

5.4 KIT OF PARTS 2006

FIRST provides a Kit of Parts to each team. Only the exact parts provided in the Kit (or their exact replacement) are considered as Kit Parts. Some Kit Parts may legally be used in additional quantities. Additional quantities of these parts are considered to be "Additional Parts" and not "Kit Parts".

5.4.1 2006 Kit Changes

Some of the exciting and important changes found in the 2006 Kit Items include:

- Labview8 and Easy C software supplied for vision system software development and programming.
- Removed two of the CIM motors and replaced them with two larger CIM "mini-bike" motors.
- 3 New Sensors for 2006 - Gear Tooth Sensor, Dual Axis Accelerometer, and Angular (Yaw) Rate Gyro. Each provides critical positioning and attitude sensing data for precision robot control.
- Enhanced CMUcam2 Vision System with new servo driven Pan/Tilt Brackets adds the capability for vision-based tracking of illuminated targets - essential to achieving competitive performance skills in this year's game.
- New igus Linear Bearing and Guide System kit provides robust lightweight components useful for designing efficient mechanical control systems.
- New Allen-Bradley Infrared Transmitted Beam Sensor for any applications where broken beam detection is a useful and important requirement.
- Returned the MAXI and the ATC fuse panels to the kit in place of the single Circuit Breaker/Power Distribution panel.
- Spiraled Pneumatic tubing from Freelin-Wade.

5.4.2 Kit Of Parts Contents

The FIRST 2006 Kit of Parts is provided in multiple containers. They consist of; 2 Large plastic Totes (blue and red) of robot parts and construction materials shipped from FIRST, cartons containing 1-KitBot box, 1 Electronics Kit, 1 Drive Kit, and 1 Motor Kit shipped from Innovation First, Inc and 2 items.

Use the tables below to inventory your Kit of Parts. The inventory may take about 45 minutes, but should be completed within 48 hours of receiving the kit in order to determine that all items are present. Any irregularities must be reported by 11:59 pm (EST) on Wednesday, January 11, 2006.

The CHECK column should be marked when the item and quantities are correct. All bags are labeled. If you are not sure what a particular part should look like, match the Pix Number to the numbered photograph for clarification. (N/A = picture not available). Kit photos are attached to the checklist supplied with the kits and may be downloaded from the FIRST web site at http://www.usfirst.org/robotics/doc_updt.htm

5.4.2.1 The following part items will be found inside the Blue container

BLUE CONTAINER ITEM 1

		<i>BATTERY BOX</i>	EXIDE	Contains 2 ea.	
✓ Pix	Part Name	Description	Part Number	Qty	
K11	Battery, Exide	12V, 18AH, Deep Cycle	EX18-12	2	

BLUE CONTAINER ITEM 2

		<i>COUPLER BAG</i>		MMH	
✓ Pix	Part Name	Description	Part Number	Qty	
K21	Wheel Hub, Plastic	Hub for Skyway wheels	DEKA	4	
K22	Coupler, Nippon-Denso Motor	Injection molded	DEKA Denso_6	2	

BLUE CONTAINER ITEM 3

		<i>ELECTRICAL BAG</i>		MMH	
✓ Pix	Part Name	Description	Part Number	Qty	
K31	Connector, Quick Disconnect	#6 Wire Pair, 12"	6331G1	4	
K32	Battery Connector Safety Plug	White (45) small plastic	AndyMark, Inc.	8	
K33	Fan, Muffin (Tiny)	12 Vdc	412	6	
K34	Fan, Muffin, (Large)	12 Vdc	4212/19H-490 or 4112N/12GL	2	
K35	Latex Tubing	¼" ID, 3/8" OD, 5 feet	5234k44	2	

BLUE CONTAINER ITEM 4

		<i>FREELIN WADE</i>			
✓ Pix	Part Name	Description	Part Number	Qty	
K41	Spiral Tubing	Coil	2MC-151-5P-FW	1	
K42	Tubing, ¼"	100 Ft length	1J-151-07P-FW	1	
K43	Catalog, Freelin-Wade		FWRGSI	1	

