICATED ITEMS (SPARE PARTS, REPLACEMENT PARTS, and UPGRADE PARTS, plus all WITHHOLDING ALLOWANCE items) to each competition event to be used to repair and/or upgrade their ROBOT at the competition site. All other FABRICATED ITEMS to be used on the ROBOT during the competition shall arrive at the competition venue packed in the shipping crate or lockout bag with the ROBOT.

There are ~~two~~ **three** exceptions to this rule:

- A. the OPERATOR CONSOLE is not included in the incoming parts weight restriction,
- B. the MINIBOT is not included in the incoming parts weights restriction, and
- C. any competition legal 12V batteries and their associated half of the Anderson cable quick connect/disconnect pair (including no more than 12" of cable per leg, the associated cable lugs, connecting bolts, and insulating electrical tape) are not included in the incoming parts weight restriction.

<R45-D> up to four, in any combination, of the BaneBots motors provided in the KOP (acceptable part numbers are M7-RS775-12, M7-RS775-18, M5-RS550-12, M5-RS550-12-B, M5-RS540-12, and M3-RS395-12),

<R46> Items specifically PROHIBITED from use on the ROBOT include:

- A. Electric motors and/or servos different from, or in addition to, those listed in the 2011 KOP Checklist, with the exception of those specifically permitted by Rule <R45>.
- B. Electric solenoid actuators (note: electric solenoid actuators are NOT the same as pneumatic solenoid valves – the latter are permitted, the former are not).

<R60> Solenoid Breakout outputs shall be connected to pneumatic valve solenoids or photoelectric sensors, PN 42EF-D1MNAK-A2 only. No other devices shall be connected to these outputs.

A note about the edit to Rule <R92>:

Unfortunately there was conflicting information distributed to teams via email blast and Team Update. The update to Rule <R92-A> combines the lists sent out into one document. The intent is to make sure that teams aren't penalized for using one list over the other in determining which Tetrax components were legal. Please accept our apologies for the confusion.

Additionally, it has come to our attention that teams have burned out their Tetrax motors by stalling them while directly connected to the battery. Please see the rule change later in this update that allows for two options to help prevent this from occurring. The first allows for changing the fuse in the battery pack to a lower amperage value; the second allows the use of the Tetrax Thermal-Protected DC Motor Power Cable. We encourage teams to consider making use of one or both of these options.

<R92> The following items are the only permitted materials for use on the MINIBOTS:

- A. TETRAX components that are not in violation of any other rules (Tetrax components are listed in **Approved Tetrax Parts** at www.usfirst.org/frc/competitionmanual),
- B. no more than two motors (PN W739083/W739023) and an unlimited number of Tetrax servos),
- C. no more than one 12V rechargeable NiMH battery pack identical to those supplied in the FTC kit of parts (PN W739057) except the 20A fuse may be replaced with an equivalent type of lower amperage,
- D. No more than one HiTechnic DC motor controllers,
- E. No more than one NXT controller with the Bluetooth functionality disabled,
- F. Polycarbonate,
- G. Polycarbonate glue,
- H. Raw aluminum sheet, 90° angle, u-channel, tube, bar, that is not sold in pre-perforated or pre-punched form.
- I. rivets,
- J. non-metallic rope or cord,
- K. wire nuts, solder, and crimps,
- L. cable ties,
- M. limit switches,
- N. no more than two common household light switches,
- O. electrical hookup wire,
- P. non-slip pad,
- Q. PVC or CPVC pipe and fittings,
- R. PVC cement or cleaner,
- S. Mechanical fasteners (e.g. screws, bolts, etc),
- T. Loctite or similar thread-locking product,
- U. Rubber bands,
- V. Surgical tubing,
- W. Electrical tape and shrink tubing,

- X. PWM extension cables,
- Y. Universal security clips to hold the PWM connectors together,
- Z. Hook and loop fastener (may not be used as tape),

- AA. Magnets, ~~and~~
- BB. NXT compatible sensors and related connectors/cables.
- CC. Grease, and
- DD. Non-functional decorations.

~~Tetrix components are defined by those that are included in this catalog:-
http://www.tetrixrobotics.com/Building_System/Downloads/default.aspx?moid=533. To get information about how/where to purchase components, please refer to the **Where to get more** document posted at www.usfirst.org/frc/kitofparts.~~

Please note that the Rule <R92> only allows **specific** Tetrix components. While Tetrix components are a subset of FTC components, it is essential to realize that not all FTC parts are Tetrix parts. As such, not all FTC parts are permitted on the MINIBOT. Please be sure to vet your components against the above list before constructing your MINIBOT.

Use of glues/cements may not be allowed in the pits at tournaments based on site-specific rules.

Please note that the FTC Samantha module is not considered a TETRIX component and is not permitted on the MINIBOT.

<R103> **FIRST** Officials may randomly re-inspect MINIBOTS participating in competition MATCHES to **ensure** ~~assure~~ compliance with the rules.

Section 5 – The Tournament

No change.

The Kit of Parts

Please note that GAME PIECES are now available for teams to purchase through AndyMark, www.andymark.com.

The **2011 Kit of Parts Checklist, Rev C**, includes the following edits:

BaneBots motor part numbers have been updated as follows:

- RS395 has become M3-RS395-12,
- RS540 has become M5-RS540-12,
- RS550 has become M5-RS550-12, and
- RS775 has become M7-RS-775-12.

The Kit of Parts website, www.usfirst.org/frc/kitofparts, has been updated to include:

- an updated **Radio Configuration** document (to better outline how to configure the radio for team use during development. It also describes the new features and advantages of the new radio, and how different operating modes are used).

January 28, 2011

TEAM UPDATE #6

GENERAL NOTICES

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No changes.

Section 1 – Introduction

No changes.

Section 2 – The Arena

The dimensions and layout of the vision targets has been posted in the *Vision Target Dimensions* document posted here: www.usfirst.org/frc/competitionmanual under **Section 2 - The Arena**.

Section 3 – The Game

Section 3 – The Game, Rev E has been updated to include the following edits:

- <G05> Alignment devices (templates, tape measures, laser pointers, etc.) that are not part of the ROBOT and fully contained within the volume defined by the **STARTING CONFIGURATION** may not be used to assist with positioning the ROBOT.
Violation: TEAMS that use external alignment devices to position their ROBOT will have their ROBOT arbitrarily repositioned by a referee before the start of the MATCH.
- <G32> Neither ROBOTS, HOSTBOTS, nor MINIBOTS may break the planes of the vertically projected borders of the opponent's ZONES, including a GAME PIECE in their POSSESSION. Momentary incursions by a POSSESSED GAME PIECE will not be penalized if they do not make contact with anything in the ZONE.
Violation: PENALTY. G61 does not apply to this rule, however strategies aimed at taking advantage of this exception will result in a YELLOW CARD. If a ROBOT enters the opponent's ZONE and does not make immediate effort to leave OR if it contacts another ROBOT (or GAME PIECE in its POSSESSION) also in the ZONE, then the intruding TEAM will receive a RED CARD.
- <G33> Neither ROBOTS, HOSTBOTS, nor MINIBOTS may break the planes of the vertically projected borders of the opponent's LANES.
Violation: PENALTY. G61 does not apply to this rule, however strategies aimed at taking advantage of this exception will result in a YELLOW CARD. If a ROBOT enters the opponent's LANE and does not make immediate effort to leave OR if it contacts another ROBOT (or GAME PIECE in its POSSESSION) also in the LANE, then the intruding TEAM will receive a RED CARD.
- <G50> ~~A ROBOT~~ An ALLIANCE may not pin another an opponent ROBOT that is in contact with a field border or TOWER for more than 5 seconds. A ROBOT will be considered

pinned until the ROBOTS have separated by at least 6 feet. The pinning ROBOT(S) must then wait for at least 3 seconds before attempting to pin the same ROBOT again.

Violation: 10 PENALTIES

If the pinned ROBOT chases the pinning ROBOT upon retreat, the pinning ROBOT will not be penalized per Rule <G61>, and the pin will be considered complete.

