

# 2001 FIRST ROBOTICS COMPETITION

## TEAM UPDATE #2

Date: January 8, 2001

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### IMPORTANT FIELD BLUEPRINT CORRECTIONS

In order to add a number of missing dimensions, the playing field blueprint files on the FIRST web site have been updated. In order to make it easier to read the Bill of Materials, FIRST has created a separate BOM file. FIRST will not provide .DWG or .DXF versions of the blueprints. If, after reviewing the revised blueprints, you still have questions about field construction, please contact Ron Rioux at ron@usfirst.org or via phone at 800-871-8326 #109.

The castor wheels used for both the Goals and the Stretcher are 3" Polyolefin Swivel Casters. They can be purchased from the following:

Ace Hardware - P/N 53294

The Home Depot - P/N 9394

True Value Hardware - P/N 9394

The paint used for the Goals is Premium Rust-Oleum Hammered Metal Finish P/N 7213 color Silver.

The Bridge has twelve 3lb Weider Cast Iron Barbell Weights, not ten.

### KIT OF PARTS CORRECTIONS

Due to lack of product, the LDPE rod was left out of the Kit of Parts, but was inadvertently left on the kit parts checklist. Please disregard this listing as it was not provided.

Batteries were a major issue for many traveling through the airlines. We apologize for any problems this may have caused and we will be shipping batteries to those who had to remove them from their kits. If you have questions, please contact Tammy Trimble at ttrimble@usfirst.org or via phone at 800-871-8326 #111. To aid us in getting you the correct information, please make sure to include your team number in any written correspondence to FIRST.

### THE MANUAL

Due to an assembly error, the Blue Tab listing the Kit Parts/Addt'l Hardware List was put in the wrong place. It should be between Appendix A & B after The Robot. Further, the Kit of Parts Album should be moved to the end of the manual (i.e. after Appendix H - Spec Sheets).

### SPORT FUN LISTING

Sport Fun order form fax # is: (818)-502-0399. Please use the fax order form only and do not call their 800 phone number.

## **PNEUMATICS CLARIFICATIONS**

A number of teams have asked if they may remove the pressure relief valve from port B on the pneumatic pump in order to draw vacuum for a suction cup. Ports A and B on the pump are both pressure ports. The pressure relief valve may not be removed from the pump because it is an important safety feature of the pneumatic system. The inlet on the pump is on the side and is not designed to connect to a standard fitting.

Teams using the pneumatics should be aware that the valves will not operate reliably at less than 20 psi.

Rule M14 refers to the Pneumatics section of the kit list, which is not printed in the manual. Rule M15 refers to pneumatic components supplied in the kit. Please consider the "FIRST Pneumatic Component Bill of Material" printed in "The Pneumatics Manual for FIRST 2001 Competition", and any cylinders ordered from the "FIRST Custom Cylinder Order Form" located in the same document, to be approved parts.

## **RULE UPDATE**

The first bullet item in Rule M14 is deleted as follows:

- ~~• Suction cups may be fabricated from legal Kit parts, as defined in rule K1 below.~~

## **ADDITIONAL HARDWARE LIST**

Many veteran teams have noticed that gears, sprockets, and chain are no longer on the Additional Hardware List. This is not a mistake. Teams wishing to use gears, sprockets and/or chain must purchase them from SMALL PARTS, INC., fabricate them from allowed robot building materials, or get them from the kit.

There were several mistakes in the Additional Hardware List printed in the Manual. Below is a revised Additional Hardware List that replaces the one printed in the Manual.

## APPENDIX C: ADDITIONAL HARDWARE LIST

### Control System

CH Products Flightstick Joystick	Up to 2
DB15 M-M Cable	6' Length, Up to 2
Electrical Tape	Any amount when used as an insulator
Heat Shrink Tubing	Any amount, Any Ø
Hood for 15 pin connector	Thermoplastic, Up to 12
Insulated Electrical Connectors	Any amount/size, off-the-shelf, proper gauge/current rating
Permanent Magnet	Any amount
Potentiometer	Any amount, 100k Ohms, linear taper
PWM/Relay Cable	Hitec/JR-style, 36" Long, Any Amount
PWM/Relay Y Cable	Hitec/JR-style, Any Amount
Relay Module (Spike)	Any amount - when used per rules
Speed Controller (Victor 883)	Any amount - when used with motor
Terminal Blocks	Any amount, off-the-shelf, proper gauge/current rating
Wire	Proper gauge, color & insulated
Wire Nuts	Any amount

### Fasteners

Fasteners, Washers, Nuts, Adhesives	Any amount/size
Hose Clamps	Any Ø, Any amount

Joining Plates for Extrusions	Any amount, Any size
Pipe Endcaps	Any amount - if used to cap pipes
Pipe fittings (tees, reducers, elbows, angles)	Any amount - to join sections of pipe
Pipe flanges	Any amount - if used to attach pipes
Rubber Band, Large	3-1/2" x 1/4" wide, Up to 5
Rubber Band, Small	3-1/2" x 1/8" wide, Up to 5

#### **Pulleys**

Timing Pulleys	Up to 6
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#### **Rods & Shafts**