BLUE CONTAINER ITEM 5

		<i>LOOSE MATERIALS</i>			
✓ Pix	Part Name	Description	Part Number	Qty	
K51	Coil, Wire, Black	10' , # 6 AWG, Black	Delphi Conn. Systems	1	
K51	Coil, Wire, Red	10' , # 6 AWG, Red	Delphi Conn. Systems	1	
K52	Battery Charger, Automatic	6 Amp, Midtronics	CXC-2005	1	
K54	Ball, 7" Foam Basketball	Sport balls	Poof-slinky.com	1	
K55	Motor, Fisher-Price, w/19T #7 Gearbox	12 Vdc	00968-9003 or 00968-9012 supplied	2	
K56	Wheel, wheelchair, 8"	Precision Hub w/o brg.	WHL70C	4	

BLUE CONTAINER ITEM 6

		<i>MAGAZINE BAG</i>		May be loose in Tote	
✓ Pix	Part Name	Description	Part Number	Qty	
N/A	Magazine, Nuts and Volts			1	
N/A	Magazine, Servo			1	

BLUE CONTAINER ITEM 7

<i>TARGET BAG</i>				
↳ Pix	Part Name	Description	Part Number	Qty
K71	Cold Cathode Dual Kit	12" green (2 bulbs/box)	Oznum	4
K72	Transformer		Oznum	4
K73	Target Lens, HDPE Panel	16" x 8"(nom) x 1/8"	Plastic Supply	1

BLUE CONTAINER ITEM 8

<i>TERMINAL SUPPLY BAG</i>				
↳ Pix	Part Name	Description	Part Number	Qty
K81	Circuit Breaker, 120A, Buss	120A, Automotive style	CB3-SM-120 185-120-F01-1(old)	1
K82	Nylon Ring Terminal	AWG 22-18	A-532-06	10
K83	Nylon Ring Terminal	AWG 16-14	B-523-06	6
K84	Maxi Style Fuse Block, 4 Position	Gold plated	JEF-531D	1
K85	Terminal Lug, SLU-35	6-14ga solderless lug	SLU-35	8
K86	ATC Fuse Panel,	12 Position	15600-12-21	1
K87	ATC Fuse Panel,	6 Position	15600-06-21	1
K88	Nylon Ring Terminal	#6ga- 1/4" stud	E760-14	4
K89	Nylon Ring Terminal	#6ga- #10 stud	E760-10	6
K810	Nylon Ring Terminal	#6ga- 3/8" stud	E757-38	6
K811	Female Quick Disconnect, Nylon	12-10ga, .250d	C-572	56
K812	Nylon Ring Terminal	12-10ga Ring Lugs	C-536-06	20
K813	Fem Quick Disconnect, Nylon	22-18ga, .250d	AA-8140	8
K814	Fem Quick Disconnect, Nylon	10-12ga, .250d	C-850	14
K815	Male Quick Disconnect, Nylon	16-14ga, .250d	MCT-850	14
K816	Fem Quick Disconnect, insulated	16-14ga, .250d	B-850	4
K817	Stud w/ Nut	3/8" stud terminal block	TB-1	1
K818	Male Quick Disconnect, Nylon	12-10ga, .250d	MCT-C-850	14

5.4.2.2 The following part items will be found inside the Red container

RED CONTAINER ITEM 1

<i>IGUS BAG</i>				
↳ Pix	Part Name	Description	Part Number	Qty
KR11	Igubal Pillow Block- 5/8"	2 in separate bag in Tote	KSTI-10	4
KR12	Iglide Flange Bearing-5/8"		JFI-1012-12	4
	IGUS Product Guide			1
KR14	Plastic Linear Bearing	5/8"	RJI-01-10	2
KR15	5/8" Aluminum Shafting	18" Hard Anodized	AWI-10	1
KR15	3/8" Aluminum Shafting	18" Hard Anodized	AWI-06	1
KR17	Iglide Sleeve Bearing-5/8"		JSI-1012-12	4
KR18	2-Hole Flange Bearing- 3/8"		EFOI-06	2
KR19	Clevis Joint w/pin & Clip	3/8"	GERIK-06	2

	KR110	5/8" Rod end Bearing		EBRI-10R	2
	KR111	3/8" Rod end Bearing		EBRI-06R	2
	KR112	EZ Chain	18" Long	Z06-16-018-0	1
	KR113	Mounting Bracket – EZ Chain	1 Set/ 2 Pieces	060-16-12PZ	1
	KR114	Low Profile Linear Guide 27mm wide	2 pieces, 18" Long, 4 carriages	NK01-27-2-457	2