<G59> TEAMS must retrieve MINIBOTS from the TOWER quickly and safely **without special equipment and while standing on the floor** after each MATCH.

Violation: The FIELD crew will retrieve the MINIBOT if the TEAM does not. A second violation may result in a YELLOW CARD.

Section 4 – The Robot

Section 4 – The Robot, Rev F has been updated to include the following edits:

<R47> Motors and servos used on the ROBOT shall not be modified in any way, except as follows:

- A. The mounting brackets and/or output shaft/interface of the motors may be modified to facilitate the physical connection of the motor to the ROBOT and actuated part.
- B. The electrical input leads on the motors may be trimmed to length as necessary.
- C. The locking pins on the window motors may be removed.
- D. The connector housings on the Window motors (PN 262100-3030 and 262100-3040) may be modified to facilitate lead connections.**

<R48> All electrical loads (motors, actuators, compressors) must be supplied by an approved power regulating device (speed controller, relay module, or Digital Sidecar PWM port) that is controlled by the cRIO-FRC on the ROBOT.

- A. Each CIM motor and Fisher-Price motor must be connected to one and only one approved speed controller. These motors must not be connected to relay modules.
- B. Servos must be directly connected to the PWM ports on the Digital Sidecar. They must not be connected to speed controllers or relay modules.
- C. If used, the compressor must be connected to one and only one approved relay module.
- D. Each other electrical load (motor or actuator) must be supplied by one and only one approved speed controller, or one and only one relay module.

Power regulating devices are “approved” if they are listed in the **2011 Kit of Parts Checklist** or have been approved by *FIRST*. To seek approval for a different device, please contact frcparts@usfirst.org with the component specifications. Any approved devices beyond those on the **2011 Kit of Parts Checklist** will be published at www.usfirst.org/frc/kitofparts.

Section 5 – The Tournament

No change.

The Kit of Parts

The **2011 Kit of Parts Checklist**, Rev C has been updated to correct the nominal voltage for the kit battery.

The **Motor Curves** document posted on the Kit of Parts site (www.usfirst.org/frc/kitofparts) has been updated to reflect the behavior of the M7-RS775-18 when supplied with 12V.

February 1, 2011

TEAM UPDATE #7

GENERAL NOTICES

Windows 7 license and activation update:

The procedure, **Windows 7 Activation Procedure, Rev 0**, to activate the Windows 7 installation distributed via the USB keys at Kickoff has been posted at www.usfirst.org/frc/kitofparts.

In order to activate the copy of Windows 7, teams must download this tool and run the application. Please note that Microsoft has donated Windows 7 to be used by *FIRST* teams for use on the 2010 and 2011 Classmate PC's. Other uses or distribution violate the terms of the donation and may jeopardize such donations in the future (if a team has purchased a new Classmate, using the donated software is within the terms of the donation and is okay).

Classmate drive space recovery procedure update:

An updated **Classmate drive space recovery procedure** and associated files have been posted at www.usfirst.org/frc/kitofparts. This update fixes a program bug.

Section 1 – Introduction

Section 1 – Introduction, Rev D, was revised to include the following edit:

HANGING – a GAME PIECE is HANGING when it is fully supported by a PEG through its center hole and released by the POSSESSING ROBOT. ~~Once a GAME PIECE has been released by the POSSESSING ROBOT (even momentarily) and is HANGING (e.g. it is fully supported by the PEG), it is considered to be HANGING until the end of the match.~~ If a GAME PIECE on the floor is preventing a GAME PIECE that has been hung on a bottom PEG from becoming fully supported (that is, if the floor GAME PIECE was not there, the hung GAME PIECE would be scored) then that GAME PIECE will still be counted as scored.

Section 2 – The Arena

No changes.

Section 3 – The Game

An image of the hook that will be used by FIELD crew to remove MINIBOTS from the TOWER has been posted under **Section 3 – The Game** at www.usfirst.org/frc/competitionmanual.

Section 3 – The Game, Rev G, was revised to include the following edits:

<G22> HOSTBOTS may not contact their ALLIANCE'S MINIBOT ~~once~~ while any part of it has climbed is above the DEPLOYMENT LINE. *Violation: TOWER is disabled.*

<G39> ROBOTS and FEEDERS may not SCORE on their opponent's PEGS, ~~or de-score~~ their opponent's GAME PIECES, or interfere with their opponent's TOWERS. *Violation: RED CARD*

Section 4 – The Robot

The **Inspection Bill of Material (BOM) Template** is now available under Section 4 of the FRC Game Manual at

Section 4 – The Robot, Rev G, was revised to include the following edits:

Section 4.2:

References to specific rules within the manual are indicated with a bracketed reference to the rule (e.g. “Rule <SR01>”).

<R18> All items and materials used in the construction of a **HOSTBOT ROBOT** and their associated costs, shall be recorded (in US dollars) in a consolidated Bill Of Materials (BOM). **KoP items must be recorded, but are accounted as an additional cost to of \$0.00 as this material is either donated or purchased by FIRST and supplied to each team.** The BOM must use the *FIRST*-approved template available for download at www.usfirst.org/frc/competitionmanual. Please refer to Rule <R82> in **Section 3.4.3.13 - Robot Inspection** for information regarding submission of the BOM.

All KOP items used on the ROBOT must be included in the BOM. The source for each of the KOP items should be listed as “KOP” and the indicated cost should be listed as “\$0.00.”

A note about the change to Rule <G59>: We did not intend to indicate in **Team Update 6** that MINIBOTS that are not able to descend the TOWER would be punished. We have further updated the rule to more properly convey our intent.

Although it greatly behooves teams to design a MINIBOT that descends itself (to avoid the possibility of damage), MINIBOTS that do not descend themselves will be pulled down by field personnel using a hook device. If they cannot remove the MINIBOT safely (or if they need to use additional equipment) then the TEAM will be warned, and likely receive a YELLOW CARD in future matches if attempts have not been made to mitigate the retrieval safety issue.

Although we are not in the business of designing MINIBOTS for teams, we do wish to point out that there are many, many ways to have a MINIBOT descend the pole after TRIGGERING the target. To name a few: mechanically reducing the friction against the pole upon hitting the target; turning off the motors using a wall switch or NXT logic; reversing the motors using a 4-way switch or NXT logic. We are sure you will think of many more.

~~<G59> TEAMS must retrieve MINIBOTS from the TOWER quickly and safely without special equipment and while standing on the floor after each MATCH. MINIBOTS must be removable from the TOWER quickly and safely after each MATCH; this may be done by TEAMS while standing on the floor without special equipment, or by field crew using a retrieval hook. Violation: The FIELD crew will retrieve the MINIBOT. A second violation may result in a YELLOW CARD. The field crew will not be responsible for accidental MINIBOT damage. If the field crew cannot safely pull the MINIBOT down using their hook, a warning will be issued to the TEAM, after which repeated violations may result in a YELLOW CARD.~~

<R75> The Driver Station software provided on the FRC website (www.usfirst.org/frc/kitofparts) is the only tool permitted to **specify and communicate the operating mode (i.e. Auto/Teleop) and operating state (enable/disable)** and ~~collate driver/operator inputs and communicate them~~ to the ROBOT. The Driver Station software must be revision 01.05.11.00 or newer.

<R82> At the time of inspection, teams must submit an electronic copy of their Bill Of Materials (BOM) of all items used in the construction of their **HOSTBOT ROBOT**, and their associated costs, to the inspector (see Rule <R18>). BOMs must be transferred to inspectors at the event via USB drive (inspector or team provided)

A note about the recent contradiction in the GDC Q&A answers regarding welding on the MINIBOT: The vision of a MINIBOT has always been an FTC-like machine – its insertion into LOGO MOTION was part

of a greater attempt to give exposure to the entire lineage of *FIRST* competitions. Given the constraints of the challenge at the starting point, we altered the rules to facilitate a shift to a slightly more open design space; one that is slightly beyond a typical FTC machine. Rule <R92> was intended to convey the materials and fastening methodologies allowed beyond the TETRIX kits, but excluded welding in its intent – consistent with the FTC platform.

