

The 2002 FIRST Robotics Competition
TEAM UPDATE #2

Date: January 11, 2002

CONTACTING FIRST

When contacting FIRST with questions via e-mail, phone or any other form, **PLEASE remember to leave Name, Team number, Phone number or e-mail address.** We cannot get back to you if we don't know who you are or where to find you.

SMALL PARTS, INC.

Many of you have called asking about the dollar limit used from Small Parts, Inc. For 2002 there is NO dollar limit on the amount of stuff you can use on your robot from Small Parts, Inc. Please refer to Rule K1. For ordering information, refer to Appendix D of The Robot section of the manual.

VICTOR 884 SPEED CONTROLLER

This special version of Innovation First's speed controller is made specifically for greater control of arms, other precise mechanisms, and precise feedback loops. The Victor 884 provides output control from 0% to 100%. The Victor 883 provides output control from 10% to 100%, which is best for drive trains since less than 10% will not move a robot, and can result in unnecessary heating of motors and consumption of battery power. Voltage and current ratings are the same.

Both the Victor 883 and 884 have a deadband with respect to the PWM signal, which is approximately 117 to 137 (127 center). Any PWM signal within the deadband results in no output (neutral). The PWM deadband accommodates joysticks that do not return to the exact same center. The PWM deadband effect can be overridden by PBASIC code if needed. The 10% minimum throttle on the Victor 883 cannot be overridden in PBASIC code.

Please see www.innovationfirst.com/firstrobotics for more information, ordering and data.

ADDITIONAL HARDWARE LIST CORRECTIONS

The following item has been added to the Additional hardware list.

Speed Controller (Victor 884)	Any amount - when used with motor
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In Team Update #1, the Timing Belt entry in the Additional Hardware List was revised. This entry is now being deleted because BELT is already allowed per the CHAIN / BELT entry in the "Ropes, Belts & Chain" category. This means you are allowed to use any type and amount of belt on the robot.

RULES UPDATE AND CLARIFICATION

- Rule SC7 has been updated as follows:
Teams that are declared No shows will be considered to have lost the match with regards to the 2nd tiebreaker in rule T4.
- Rule SC9 has been updated.
 - Add 6th tiebreaker
 - Flip of coin
- Many questions have been asked regarding entanglement. Please read the questions and answers posted on the FRCtech2002 Yahoo group.

SOCCER BALLS

A source for the soccer balls can be found at: www.espsoccer.com or by calling 1-888-ESP-7455 and ask for Don. FIRST has no relationship with this vendor and teams deal with this supplier at their own risk.

FIELD CORRECTIONS

Section 2.2 Playing Field Border

The second paragraph should read as follows:

The perimeter of the field is defined by an aluminum welded rail system. The bottom of the rail systems that sits directly on the carpet is 3"x 3"x ¼" angle aluminum. There will NOT be any aluminum diamond plate on this rail system.

Section 2.3 Alliance Station

Please remove any reference to Ball chutes or Ball returns available in the alliance station wall. These will not be used and the openings in the front of the driver stations have been covered.