RED CONTAINER ITEM 2


LOOSE MATERIALS					
☞	Pix	Part Name	Description	Part Number	Qty
	KR21	Motor, Globe, w/drive assy	12 Vdc	409A587	2
	KR22	Volume Tank, Clippard	2" bore by 6" long	AVT-32-16	2
	KR23	Motor, CIM	Keyed output shaft	FR801-001	2
	KR24	Motor, Nippon-Denso Window, RH		262100-3030/ RH	1
	KR25	Motor, Nippon-Denso Window, LH		262100-3040/ LH	1
	KR26	Motor, Sliding Door, Van	Bosch	16636815	1
	KR27	Joystick, Analog	AVB Top Shot Analog	GC-1000FR	2
	KR28	Rod Clevis Kit		LO7130 0400	1
	KR29	Pivot Bracket Set (R/L)		LO7131 0300	1
	KR210	Lead Screw w/ Nut		BZ6050 x 12"	1
	KR211	Motor, Mabuchi		RS-545SH-2485	1
	KR212	Cylinder	1.5" bore x 8" stroke; rear pivot	1.5DPSR8.00	1
	KR213	Compressor, Thomas		405ADC38/12	1
	KR214	US Patent + Trademark Office	DVD		1
	KR215	80/20 CD			1
	KR71	MSC Catalogue – CDROM	& Starrett table		1
	KR216	FedEx Envelope			1

RED CONTAINER ITEM 3

KR30 PNEUMATICS – SMC		<i>Note: 24V solenoid is an extra item</i>			
☞	Pix	Part Name	Description	Part Number	Qty
	KR31	Flow Control		NAS2201F-N01-07S	6
	KR32	Fitting, Straight	¼" tube, straight	KQH07-34S	10
	KR33	Fitting, 90 Elbow	¼" tube, 90° elbow	KQ2L07-34S	5
	KR34	Solenoid Valve, Double w/ Lead Wire Assy, Pilot Valve & gaskets	12VDC pilot valves hardwired to assy.	SY3240-6HZ-X70	2
	KR314	Solenoid Valve, Double w/ Pilot valves 24VDC	24VDC, no lead wires	SY3240-5LOZ (Spare for solenoid)	1
	KR37	Sub Base,	1/8" ports	SY3000-27-1T	2
	KR38	Fitting, 90 Elbow	90° Elbow ¼" tube	KQLO7-35S	10
	KR39	Fitting, Tee-Union	Tee union – 1/4" tube	KQTO7-00	5


	KR312	Fitting, 90 Elbow	Male, 90° Elbow, 5/32" tube- 1/8 NPT	KQ2L03-34S	1
	KR313	Fitting, Straight	Male Conn. 5/32" tube -1/8 NPT	KQ2H03-34S	1

RED CONTAINER ITEM 4


<i>PNEUMATICS BAG #1</i>					
	Pix	Part Name	Description	Part Number	Qty
	KR41	Teflon Tape	¼" x 520'		1
	KR42	Pressure Gauges, Wika	1/8" NPT, 0-160 psi	9690242	2
	KR43	Solenoid, Festo, Single valve kit	Single solenoid valve	VPLE18-M5H-4/2-1/4	2
	KR44	Vibration isolators, Lord		SMB003-0100-2	3
	KR45	Secondary Regulator & Bracket, Mounier	Regulator & Mtg Kit	101-3002-1	1
	KR46	Pressure Switch, Nason	Open; 115, Close; 95psi	SM-2B-115R	1
**	KR47	Main Regulator, Norgren, 60psi	60 psi Max output	R07-153-RNEAJ060	1
	KR48	Regulator Mounting Kit	Bracket & Nut	18-025-003	1
	KR49	Relief Valve, Norgren, 120 psi	120 psi Relief Valve	16-004-074	1
	KR410	Gauge, Norgren	Gauge, 0-160 psi	18-013-212	1
	KR411	Parker Brass Bag			1

** Verify part number is R07-153-RNEAJ060

RED CONTAINER ITEM 5


<i>PNEUMATICS #2 BAG</i>					
	Pix	Part Name	Description	Part Number	Qty
	KR51	Valve, BoschRexroth	Valve, 12V	5728400410	1
	KR52	Connector kit, BoschRexroth	Connector, & hdwre	H894101-02202	1
	KR53	Nut, BoschRexroth	Gray Nut - ¼" tubing	H893071-4904	3

RED CONTAINER ITEM 6

<i>SENSOR BAG</i>					
	Pix	Part Name	Description	Part Number	Qty
	KR61	Receiver	Combine Rx & Source	42SMR-7100	1
	KR62	Source	Rockwell Automation	42SML-7100	1
	KR63	Power Distribution Block	Rockwell Automation	1492-PDM 3141	1
	KR64	Micro switch	Sager Electronics	V7-2B17D8-048	2