We mistakenly answered two Q&A questions about welding with conflicting answers. While the edit in Rule <R92> below is not consistent with the original intent to have MINIBOTS much like FTC robots, we believe it's more important to honor our initial answer. We sincerely apologize for the inconsistency and subsequent confusion.

<R92> The following items are the only permitted materials for use on the MINIBOTS:

- A. TETRIX components that are not in violation of any other rules, (Tetrix components are listed in **Approved Tetrix Parts** at www.usfirst.org/frc/competitionmanual),
- B. no more than two motors (PN W739083/W739023) and an unlimited number of Tetrix servos),
- C. no more than one 12V rechargeable NiMH battery pack identical to those supplied in the FTC kit of parts (PN W739057) except the 20A fuse may be replaced with an equivalent type of lower amperage,
- D. No more than one HiTechnic DC motor controllers,
- E. No more than one NXT controller with the Bluetooth functionality disabled,
- F. Polycarbonate,
- G. Polycarbonate glue,
- H. Raw aluminum **welding rod**, sheet, 90° angle, u-channel, tube, bar that is not sold in pre-perforated or pre-punched form.
- I. rivets,
- J. non-metallic rope or cord,
- K. wire nuts, solder, and crimps,
- L. cable ties,
- M. limit switches,
- N. no more than two common household light switches,
- O. electrical hookup wire,
- P. non-slip pad,
- Q. PVC or CPVC pipe and fittings,
- R. PVC cement or cleaner,
- S. Mechanical fasteners (e.g. screws, bolts, etc),
- T. Loctite or similar thread-locking product,
- U. Rubber bands,
- V. Surgical tubing,
- W. Electrical tape and shrink tubing,
- X. PWM extension cables,
- Y. Universal security clips to hold the PWM connectors together,
- Z. Hook and loop fastener (may not be used as tape),
- AA. Magnets,
- BB. NXT compatible sensors and related connectors/cables,
- CC. Grease, and
- DD. Non-functional decorations.

<R96> Deleted.

Section 5 – The Tournament

Section 5 – The Tournament, Rev A, was revised to include the following edit:

<T14> At the conclusion of a MATCH, all players shall remain in their assigned locations until the Head Referee issues the “field-reset” signal. Once the Head Referee issues this signal, the “match-reset” period will begin. The ARENA must be cleared of ROBOTS, MINIBOTS, and OPERATOR CONSOLES from the MATCH just ended, and the ROBOTS, MINIBOTS, and OPERATORS CONSOLES for the following MATCH must be placed in position and ready to start before the expiration of the “match-reset” period. Field Attendants will reset the ARENA elements during this time.

Teams are expected to use utmost care in removing MINIBOTS from the TOWERS and mitigate risk of a MINIBOT falling uncontrollably. If a MINIBOT is seen as unsafe, the REFEREE may consider it a violation of Rule **<G26>** ~~<S04>~~. MINIBOTS seen as egregious threats to safety may earn the TEAM a YELLOW or RED CARD.

The Kit of Parts

No change.

February 4, 2011

TEAM UPDATE #8

GENERAL NOTICES

Mandatory Software Update Released

Mandatory software updates for LabVIEW, C/C++, and Java are available at <http://usfirst.org/roboticsprograms/frc/content.aspx?id=18758>. Each of these updates requires a reimage of the cRIO, which is included in the updates. New software version numbers are as follows:

- Java is now 4.12
- C++ is now 20110203rev2259
- LabVIEW is now 3.1
- cRIO image is now FRC_2011_v27

Section 1 – Introduction & Section 2 – The Arena

Section 2, The Arena, Rev C has been updated to include the edits below. The **2011 Game Field Elements** drawing package and **2011 Arena Layout and Marking** drawings have been revised to reflect the addition.

2.2.1 Dimensions and Tolerances

2011 FRC DRAWINGS			
TITLE	CATEGORY	DWG NO.	SHEET/S
<i>2011 Arena Assembly*</i>	<i>Overall Arena Assembly</i>	<i>FE-00034*</i>	<i>5 Sheets</i>
<i>Outer Pole Assembly*</i>	2011 Game Specific	GE-11000	1 Sheet
<i>Middle Pole Assembly*</i>	2011 Game Specific	GE-11003	1 Sheet
Base	2011 Game Specific	GE-11020	3 Sheets
Mounting Angle, Left	2011 Game Specific	GE-11021	2 Sheets
Mounting Angle, Right	2011 Game Specific	GE-11022	2 Sheets
<i>Lane Divider Assembly*</i>	2011 Game Specific	GE-11025	1 Sheet
Corner Glass Right	2011 Game Specific	GE-11027	1 Sheet
Corner Glass Left	2011 Game Specific	GE-11028	1 Sheet
Modified End Panel, Corner	2011 Game Specific	GE-11041	8 Sheets
Tower Assembly*	2011 Game Specific	GE-11049	2 Sheets
Net Support	2011 Game Specific	GE-11051	1 Sheet
Net	2011 Game Specific	GE-11055	1 Sheet
Guard	2011 Game Specific	GE-11060	1 Sheet
Fueling Port Rear Plastic	2009 Game Specific	GE-09023	1 Sheet
Top Rail	2009 Game Specific	GE-09031	1 Sheet
Drivers Station Support	Generic Field Drawing	FE-00001	2 Sheets
Corner Supports, Left and Right	Generic Field Drawing	FE-00002	2 Sheets
Rail Pin Assembly	Generic Field Drawing	FE-00003	1 Sheet
End Panel	Generic Field Drawing	FE-00004	3 Sheets
Field Top Rail	Generic Field Drawing	FE-00007	1 Sheet
Field Plastic "A"	Generic Field Drawing	FE-00008	1 Sheet
Field Plastic "B"	Generic Field Drawing	FE-00009	1 Sheet

Field Plastic "C"	Generic Field Drawing	FE-00010	1 Sheet
Field Plastic "G"	Generic Field Drawing	FE-00011	1 Sheet
Drivers Station Acrylic	Generic Field Drawing	FE-00012	1 Sheet
Field Outrigger	Generic Field Drawing	FE-00013	1 Sheet
Field Entry Ramp	Generic Field Drawing	FE-00014	2 Sheets
Field Trip Guard	Generic Field Drawing	FE-00015	1 Sheet
Hanger, Plastic "G"	Generic Field Drawing	FE-00016	1 Sheet
<i>Field Rail Assembly - Middle*</i>	<i>Generic Field Drawing</i>	<i>FE-00022*</i>	<i>1 Sheet</i>
<i>Field Rail Assembly - End*</i>	<i>Generic Field Drawing</i>	<i>FE-00023*</i>	<i>1 Sheet</i>
<i>Field Rail Assembly – Gate*</i>	<i>Generic Field Drawing</i>	<i>FE-00029*</i>	<i>1 Sheet</i>

2.2.7 FEEDER STATIONS

A FEEDER STATION is located on either side of the ALLIANCE STATION. A FEEDER from the opposing ALLIANCE stands in the FEEDER STATION during the MATCH. The FEEDER STATION extends back eight feet from the ALLIANCE WALL, and from the line at the edge of the ALLIANCE STATION to the edge of the FIELD width.

A 50.5" x 29" polycarbonate sheet is mounted vertically, with its lowest edge resting on the carpet, between the rearmost vertical supports of the uprights to the left and right of the FEEDING SLOT in each FEEDER STATION. This polycarbonate spans the width of the FEEDING STATION, forming a narrow protective box with the ALLIANCE WALL. This helps prevent contact between FEEDERS and field electronics located near the ALLIANCE WALL.