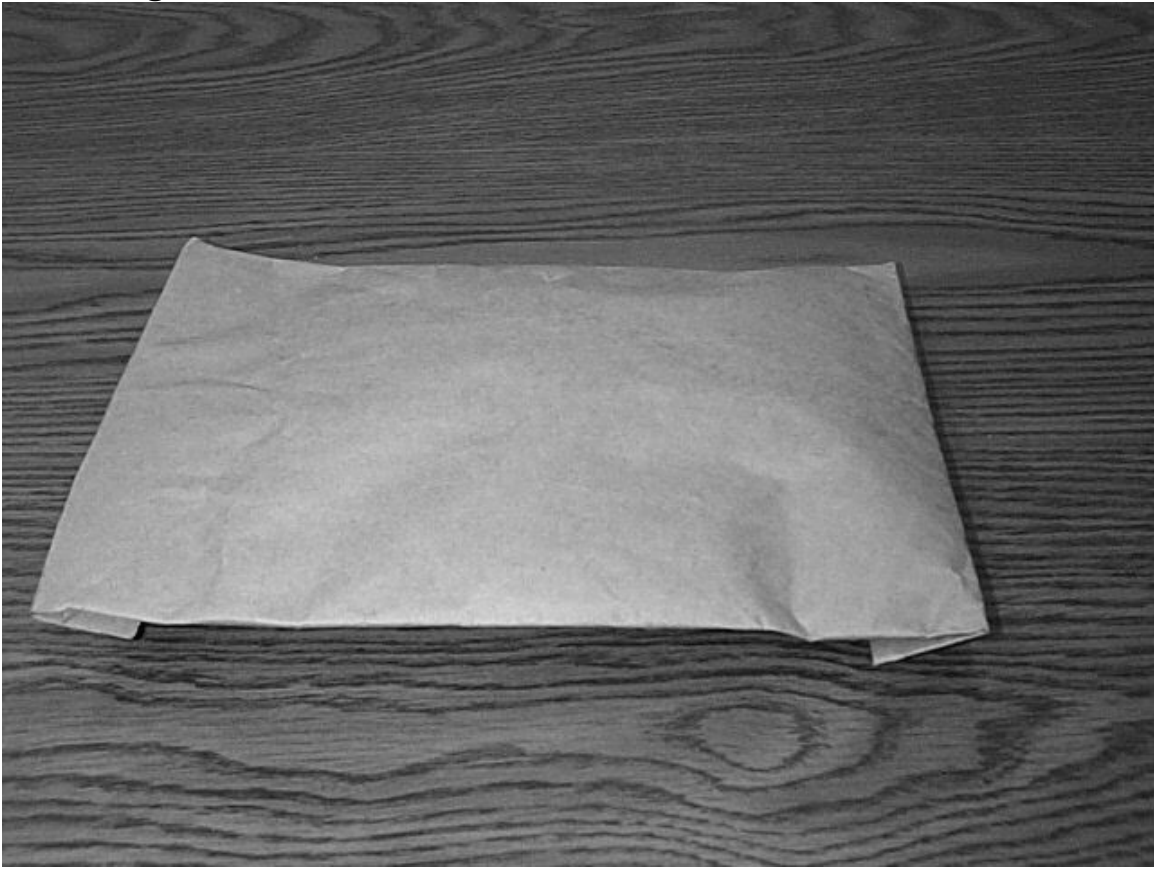
KIT OF PARTS

We have received many calls regarding the Pulley bag as well as the Sensors. The Pulley bag is clear and contains a catalog. Inside the middle of the catalog are 4 pulleys and 4 bushings. The bushings are likely to be in the middle of the pulley already. The tool included is for bushing insertion and removal.

CAUTION: Do Not over tighten bushing screws.

The sensors can be found in a brown padded envelope. If you haven't received either of these items, please contact us via e-mail only to tammy@usfirst.org.

Sensor Bag



Sensor Bag Contents



➤ Information on the Atwood Mobile Chiaphua motor and it's mating gear.

The output shaft pinion of the Atwood Mobile (Chiaphua) motor has a non-standard gear tooth configuration with a pressure angle of 25 degrees and diametral pitch of 36. The 44-tooth cluster gear (1.2778" outside diameter) included in the Drill Bag is designed to mate with this pinion. The smaller (16 teeth) gear of the cluster pair is a standard 20-degree pressure angle, 32 diametral pitch configuration, and may be mated with other 32 pitch standard gears.

➤ Main Circuit Breaker Characteristics

The main circuit breaker included in the Kit is "rated" as a 60 Amp breaker that may be used in either AC or DC applications. It functions both as a manually operated switch to connect / disconnect the battery from the robot's electrical system, and as a current overload protection device that will open (trip) automatically under sustained overload or short-circuit conditions.

NOTE: The Main Breaker is not auto-resetting. When automatically tripped, the circuit breaker's switch lever moves to a position between ON and OFF, and a red indicator flag appears in the small window located beneath the lever. A tripped breaker must be manually reset. To reset a tripped breaker, push the lever to OFF and then to ON.