Copper Water Pipe	Any length, 1/2" Ø
Electrical Conduit Pipe (EMT)	Any length, 1/2" - 3/4" Ø
Flexible Conduit (ENT)	Any length, 1/2" Ø PVC
Pins - linkage or hinge	Any amount
Schedule 40 PVC Pipe	Any length, 1/2" - 1 1/2" Ø
Shaft Couplings	any amount, any size
Wooden Closet Rod	Any length, up to 1 1/4" Ø

#### **Rope, Belts, & Chain**

Nylon Braided Rope	Any length, up to 5/16" Ø
Steel Cable	Any length, up to 1/8"Ø

Timing Belt	Up to 20', single or double sided
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#### Sheets & Boards

1/2" Plywood	1 sheet 4'x8'
1/4" Plywood	1 sheet 4'x8'
Aluminum Plate	Any length, Up to 1/4" thick
HDPE Block	1 Piece 1" x 12" x 12"
Pine Board	Any length, 3/4" x 3-1/2"
Polycarbonate Sheet	Any amount, Up to 3/8" thick
Steel Plate	Any amount, Up to 1/4" thick

#### Structural

Aluminum Angle	Any length, Up to 2"x2"x 1/4" thick
Extruded Aluminum	Any length, Up to 2"x3" cross-section
Extruded Fiberglass	Any length, Up to 3"x3" cross-section
Fiberglass	Any amount, Up to 1/8" thick
Resin + Hardener	As needed for fiberglass
Steel Angle	Any length, Up to 2"x2"x 1/4" thick

#### Wheels

Caster, Swivel	Any amount, up to 3" Ø
Skyway Wheelchair Wheel	5"-8" Ø, Up to 6 non-pneumatic

## QUESTIONS & ANSWERS

- Q1. If our robot is damaged and we wish to continue working on it while we are scheduled for a match, may we use our stretcher coupon without actually placing our robot on the stretcher?
- A1. It is acceptable to utilize the stretcher without placing a robot on it (i.e. the robot is not anywhere on the field). However, this will reduce the number of points that the alliance could score and is not encouraged. Remember, a non-functioning robot on a stretcher in the end zone is worth 20 points, whereas an empty stretcher in the end zone is worth only 10 points, and that's before any multipliers. By not placing your robot on the stretcher, you could cost the alliance significantly more than 10 points.
- Q2. Is it acceptable for our robot to release a section of itself, connected by a cable, so as to climb up the section and then pull it up behind the robot?
- A2. If a cable is used to connect the two sections, then it is still considered one robot and does not violate Rule DA4. However, Rule DQ3 covers mechanisms which might entangle other robots. Therefore, you must be careful to design any such mechanism so that it does not present a danger of entanglement.
- Q3. Are the following statements correct? The only time a stretcher is to be used is when a robot is incapacitated prior to the match... you place the robot on it and it can be maneuvered into the endzone for points. Other than that, the stretcher is not used in any match, other than with a robot that is already incapacitated. Therefore, our robot would have no need for an arm to lift a robot onto a stretcher during the match?
- A3. The stretcher will only be on the field when a team uses one of their "coupons", presumably because their robot is damaged and unable to move. In those cases, their robot will start the match on the stretcher (if they choose to use their robot at all). It is possible that a robot could fall off the stretcher, in which case you might want to be able to put it back, but that will probably be rare. It is also possible that a team will opt to use a "coupon" in order to have a chance at scoring an additional 10 points, prior to multipliers, even if their robot is not broken.
- Q4. If the bridge is "balanced", and both goals are "on" the bridge, then the score will be multiplied by 2x for each goal. Will this still work even if a goal is down on its side lying on the bridge?
- A4. Yes. The orientation of the goal is not considered. See Rule SC6 in The Game section of the Manual.
- Q5. Last year there were no material limits for constructing the interface (joystick mounts, glove mounted switches, etc.) for operators. Will that rule apply again this year?
- A5. For the structural part of the interface, there are no materials restrictions. As far as electronic parts, you are restricted to the kit parts and other parts specifically allowed in The Robot section of the manual.

- Q6. Are we permitted to use contact points to transfer electrical current? We would like to build an arm that would turn more than 360 degrees without having the wires to a motor up the arm getting tangled.
- A6. You may use an off-the-shelf connector that is insulated (on the outside) to do the job. However, a slip-ring system would probably work better than a series of contact points.
- Q7. May we cannibalize gear boxes from the motors in the kit (drill motor, globe motor, seat motor horizontal actuator)? For example, may we take the internal workings (gears, shims, gear axles) and either reconfigure them into another gear box that we make or use them for an entirely different purpose? Rule M18 part 1 seems to prohibit what we want to do. However, part 2 seems to allow it for the Fisher-Price, Drill, and Torque motor gearboxes.
- A7. You may remove the gearboxes from the Drill, Fisher-Price, and Torque motors, and use the parts as you see fit. You may not disassemble the seat, window, Globe, or van door motors.
- Q8. We were considering making a plate with holes drilled in it. By pumping compressed air to the back side of this plate, we could create an air cushion on the front side. Does this violate rule M14?
- A8. Yes, that would violate M14 because it would be a custom pneumatic device transmitting compressed air.
- Q9. May we make a nozzle to accelerate compressed air from the air pump (perhaps for the purpose of firing balls at the goal)?
- A9. No, that would also violate M14 because it would be a custom pneumatic device transmitting compressed air.