Section 3 – The Game

A note about recent revisions of Section 3 – The Game:

Section 3, The Game, Rev G, released on 2/1/11, accidentally omitted Rule <G30>. Rev G+ was soon released with Rule <G30> reinstated. Rev H incorporates edits to Rev G+. Please accept our apologies for any confusion. The edits for Rev H are as follows:

- <G10>** Each FEEDER STATION must contain 3 sets of LOGO PIECES. LOGO PIECES are considered "contained" if they overlap the FEEDER STATION in any way. LOGO PIECES may not contact the opponent's ALLIANCE STATION.
- <G20>** ROBOTS/HOSTBOTS may not contact their own TOWERS above the DEPLOYMENT LINE.
Violation: PENALTY for contact. TOWER is disabled if MINIBOT is DEPLOYED above the DEPLOYMENT LINE.
- <G21>** HOSTBOTS may DEPLOY MINIBOTS only onto their ALLIANCE'S TOWERS and entirely below the DEPLOYMENT LINE.
Violation: RED CARD. TOWER is disabled if MINIBOT is DEPLOYED above the DEPLOYMENT LINE.
- <G33>** Neither ROBOTS, HOSTBOTS, nor MINIBOTS may break the planes of the vertically projected borders of the opponent's LANES, including a GAME PIECE in their POSSESSION. Momentary incursions by a POSSESSED GAME PIECE will not be penalized if they do not make contact with anything in the LANE.
Violation: PENALTY. G61 does not apply to this rule, however strategies aimed at taking advantage of this exception will result in a YELLOW CARD. If a ROBOT enters the opponent's LANE and does not make immediate effort to leave OR if it contacts another ROBOT (or GAME PIECE in its POSSESSION) also in the LANE, then the intruding TEAM will receive a RED CARD.

Section 4 – The Robot

Section 4, The Robot, Rev H has been updated to include the following edits:

<R42> Each power-regulating device (speed controller or relay module) shall control one and only one electrical load (motor, actuator, light or compressor).

Exception: Multiple low-load, pneumatic solenoid valves or lights may be connected to a single relay module. This would allow one relay module to drive multiple pneumatic actions or multiple lights. No other electrical load can be connected to a relay module used in this manner.

Section 5 – The Tournament

Section 5, The Tournament, Rev B has been updated to include the following edits:

<T25> The only equipment that may be brought on to the ARENA is the OPERATOR CONSOLE, non-powered ANALYST-to-FEEDER signaling devices, reasonable decorative items, and special clothing and/or equipment required due to a disability. Other items, particularly those intended to provide a competitive advantage for the TEAM, are prohibited.

The Kit of Parts

If you received a bad D-Link radio:

If your D-Link product is defective, please contact D-Link Technical Support at 877-453-5465. Technical Support will troubleshoot the problem you are having with your product. If the unit is deemed defective by Technical Support, you will be given a case number from the technician. With the case number, you will be able to apply for an RMA online at <http://rma.dlink.com>.

D-Link will likely require proof of purchase for the radio. An invoice (with pricing redacted) has been posted on the [Kit of Parts website](#) in the *Support* section.

February 8, 2011

TEAM UPDATE #9

GENERAL NOTICES

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No changes

Section 1 – Introduction & Section 2 – The Arena

No changes

Section 3 – The Game

Section 3 – The Game, Rev I, has been edited to incorporate the following edits:

<G40> ROBOTS or HOSTBOTS may not exceed PLAYING CONFIGURATION at any time. *Violation: PENALTY for unintentional, momentary violations. RED CARD for intentional or continuous violations.*

<G48> Strategies aimed at the destruction, damage, tipping or entanglement of ROBOTS, MINIBOTS, or HOSTBOTS are not in the spirit of the FRC and are not allowed. ~~Contact with another ROBOT or HOSTBOT inside its FRAME PERIMETER is not allowed.~~ *Violation: PENALTY, plus potential disablement and YELLOW CARD*

~~High speed accidental collisions may occur during the MATCH and are an expected part of LOGO MOTION™. ROBOTS place mechanisms outside of the BUMPER PERIMETER at their own risk; no penalties will be assigned for incidental contact involving ROBOT parts outside the FRAME PERIMETER with such extended mechanisms.~~

For example, use of wedge-like mechanisms to flip ROBOTS would be considered a violation.

<G48A> *Deliberate or damaging contact with an opponent ROBOT or HOSTBOT inside its FRAME PERIMETER is not allowed. Violation: PENALTY and potential YELLOW CARD*

High speed accidental collisions may occur during the MATCH and are an expected part of LOGO MOTION™. ROBOTS place mechanisms outside of the BUMPER PERIMETER at their own risk; no penalties will be assigned for contact between two such extended mechanisms.

A ROBOT with a mechanism outside of its BUMPER PERIMETER may be penalized under this rule if it appears they are using that MECHANISM to purposefully contact another ROBOT inside its FRAME PERIMETER. Regardless of intent, a ROBOT with a MECHANISM outside its BUMPER PERIMETER that causes damage to another ROBOT inside of its FRAME PERIMETER will be penalized.

Repeated or egregious violations of this rule will earn the offending ROBOT a YELLOW CARD.

Section 4 – The Robot & Section 5 – The Tournament

No changes

The Kit of Parts

The **2011 Kit of Parts Checklist**, Rev D, has been updated to correct the battery specifications.

February 11, 2011

TEAM UPDATE #10

GENERAL NOTICES

FRC Administrative Manual revision:

Section 4 – At the Events has been edited to incorporate the following edits:

4.9.3 Spare Parts Station

Spare parts will be available at the events; however, item availability varies from event to event. ~~the list of available parts will not be published until after Kickoff. Watch for a Team Update with this information.~~ FIRST asks that teams bring any unused parts from their kits to events to assist and support each other or donate them to the spare parts cart (which will be used at other events). This kindness can expand your FIRST network of friends as you exchange parts.

Configuring a non-Classmate PC for use with FMS:

Installing the 2011 Driver Station on a Non-Classmate PC has been posted on the Kit of Parts website in the Control System section. This document includes instructions on how to configure a non-Classmate PC for use with the FRC competition field and electronics.

Section 1 – Introduction & Section 2 – The Arena

No changes

Section 3 – The Game

Section 3 – The Game, Rev J, has been edited to incorporate the following edits:

<G30> Any ROBOT used during a MATCH must be in compliance with all ROBOT Rules (as defined in **Section 4 – The Robot**).

Violation: ~~RED CARD~~ PENALTY plus a potential YELLOW CARD

<G48-C> ALLIANCE ROBOTS may not work together to blockade the FIELD in an attempt to stop the flow of the MATCH. This rule has no effect on individual ROBOT-to-ROBOT defense.

Violation: RED CARD

Section 4 – The Robot

Section 4 – The Robot, Rev I, has been edited to incorporate the following edits:

The footer has been corrected to show the correct section number.

<R66-D> Additional 0.160" inside diameter pneumatic tubing functionally equivalent to that provided in the KOP, with the pressure rating clearly factory-printed on the exterior of the tubing or with supplier documentation showing the pressure rating,

<R71> The relief valve must be attached directly to the compressor or attached by suitable brass fittings connected to the compressor output port.

Section 5 – The Tournament & The Kit of Parts

No changes

February 15, 2011

TEAM UPDATE #11

GENERAL NOTICES

At the Events, Rev 1 has been updated to include the following information:

4.4.1 Robot Wireless Control

- Robots may be operated via wireless control only on the competition fields and the practice field with the FIRST supplied radio; and
- Teams are not allowed to set up their own 802.11a/b/g/n (2.4GHz or 5GHz) wireless communication (access points or ad-hoc networks) in the venue

Wiring Diagrams:

The *Data Connectivity* and *Power Distribution* diagrams have been fixed to include appropriate wiring alternatives as described in the **2011 FRC Game Manual**. They are posted on the Kit of Parts site: www.usfirst.org/frc/kitofparts.

Section 1 – Introduction

No changes

Section 2 – The Arena

Section 2, The Arena, Rev D has been updated to include the following information:

2.2.5 The TOWERS

TOWERS are located near the mid-field end of each LANE and are owned by the ALLIANCE associated with the LANE in which it is located (i.e. the TOWER intersecting the red LANE is owned by the red ALLIANCE). The TOWERS are climbed by MINIBOTS during the END GAME of a *LogoMotion* match. Each TOWER is composed of a BASE, a POST, and a TARGET. The BASE is a cylindrical section approximately 30 inches in diameter by 12 inches tall. The sides and top of the BASE are covered in translucent white LDPE plastic.