When the breaker senses a current overload condition, the point at which it trips depends on both the amount of current in excess of its rating and the amount of time the excess current has been flowing. Typically, the greater the amount of current, the sooner the trip point will be reached. The following DC performance data were gathered from test results of the Main Breaker, and may be considered representative for applications in FIRST robots: @200 Amp, it took 8 seconds to trip, @ 100 Amp, it took 1 minute and 48 seconds to trip. Also, a continuous series of hi -low current cycles were run to simulate a robot match condition as indicated below. The Main Breaker did not trip during this test.

200 Amp for 2 seconds then
50 Amp for 28 seconds then
200 Amp for 2 seconds then
50 Amp for 28 seconds then
200 Amp for 2 seconds then
50 Amp for 28 seconds then
200 Amp for 2 seconds then
50 Amp for 35 seconds

NOTE: Stall current for a drill motor is 114 Amp and 107 Amp for the Atwood Mobile motor. Teams should carefully assess their robot's maximum total current draw /time characteristic under possible worse case operating conditions, and ensure that their designs will not be operated in a sustained overload mode that would cause the main breaker to trip during a match.

FREE PARTS

Gates Rubber Company has graciously offered to donate belts to FIRST teams. Please use the forms below to order belts used with the CMT Pulley's found in the Pulley bag. Teams are responsible for shipment costs and credit cards will be accepted.

Gates is pleased to offer all 2002 FIRST teams with three belts compatible with the sprockets in your competition kits at no charge. Below is the current list of belts that are available. Additional belts should be purchased through a local distributor which can be found at <http://www.gates.com/industrial/distributors/> The order form with the competition manual must be faxed, as it will not be honored by local distributors.

A downloadable copy of our design manual for PowerGrip® HTD® belts can be found at: <http://www.gates.com/firstcompetition> The drive design manual titled "Light Power and Precision Drives" will answer many of your questions and includes HP rating tables and a drive design example. Our main website www.gates.com will lead you to other useful drive design information.

PowerGrip® HTD® Belts (continued)

Product No. Series 9293 (continued)

For sprockets see Product No. Series 7882.

5mm Pitch Belts — 15mm Wide

Part No.	Sugg. List Price	Product No.	No. of Teeth	Pitch Length (In.)	Wt. Ea. (Lbs.)
350-5M-15	\$15.88	9293-0531	70	13.78	.05
375-5M-15	16.40	9293-0532	75	14.76	.06
400-5M-15	16.95	9293-0533	80	15.75	.06
425-5M-15	17.47	9293-0534	85	16.73	.06
450-5M-15	18.02	9293-0535	90	17.72	.07
475-5M-15	18.56	9293-0536	95	18.70	.07
500-5M-15	19.15	9293-0537	100	19.69	.07
535-5M-15	20.23	9293-0538	107	21.06	.08
565-5M-15	20.65	9293-0539	113	22.24	.08
600-5M-15	21.30	9293-0540	120	23.62	.09
635-5M-15	22.38	9293-0541	127	25.00	.09
670-5M-15	23.00	9293-0542	134	26.38	.10
710-5M-15	23.48	9293-0543	142	27.95	.10
740-5M-15	24.61	9293-0544	148	29.13	.11
800-5M-15	25.68	9293-0545	160	31.50	.12
850-5M-15	26.76	9293-0546	170	33.46	.12