The BASE rests on a 48-inch by 76-inch floor protector made of 3/16-inch HDPE. The floor protector is velcroed to the FIELD surface, and covered with a piece of similar carpet. The floor protector carpet is 84" wide by 94.5" long. It has a 42" radius at one end (similar in shape to the floor protector). The edges of the floor protector ~~over~~ carpet are taped to the FIELD carpet (Pro Gaff Tape, "black", 2-inch). The tape extends the outside dimensions of the floor protector carpet by an additional 1" on the taped seams (note: there is no extension on the side of the carpet against the field border). The final outside dimension is 86" wide by 95.5" long. This taped seam forms a slight (approximately 1/4 inch) ridge in the FIELD

Section 3 – The Game

Section 3, The Game, Rev K has been updated to include the following edit:

<G33> During the TELEOPERATED PERIOD, neither ROBOTS, HOSTBOTS, nor MINIBOTS may break the planes of the vertically projected borders of the opponent's LANES, including a GAME PIECE in their POSSESSION. Momentary incursions by a POSSESSED GAME PIECE will not be penalized if they do not make contact with anything in the LANE. *Violation: PENALTY. G61 does not apply to this rule, however strategies aimed at taking advantage of this exception will result in a YELLOW CARD. If a ROBOT enters the opponent's LANE and does not make immediate effort to leave OR if it contacts another ROBOT (or GAME PIECE in its POSSESSION) also in the LANE, then the intruding TEAM will receive a RED CARD. (Exception: if a ROBOT should break the planes of the vertically projected borders of the opponent's LANES during the AUTONOMOUS PERIOD, it will have a "grace period" to remedy the situation at the beginning of the TELEOPERATED PERIOD; the grace period will be either 5 seconds or until an opponent ROBOT enters the LANE – whichever comes first.)*

Section 4 – The Robot

Section 4, The Robot, Rev J has been updated to include the following edits:

<R55> The control system is designed to allow wireless control of the ROBOTS. The Driver Station software, FirstTouch I/O module, cRIO-FRC, speed controllers, relay modules, radio, and batteries shall not be tampered with, modified, or adjusted in any way (tampering includes drilling, cutting, machining, gluing, rewiring, disassembling, etc.), with the following exceptions:

...

M. Devices may be repaired, provided the performance and specifications of the component after the repair are identical to those before the repair.

Please note that the Driver Station application is a separate application from the Dashboard. The Driver Stations software may not be modified, while teams are expected to customize their Dashboard code.

Note that if you are using the FirstTouch I/O module as part of the OPERATOR CONSOLE, you should not update the firmware if the manufacturer releases a new version. The new version will wipe out the *FIRST* custom firmware and your FirstTouch I/O module will no longer function with the Driver Station software.

Please note that while repairs are permitted per the **FRC Game Manual**, the allowance is independent of any manufacturer's warranty. Teams make repairs at their own risk and should assume that any warranty or RMA options are forfeited. Be aware that diagnosing and repairing components such as these can be difficult.

<R66> In addition to the items included in the KOP, pneumatic system items specifically permitted on 2011 FRC ROBOTS include the following items. All included items must be "off the shelf" COTS pneumatic devices rated by their manufacturers for working pressure of at least 125psi and burst pressure of 250psi, and used in their original, unaltered condition (except as required for assembly with other components).

A note about the edit to Rule <R66>: It has come to our attention that manufacturers in the pneumatic industry no longer typically offer burst pressure data, and therefore this is an unfair requirement of the teams.

<R93> Minibot motors may not be modified except:

- a) as allowed in Rule <R47 A-D>
- b) a burned out motor may be repaired by replacement of the burned-out inductor with an identical part.

Teams are encouraged to use caution when opening and closing MINIBOT motor cases.

Section 5 – The Tournament

No changes

The Kit of Parts

The 2011 Kit of Parts Checklist, Rev E has been updated to include VUVG-L10-B52-T-M7 as an alternate part number for the FESTO valves delivered in the Kit of Parts. There were two part numbers shipped for use in kitting and this revision allows teams to use either or both valves on the ROBOT.

February 18, 2011

TEAM UPDATE #12

GENERAL NOTICES

Mandatory Software Update Released:

Mandatory software updates for LabVIEW, C/C++, and Java are available at <http://usfirst.org/roboticsprograms/frc/content.aspx?id=18758>. Each of these updates requires a reimage of the cRIO, which is included in the updates. New software version numbers are as follows:

- Java is now 4.14
- C++ is now V20110203rev2262
- LabVIEW is now 3.2
- cRIO image is now FRC_2011_v28

Re-imaging of the cRIO is required to address a recently discovered stack corruption issue. This issue could manifest itself in any number of ways, and it has been documented as a crash of the a process on the cRIO which makes the status LED blink 4 times and prevents LabVIEW from connecting with the cRIO. Re-imaging takes 2 minutes after the update is installed.

Section 1 – Introduction through Section 3 – The Game

No changes

Section 4 – The Robot

Section 4 – The Robot, Rev K has been updated to include the following edit:

<R49> ROBOTS must be controlled via the programmable National Instruments cRIO-FRC (National Instruments part number 780406-01), with image version FRC_2011_v28. Other controllers shall not be used.

A note about “light switches” permitted on the MINIBOT:

We have previously stated in the Q&A that “light switches” are only “light switches” if they are commonly used in a wall mounting box. Rule R92-N, however, uses the language “common household light switches”; which can have a much broader interpretation. Given the discrepancy in specificity between R92 and the Q&A statements, we defer to the manual. Therefore, “light switches” permitted on the MINIBOT are not confined to those used in wall mounting boxes; anything sold as a “light switch” for household use is allowed. The Q&A answers will be revised.

Section 5 – The Tournament & The Kit of Parts

No changes

February 22, 2011

TEAM UPDATE #13

GENERAL NOTICES

Observations from Week 0:

- Rule <R74> is different from previous years. Two solenoids cannot be used to control a single commanded action in a cylinder. For example, one solenoid may not be used to provide pressurized air through one port of a cylinder while a second solenoid is used to close the exhaust port of that cylinder at a certain point in the piston's travel to prevent further movement.
- Remember that all parts of the ROBOT must fit in STARTING CONFIGURATION volume before the start of the MATCH, even if POSSESSING an UBERTUBE.
- In order for the ROBOT to work with the Field Management System, all software must be at the latest revision. Please make sure you update your software before coming to the ARENA.
- Teams must configure their radios once they get to the event and before their ROBOT heads to the ARENA. There will be a kiosk at the event that will configure the radio, but it's important to reset the radio to its factory defaults before running the radio configuration tool. The configuration tool has step-by-step instructions which must be followed for the tool to work effectively.
- Sharp edges on the ROBOTS will not be tolerated, even during Practice Matches. Teams are strongly encouraged to make sure their ROBOT does not pose a puncture hazard to the GAME PIECES.

Section 1 – Introduction & Section 2 – The Arena

No changes

Section 3 – The Game

Section 3 – The Game, Rev L has been updated to include the following edits:

<G20-B> Only MINIBOTS may TRIGGER the TARGET. *Violation: TOWER is disabled.*

<G21> HOSTBOTS may DEPLOY MINIBOTS only onto their ALLIANCE'S TOWERS and entirely below the DEPLOYMENT LINE.

Violation: PENALTY plus RED CARD. TOWER is disabled if MINIBOT is DEPLOYED above the DEPLOYMENT LINE.

<G23> Contact (via ROBOT or GAME PIECE) with the opposing ALLIANCE'S TOWERS is prohibited.

Violation: PENALTY plus RED CARD

<G24> The opposing ALLIANCE may not interfere with the DEPLOYMENT or climbing of a MINIBOT.

Violation: PENALTY plus RED CARD

<G25> During the END GAME, ROBOTS/HOSTBOTS in contact with their ALLIANCE'S TOWER are protected and may not be contacted by an opponent.

Violation: PENALTY for inadvertent contact; PENALTY plus a RED CARD for obviously intentional contact.

<G29> If a ROBOT becomes unsafe (e.g. the ROBOT begins to smoke, the battery falls out, etc.) it may be disabled by pressing the E-Stop button. This will cause the TEAM'S ROBOT to be disabled for the remainder of the MATCH. The E-Stop buttons are intended for remote shut down during a MATCH in the event of safety hazards and will not otherwise affect MATCH score or duration. Any TEAM member may press the E-Stop button.

*Violation: Inappropriate use of the E-Stop button (i.e. not for safety reasons) will result in a **PENALTY plus RED CARD**.*

<G38> ROBOTS and HOSTBOTS may not intentionally deflate GAME PIECES. No violation will be assigned for unintentional deflation.

*Violation: **PENALTY plus RED CARD** for intentional deflation. Repeated unintentional deflation may result in a YELLOW CARD.*

<G39> ROBOTS and FEEDERS may not SCORE on their opponent's PEGS or descore their opponent's GAME PIECES, or interfere with their opponent's TOWERS. *Violation:*

***PENALTY plus RED CARD**.*

<G40> ROBOTS or HOSTBOTS may not exceed PLAYING CONFIGURATION at any time.

*Violation: PENALTY for unintentional, momentary violations. **PENALTY plus RED CARD** for intentional or continuous violations.*

<G46> MINIBOTS may only be used to climb the TOWER.

*Violation: **PENALTY plus YELLOW CARD***

<G47> From the start of the MATCH until it is DEPLOYED, the MINIBOT must remain on the HOSTBOT.

*Violation: **Potential YELLOW CARD**.*

<G48> Strategies aimed at the destruction, attachment, damage, tipping or entanglement of ROBOTS, MINIBOTS, or HOSTBOTS are not in the spirit of the FRC and are not allowed.

*Violation: **PENALTY plus YELLOW CARD***

<G48-C> ALLIANCE ROBOTS may not work together to blockade the FIELD in an attempt to stop the flow of the MATCH. This rule has no effect on individual ROBOT-to-ROBOT defense. *Violation: **PENALTY plus RED CARD***

<G51> Fallen (i.e. tipped over) ROBOTS attempting to right themselves (either by themselves or with assistance from an ALLIANCE partner) have one 10-second grace period per fallen ROBOT in which they may not be contacted by an opposing ROBOT. This protection continues for either 10 seconds or when the protected ROBOTS have completed the righting operation, whichever comes first.

*Violation: PENALTY for inadvertent contact. **PENALTY plus RED CARD** for obviously intentional contact.*

<G52> Intentionally falling down or tipping over to block the field is not allowed.

*Violation: **PENALTY plus YELLOW CARD***

<G54> Each ALLIANCE shall have no more than the four designated members of each of the three participating TEAMS in the ARENA during a MATCH. Any ALLIANCE with additional personnel in the ARENA must have the additional personnel leave the area before the MATCH may proceed.

*Violation: **PENALTY. YELLOW CARD** for repeated offenses.*

Section 4 – The Robot

5V Converter availability:

If your power regulator has failed and you haven't received a new one yet, there are a few options that, while not ideal, will enable teams to continue development. We emphasize that these solutions are not legal on the competition field. Options include:

- 1) Power the radio from the power supply included with it. This would require tethering the robot to an outlet and an extension cord. Teams are encouraged to use diligence and keep safety a priority.
- 2) Tether to the cRIO. Robot performance will be the same wired vs. wireless; however teams will require a long Ethernet cord and must keep safety a priority while tethered.

- 3) Connect the radio to the 5V supply on the PD. While this will work, the 5V supply is not regulated and radio performance will be affected if the battery voltage drops. The result is an unpredictable wireless connection.

At events, the Spare Parts station will include a limited number of converters available for teams to use during the competition, however they must be returned at the conclusion of the event.

Section 5 – The Tournament & The Kit of Parts

Section 5 – The Tournament, Rev C has been updated to include the following edits:

<T25> The only equipment that may be brought on in to the ARENA ALLIANCE STATION is the OPERATOR CONSOLE and non-powered ANALYST-to-FEEDER signaling devices. Reasonable decorative items, and special clothing and/or equipment required due to a disability may be brought into the ALLIANCE or FEEDER STATIONS. Other items, particularly those intended to provide a competitive advantage for the TEAM, are prohibited.

The Kit of Parts

No changes.

February 25, 2011

TEAM UPDATE #14

GENERAL NOTICES

No changes

Section 1 – Introduction through The Kit of Parts

No changes

Good luck at Week 1!

March 1, 2011

TEAM UPDATE #15

GENERAL NOTICES

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With Regional and District Competitions starting this week, we will only be releasing Team Updates on Tuesdays for the duration of the competition season.

FRC Administrative Manual Section 4 – At The Events

This update adds detail already shared through event agendas and other sources.

4.7 EARLY UNCRATING PROCEDURE AT NON BAG & TAG EVENT / LOAD IN PROCEDURES

4.7.1 At Non Bag and Tag Events (section renumbered)

The Championship: Uncrating will be allowed on Wednesday evening from ~~6 PM~~ ~~9 PM~~ 5 PM to 9:30 PM.

4.7.2 At Bag and Tag Events (new section)

For convenience and to help ensure safety in the pit, five (5) people from each team will be allowed to bring their robots and equipment in to the event before the pit officially opens. Load in time may be available both the day before the event starts and early the day of the event. Refer to your event agenda for possible early opening time. **At least one (1) of the five (5) must be an adult of post high school status. Teams cannot work on the robot or set up the team's station during that time. Teams may not unbag their robots until their Robot-Lock Up Form has been approved by an inspector AND pits have officially opened**

Two additional people are allowed in early to bag and tag events as compared to non-bag and tag events because they must bring in all equipment and robots themselves and because the lack of crates will mean a less cluttered environment.

FRC Administrative Manual Section 5 – At The Events

This update to the 'Attending a Bag and Tag Event' document adds detail already shared through event agendas and other sources and corrects a section reference error.

2.2 Your First Event is a Bag and Tag event

4. You may NOT open your BAG until it has been checked, ~~and signed off~~ approved by an inspector, **AND pits have officially opened for the first day of competition.**

8. IF you are attending a traditional Regional Event or the Championship next:

- e. DO NOT open your BAG at the next event until it has been checked, ~~and signed off by the appropriate person at that event,~~ **approved by an inspector, AND pits have officially opened for the first day of competition.**

2.3 Your Second Event is a Bag and Tag event

4. You may NOT open your BAG until it has been checked, ~~and signed off~~ approved by an inspector, **AND pits have officially opened for the first day of competition**

3.2 When the *Robot Lock-Up Form* must be used

The *Robot Lock-Up Form* must be filled in during the periods indicated in **Sections 2.2 and 2.3** above.

Section 1 – Introduction through The Kit of Parts
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No changes

Good luck at Week 1!

March 2, 2011

TEAM UPDATE #16

GENERAL NOTICES

Note: In *Team Update 15* we stated we would only post Team Updates on Tuesdays during the competition season. While we still plan to stick to that schedule, a scenario has come to light that we feel must be addressed before the Week 1 competitions begin to ensure fair play for all TEAMS.

It has come to our attention that some TEAMS have concluded a 'one move win' is possible under the following scenario:

A blue ALLIANCE ROBOT is in the blue ZONE. A second blue ALLIANCE ROBOT is outside the ZONE, but in the general vicinity. A ROBOT from the red ALLIANCE, exiting its LANE, crosses near the second blue alliance ROBOT. The second blue ALLIANCE ROBOT intentionally pushes the red ALLIANCE ROBOT in to the blue ZONE. The red ALLIANCE ROBOT contacts the first blue ALLIANCE ROBOT. This would normally result in a YELLOW CARD for the second blue ALLIANCE ROBOT and a RED CARD for the red ALLIANCE ROBOT per Rule <G32>. However, if this were to occur during an elimination match, this would result in the entire red ALLIANCE being disqualified per Rule <T13>, and a 'one move win' by the blue ALLIANCE.