Part No.	Sugg. List Price	Product No.	No. of Teeth	Pitch Length (In.)	Wt. Ea. (Lbs.)
890-5M-15	\$27.83	9293-0547	178	35.04	.13
950-5M-15	28.91	9293-0548	190	37.40	.14
1000-5M-15	30.05	9293-0549	200	39.37	.15
1050-5M-15	31.11	9293-0550	210	41.34	.15
1125-5M-15	32.74	9293-0551	225	44.29	.16
1195-5M-15	34.35	9293-0552	239	47.05	.17
1270-5M-15	36.03	9293-0553	254	50.00	.19
1420-5M-15	38.18	9293-0554	284	55.91	.21
1595-5M-15	42.56	9293-0555	319	62.80	.23
1690-5M-15	44.69	9293-0556	338	66.54	.24
1790-5M-15	46.92	9293-0557	358	70.47	.26
1895-5M-15	49.13	9293-0558	379	74.61	.28
2000-5M-15	51.02	9293-0559	400	78.74	.28
2250-5M-15	56.74	9293-0560	450	88.58	.30
2525-5M-15	62.17	9293-0561	505	99.40	.32

POWERGRIP GT2, GT AND HTD BELTS

5mm Pitch Belts — 9mm Wide

Part No.	Sugg. List Price	Product No.	No. of Teeth	Pitch Length (In.)	Wt. Ea. (Lbs.)
350-5M-09	\$10.43	9293-0500	70	13.78	.03
375-5M-09	10.74	9293-0501	75	14.76	.03
400-5M-09	11.08	9293-0502	80	15.75	.03
425-5M-09	11.32	9293-0503	85	16.73	.04
450-5M-09	11.66	9293-0504	90	17.72	.04
475-5M-09	12.00	9293-0505	95	18.70	.04
500-5M-09	12.34	9293-0506	100	19.69	.04
535-5M-09	12.92	9293-0507	107	21.06	.05
565-5M-09	13.28	9293-0508	113	22.24	.05
600-5M-09	13.53	9293-0509	120	23.62	.05
635-5M-09	14.15	9293-0510	127	25.00	.06
670-5M-09	14.55	9293-0511	134	26.38	.06
710-5M-09	14.82	9293-0512	142	27.95	.06
740-5M-09	15.41	9293-0513	148	29.13	.06
800-5M-09	16.06	9293-0514	160	31.50	.07
850-5M-09	16.67	9293-0515	170	33.46	.07

Part No.	Sugg. List Price	Product No.	No. of Teeth	Pitch Length (In.)	Wt. Ea. (Lbs.)
890-5M-09	\$17.34	9293-0516	178	35.04	.08
950-5M-09	17.92	9293-0517	190	37.40	.08
1000-5M-09	18.60	9293-0518	200	39.37	.09
1050-5M-09	19.21	9293-0519	210	41.34	.09
1125-5M-09	20.14	9293-0520	225	44.29	.10
1195-5M-09	21.12	9293-0521	239	47.05	.10
1270-5M-09	22.08	9293-0522	254	50.00	.11
1420-5M-09	23.28	9293-0523	284	55.91	.12
1595-5M-09	25.78	9293-0524	319	62.80	.14
1690-5M-09	27.05	9293-0525	338	66.54	.14
1790-5M-09	28.29	9293-0526	358	70.47	.16
1895-5M-09	29.56	9293-0527	379	74.61	.16
2000-5M-09	30.82	9293-0528	400	78.74	.17
2250-5M-09	34.18	9293-0529	450	88.58	.18
2525-5M-09	38.34	9293-0530	505	99.40	.19



Gates Rubber Company	Belt Order Form		Fax Completed form to:
			843 899 8347
FIRST Competitors			For assistance call:
			303 744 5800
		or email: industrialbelts@gates.com	
Team #			
Corporate Sponsor			
Phone #			
Fax #			
SHIP TO ADDRESS:			
CITY			
STATE		ZIP-CODE	
ATTN:			
Phone #:			
SHIPPING METHOD	UPS	FED-EX	
Circle One	Next-Day	Next-Day	
	2nd-Day	2nd-Day	
Shipping Account #:	_____		
or Bill Recipient by	Circle one:	M/C	Visa
(This option for Fed-Ex only)			
Card Number	_____		
Exp Date: MM/YY	_____		
	Part Number	Product Number	Qty
		Total =	3

VIRTUAL KIT OF PARTS FROM AUTODESK

Please refer to <http://www.autodesk.com/streamline> to find the virtual kit of parts. Not all parts are available, but many are. This seems best viewed with Internet Explorer rather than Netscape.