Referees will be instructed that an attempt to win a MATCH in this way, by the blue ALLIANCE in the scenario above, would be considered particularly egregious behavior under Rule <T09>, resulting in a RED CARD for the blue robot and thus a disqualification of the entire blue ALLIANCE under Rule <T13>. As any attempt at this behavior would necessarily precede contact, in the scenario above, of the red ALLIANCE ROBOT with the blue ALLIANCE ROBOT in the blue ZONE, the blue ALLIANCE disqualification would take precedence over the red ALLIANCE disqualification, and the red ALLIANCE will be declared the winner of the MATCH.

Section 1 – Introduction & Section 2 – The Arena

No changes.

Section 3 – The Game

In *Team Update 13*, we inadvertently missed adding penalties to the following rules:

<G32> Neither ROBOTS, HOSTBOTS, nor MINIBOTS may break the planes of the vertically projected borders of the opponent's ZONES, including a GAME PIECE in their POSSESSION. Momentary incursions by a POSSESSED GAME PIECE will not be penalized if they do not make contact with anything in the ZONE.

Violation: PENALTY. G61 does not apply to this rule, however strategies aimed at taking advantage of this exception will result in a PENALTY plus a YELLOW CARD. If a ROBOT enters the opponent's ZONE and does not make immediate effort to leave OR if it contacts another ROBOT (or GAME PIECE in its POSSESSION) also in the ZONE, then the intruding TEAM will receive a RED CARD.

<G33> During the TELEOPERATED PERIOD, neither ROBOTS, HOSTBOTS, nor MINIBOTS may break the planes of the vertically projected borders of the opponent's LANES, including a GAME PIECE in their POSSESSION. Momentary incursions by a POSSESSED GAME PIECE will not be penalized if they do not make contact with anything in the LANE.

Violation: PENALTY. G61 does not apply to this rule, however strategies aimed at taking advantage of this exception will result in a PENALTY plus a YELLOW CARD. If a ROBOT enters the opponent's LANE and does not make immediate effort to leave OR if it contacts

another ROBOT (or GAME PIECE in its POSSESSION) also in the LANE, then the intruding TEAM will receive a RED CARD. (Exception: if a ROBOT should break the planes of the vertically projected borders of the opponent's LANES during the AUTONOMOUS PERIOD, it will have a "grace period" to remedy the situation at the beginning of the TELEOPERATED PERIOD; the grace period will be either 5 seconds or until an opponent ROBOT enters the LANE – whichever comes first.)

Section 4 – The Robot, Section 5 – The Tournament & The Kit of Parts

No Changes

March 8, 2011

TEAM UPDATE #17

GENERAL NOTICES

Observations from Week 1 Regionals:

Thanks to all the teams that came out to compete in all the week one events. The competitions were successful, and we look forward to week two. Below are observations from the events that may help teams be ready to take the field.

- For “Bag & Tag” events, teams may deliver all equipment to their pit during the “load-in” time on the public agenda for that event. Please note however, that no setup is permitted. This includes, but isn’t limited to, charging batteries, setting up tool cases, etc.
- Please make sure your software is up to date. If the software is not updated to the versions listed below, your robot will not work with the FRC field.
 - o cRIO image: FRC_2011_v28
 - o Driver Station software: 01.05.11.00 or 02.27.11.00
- In order for radio performance to be consistent, it must be connected to the 5V power converter and the 5V power converter must be plugged in to the dedicated 12V supply on the Power Distribution Board.



- In order for the radios to connect to the field’s access point, they must be switched to “bridge” mode.



- Teams can simulate their robot’s behavior when connected to the Field Management System by replicating the order of operations typical on the field. The following steps imitate a typical start-up process when on the competition field. Before doing this, you must make sure that, in the “Setup” tab of the Driver Station, the Autonomous time and the Teleoperated time are set to 15 seconds and 120 seconds respectively. Also, ensure that the Driver Station is set to “Practice” and “Disabled.”
 - o Boot the robot (cRIO, etc) *without* communication (either not tethered, or not connected via wireless link).

- Boot the radio in bridge mode (this requires either a tether or external access point).
 - Once the radio has booted up (flashing orange bridge light for at least 10 seconds), connect the robot to the Driver Station – either by tethering or powering the external access point.
 - In the “Operation” tab of the Driver Station, ensure the “Practice” button is still selected, and click “Enable.”
- If you are not using a Classmate as your Driver Station (and thus not using a FIRST image), you must configure your PC per the document posted [here](#) (i.e. the Driver Station software must be running in account called “Driver” when created.)
 - If a team is using a CAN network on the robot, they should check the messages in the “Diagnostic” tab of the Driver Station before a match starts to ensure that there aren’t any scrolling CAN timeouts. If there are such messages, give the MC a “thumbs down” to show you’re not ready and click on “Reboot Robot” to restart the cRIO and clear the errors. Teams will only see such timeout errors if it’s properly handled in code, and they should take care to ensure that these exceptions are handled such that they can be seen on the field.

Section 1 – Introduction through Section 3 – The Game

No changes.

Section 4 – The Robot

Inspection Checklists:

The *Robot Inspection Checklist* and *Mini Bot Inspection Checklist* have been upgraded to Rev B. Edits provided additional detail to existing items, but did not add new items.

BOM Naming Convention:

Before you submit your electronic BOM to inspection, please save the file using the following naming convention: FRCxxxx_City.xls (Microsoft Excel 97/2000/XP), FRCxxxx_City.csv, or FRCxxxx_City.ods (ODF Spreadsheet), where “xxxx” is your team’s four-digit team number (i.e. 0011) and City is equal to the city in which your event takes place (i.e. Manchester). For the Championship, City should be your team’s Division (i.e. Curie). Thank you for doing this, as it will facilitate the data mining after the season!

Driver Station Software update:

An update to the Driver Station software, version 02.27.11.00, is now posted here: <http://joule.ni.com/nidu/cds/view/p/id/2263>. The update is highly recommended, not required, for competing in the 2011 FRC. There is no effect on performance of the Driver Station software and the update is out of convenience, not safety or functionality.

The update changes the way the network IP addresses are assigned to the PC. It removes all existing IP addresses assigned to the wired and wireless network interfaces and replaces them with the ones required for communication with the robot and defined by the Driver Station software when the team number is added in the Driver Station's "Setup" tab.

Without the update, there's a possibility for multiple IP addresses to be assigned to a single network interface, and thus the PC recognizes the FMS, but the FMS doesn't recognize the PC. The fix for the current Driver Station version (01.05.11.00) is a multiple-step process that has the potential to delay game play. If necessary, the field crew will perform the steps and likely recommend the update.

Section 5 – The Tournament through The Kit of Parts

No changes.

March 15, 2011

TEAM UPDATE #18

GENERAL NOTICES

Notes going into Week 3 Regionals:

During the Week 1 competitions, we learned that we had erratic sensitivity issues with the sensors in the TOWER TARGETS, so, we reverted to manual scoring of the race. After Week 1, the sensitivity issue was examined and a change to the sensing method was implemented. Week 2 results indicated that this change was successful. The TARGET still looks and functions the same to the MINIBOTS, with the only change being the sensing methods between the plates. No changes were made to the physical aspects of the TARGET which are interacted with by the MINIBOTS. So moving forward, we will be relying on the automated scoring of the MINIBOT RACE.

As a number of teams were surprised by the bolts that exist on the Sensor Plate Assembly, we wish to point out that the MINIBOT must move the Bottom Plate in order to TRIGGER the TARGET. Note that the bolts do not move with the plate (it has always been this way, ever since Kickoff); for dimensional specifics, please reference pages 37, 38 and 69 of the Game Field Elements drawings found under the Field Drawings link on the competition manual webpage. Also note, per section 2.2.5, approximately 2-4 Newtons of force is required to TRIGGER the TARGET.

Good Luck to Week 3 teams!

Section 1 – Introduction through The Kit of Parts

No changes.

March 22, 2011

TEAM UPDATE #19

GENERAL NOTICES

Updated Robot Inspection Checklist

The Robot Inspection Checklist has been updated to Rev D. You can find it here, <http://www.usfirst.org/roboticsprograms/frc/content.aspx?id=452>, under FRC Game Manual, Section 4, The Robot. Changes include the addition of a Rule <R62> reference in the 'custom circuits' section, the addition of cRIO image v29 as allowed, and the specific listing of and preference for Driver Station software version 2.27.11.00.

Information on Software and Firmware Updates

One significant reason why teams have trouble connecting to their robot at events is outdated software or firmware.

In order to connect to your robot, your cRIO must be running v28 or v29 of the cRIO image. See more information below on the new v29 image. v29 is recommended for teams using CAN. Non-CAN users will see no difference in performance if they stay with v28. Both v28 and v29 may be downloaded here: http://firstforge.wpi.edu/sf/go/projects.wpilib/frs.crio_images

In order to connect to your robot, your Driver Station must be running software version 01.05.11.00 or 02.27.11.00. However, as we stated in **Team Update #17**, while Driver Station version 02.27.11.00 is not required, it is highly recommended. It can be downloaded here: <http://joule.ni.com/nidu/cds/view/p/id/2263> If you come to the field without this update and experience connection issues, your FTA is almost certain to request you update to this version.

Please note that you will not have an internet connection at events! Bring your updates with you on USB drives or your laptop!

Section 2 – The Arena

Interest has been expressed by many teams on how the TRIGGERING of the TOWERS is monitored. The following is a more technical explanation.

Each TOWER in LOGOMOTION has a dedicated module that monitors the trigger mechanism for that TOWER and controls the lights at the top. The trigger mechanism activates at ~0.25 inches of plate movement. The control module has a built-in noise buffer of 1ms. Any input signal longer than the noise buffer is immediately time-stamped and reported back to the central field controller. This central field controller then processes the received data every 5ms or less. Once the field controller sees a TOWER as TRIGGERED, it assigns a finish place to that TOWER (1st, 2nd, 3rd, or 4th) depending on the state of the remaining three TOWERS.

Section 3 – The Game

No changes.

Section 4 – The Robot

<R49> ROBOTS must be controlled via the programmable National Instruments cRIO-FRC (National Instruments part number 780406-01), with image version FRC_2011_v28 or FRC_2011_v29. Other controllers shall not be used.

cRIO image version FRC_2011_v29 is preferred for teams using CAN

Information on the V29 cRIO Image Update

Some teams have reported intermittent timeout issues when using Jaguars connected via the CAN bus. A bug has been identified in the communications library that runs on the cRIO that could potentially cause Jaguar CAN timeouts at startup. While this update has been tested with a number of FRC robots in competition there is no guarantee that it will fix all CAN issues.

This update is not mandatory and only fixes an issue related to CAN Jaguar startup. If you do not use CAN, there is no reason for you to install this update. If you do use CAN, while this update is not mandatory, it can help resolve an issue some teams are experiencing.

Installing the update

Installation of the update involves replacing the V28 cRIO image file in your development environment with the V29 image supplied here:

http://firstforge.wpi.edu/sf/go/projects.wpilib/frs.crio_images.crio_image_frc_2011_v29.

You need to add the V29 image file to the following location:

C++	c:\windriver\WPILib\cRIO_images\FRC_2011_v29.zip
Java	<user-directory>/sunspotfrsdk/cRIO_Images/FRC_2011_v29.zip
LabVIEW	c:\Program Files\National Instruments\LabVIEW 8.6\project\cRIO Tool\FRC Images\FRC_2011_v29.zip

In addition, for Java users, you must back-up and then replace the file: <user-directory>/sunspotfrsdk/ant/upgrade.xml with the version supplied in this release. This will allow Java to work with the V29 image. If for any reason you decide to revert back to the V28 image, then replace the upgrade.xml file with the original file which you should have backed up.

After installing the update you must update the cRIO to the V29 image using the Imaging Tool.

Additional CAN Jaguar suggestions

CAN Timeout errors will occur when a request to the speed controller is not acknowledged by the Jaguar within a prescribed time. Often these errors are not related to the issue described here and can be traced back to wiring or bus termination on the CAN network when a message doesn't get to the Jaguar or the reply doesn't make it back to the cRIO. If you are seeing these errors, check your wiring!

All teams using CAN connected Jaguars should be sure that there are no CAN Connection Timeout errors appearing on the driver station display on start-up before starting a match. You should advise the field personnel if you are seeing these errors before the match starts. Restarting the cRIO using the "Reboot robot" button on the driver station usually clears up these errors. If you are continuing to see Connection Timeout errors after installing this update, please report your experience on the CAN area on the FIRST forums here: <http://forums.usfirst.org/forumdisplay.php?f=1339>.

Section 5 – The Tournament

No changes.

March 29, 2011

TEAM UPDATE #20

GENERAL NOTICES

UPDATE TO SECTION 4 of FRC ADMINISTRATIVE MANUAL 'AT THE EVENTS'

4.1 Early Uncrating / LOAD IN PROCEDURES

4.7.1 At Non Bag and Tag Events Regionals

For convenience and to help ensure safety in the pit, three (3) people from each team will be allowed to uncrate their robots before the pit officially opens at non-bag & tag events. **At least one (1) of the three (3) must be an adult of post high school status.** If any of the three (3) team members leave the pit area during that time, he/she will not be re-admitted until general pit opening. **Teams cannot work on the robot or set up the team's station during that time.**

Regional Competitions: Refer to your event agenda for possible early opening time, for uncrating only, on the morning of the first day of the event.

4.7.2 At The Championship: For convenience and to help ensure safety in the pit, five (5) people from each team will be allowed to uncrate and work on their robot on Wednesday. Uncrating and robot work will be allowed on Wednesday evening from 5 PM to 9:30 PM. At least one (1) of the ~~three~~ **five (35)** team members entering the pits must be a post-high school adult. (The others may be either students or adults).

The rules for Wednesday night pit entry at the Championship are as follows:

- **The priority tasks for team members is are to uncrate their robot, and move their crate to the aisle so that it is accessible to Shepard for removal; , set up their pit and GET INSPECTED;**
- **Teams arriving from Bag and Tag events MUST have their robot lock-up form signed off by an inspector before they unbag their robot. No work on the robot is allowed until this form has been signed off;**
- **Teams will not be allowed to use the practice fields Wednesday night. Teams should be focused on uncrating, setting up their pits, and getting inspected;**
- ~~The three five (35) team members will be permitted to load in team materials on Wednesday night;~~
- ~~Team members may only make one trip with load-in materials;~~
- ~~There is no set limit to the amount of material teams may load-in, but it must be done in a safe, manageable way (Safety Advisors and other volunteers will be on site checking for, and helping mitigate, unsafe conditions);~~
- ~~Team members are permitted to stow load-in materials safely in their pit and out of the way of aisle traffic;~~
- ~~Team members are permitted to begin charging batteries;~~
- ~~Pit setup will not be permitted (if your crate becomes your pit setup, remember that you may only uncrate your robot);~~
- ~~Working on the robot will not be permitted;~~
- ~~Safety glasses are required while in the pit; and~~
- ~~An adult team member (one (1) of the three five (35) permitted in the pit) may use this time to check in early to avoid the rush on Thursday morning.~~

4.7.23 At Bag and Tag Events

Section 1 – Introduction to Section 3 – The Game

No changes.

Section 4 – The Robot

Note to teams purchasing additional batteries: <R34> allows for one EnerSys NP18-12; both the NP18-12B (supplied in the Kit of Parts) and the NP18-12BFR (the same battery with a fire-retardant case) are allowed.

Section 5 – The Tournament to The Kit of Parts

No changes.

Good luck to all teams competing in Week 5!

April 4, 2011

TEAM UPDATE #21

GENERAL NOTICES

Section 1 – Introduction to Section 4 – The Robot

No changes.

Section 5 – The Tournament

There were some questions at previous weeks' events about what is allowed on the field during the Alliance Selection process. We'd like to remind everyone of our answer to a Q&A post on this subject from 16 February, 2011 (found at <http://forums.usfirst.org/showthread.php?t=17137>).

“There are no rules that prohibit laptops or team collaboration during the alliance selection process. These methods are permitted, however the team is expected to make quick and expeditious decisions in the interest of keeping the process moving.”

The Kit of Parts

No changes.

Good luck to all teams competing in Week 6!