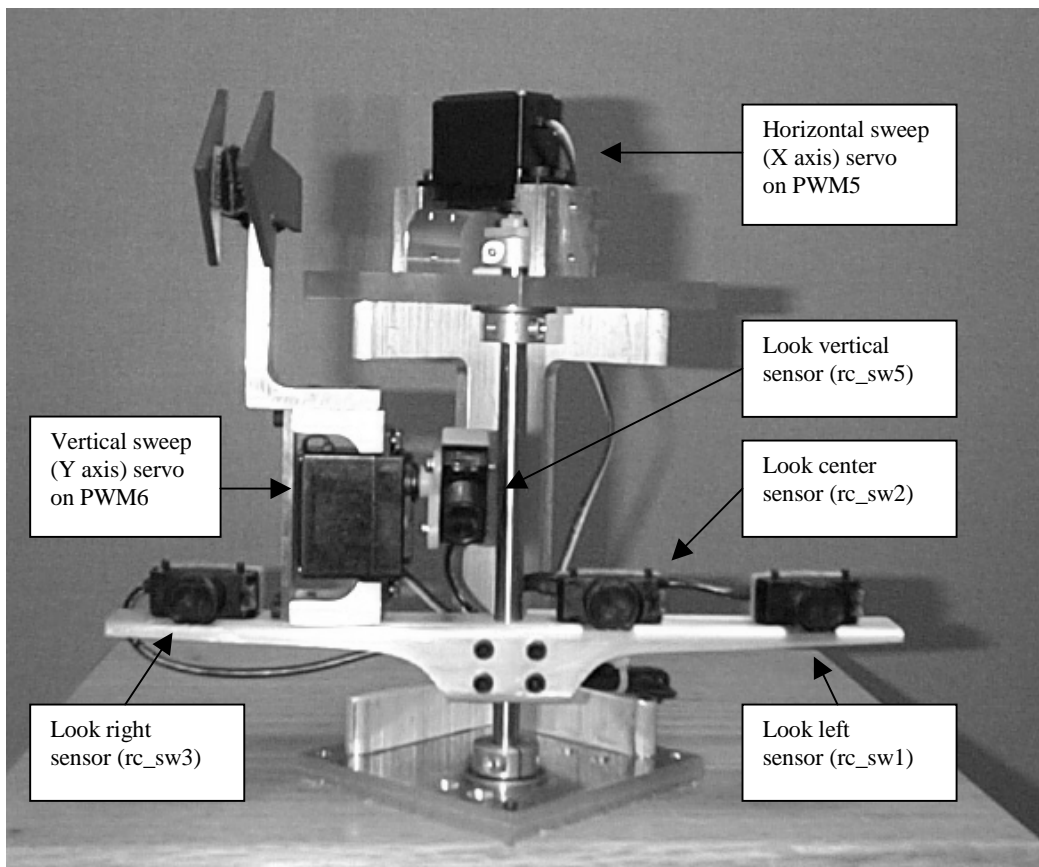
PBASIC PROGRAM FOR GOAL TRACKING

The PBASIC program for the goal tracking mechanism demonstrated at the Kickoff in Manchester, NH is now available on the FIRST web site at: http://www.usfirst.org/robotics/doc_art1.htm. The teams assume all responsibility for unexpected behavior (i.e., bugs) if using this code.

This program is based on the default program. When looking at the source code, please pay special attention to the following areas:

- New variables added in the “Declare Variables” section
- Initialization of new variables just above “Main Loop”
- All code below “Custom code for Tracking system”

The picture below shows the mechanism demonstrated at the Kickoff and indicates how each device is connected to the Robot Controller.



VIDEO OF MANCHESTER KICKOFF AND WORKSHOPS

NASA has kindly made available recordings of all Manchester, NH Kickoff training workshops as well as the Kickoff event itself. Teams are encouraged to view the training workshop videos as they may provide valuable information. The webcasts are available at: <http://explorer.arc.nasa.gov/webcast.html>