5.4.2.3 The following part items are shipped from Innovation First

INNOVATION FIRST, INC. ITEM 1


<i>FIRST-2006 ELECTRONICS KIT</i>				E-KIT-2006	
	Pix	Part Name	Description	Part Number	Qty
	IF16	Robot Controller Unit	ROBOT-RC	FR-2006-RC	1
	IF17	Operator Interface Unit	ROBOT-OI	FR-2006-OI	1
	IF13	Radio Modem – Robot Controller	RS-422, 9 pin, M, w/ Rubber Antenna	ROBOT-RADIO-RC	1
	IF14	Radio Modem – Op. Interface	RS-422, 9 pin, M, Metal Antenna	ROBOT-RADIO-OI	1
	IF110	Speed Controller, Victor 884	VICTOR-884-12-12	FR-VIC884	4
	IF18	Cable, PWM/Relay	Hitec/JR –36”	CABLE-PWM-36	8
	IF19	Cable, PWM/Relay – Y	Hitec/JR –24”	CABLE-PWM-Y	2
	IF119	Adapter, 7.2V Battery Charger	Old Connector to Spade-Lock	ADAPT-BATTERY- 7.2	1
	IF11	Cable, 9 pin, M/F, Blk, 6”	DB9 M/F 6’, Shielded	CABLE-DB9-6FT-MF	3
	IF111	Cable, 9-Pin, 6’, Tether	DB9 Female/Female	CABLE-DB9-6FT-FF	1
	IF117	Battery, 7.2V, NiCad, Backup	7.2V NiCad	BATTERY-BACK-7.2	1
	IF124	Wall Adapter – OI	AC/DC Adapter 9VDC	AC-ADAPTOR-OI	1
	IF12	Servo	42 oz/in peak torque 0.19	SERVO-HS-322HD	2
	IF120	Circuit Breaker Bag	20Ax4, 30Ax2, 40Ax4	CB-20A, CB-30A, CB- 40A	1
	IF123	MPLAB CBOT Compiler	MicroChip Software	C-BOT-COMPILER	1
	IF128	LabView Software	Student Edition	National Instruments	1
	IF15	Spike Relay	12v, 20A	SPIKE-RELAY-H	4
	IF115	Camera Pan/Tilt Bracket Kit	3 Brackets plus h/w	FRC-PANTILT-01	1
	IF122	LED Cluster	Robot LED, Red/Blue	ROBOT-LED-RB	1
	IF112	Camera Lens	Camera Lens	CAMERA-CMU-2	1
	IF113	CMU CAM Printed Circuit Board	CMU-CAM-2 PCB	CAMERA-CMU-2	1
	IF114	TTL-232	TTL-RS232 Converter	CAMERA-CMU-2	1
**	IF125	Sensor Strip	DAA, YRG, GTSx2	SENSOR-STRIP-01	1
	N/A	Gear-Tooth Sensor Hardware	Not Used	See Motor kit item 3	1
	IF127	Picasa Software Ver 2.0 on CD	for Google Camera		1

** Note: See <http://www.ifrobotics.com/> BEFORE wiring the YRG sensor.


INNOVATION FIRST, INC. ITEM 2

<i>FIRST 2005 KITBOT</i>				FRC-KITBOT-001	
	Pix	Part Name	Description	Part Number	Qty
	IF31	Transmission Support Frame	Metal plate, 30” x 5”	KITBOT-TRAN-TOP	1
	IF32	Bumper, C-Channel	Metal C- channel, 37”	KITBOT-BUMPER	2
	IF33	Main Chassis Rail	Rail	KIT-BOT- RAIL	4
	IF34	End Cap	U-shaped C-channel	KITBOT-ENDCAP	4
	IF35	Mount Plate, Transmission	Plate, 9” x 2.75”	KITBOT-TRAN-MNT	2
	IF36	Chassis Stiffener	Angle Bracket, 6”	KITBOT-STIFFENER	4
	IF37	Hardware Kit	Misc Hardware	KITBOT-2005-HDWR	1

INNOVATION FIRST, INC. ITEM 3


MOTOR KIT				FRC-KIT-MOTOR-001	
	Pix	Part Name	Description	Part Number	Qty
	IF41	Motor (Large)	Motor	FP801-005	2
	IF21	Bearing, Timken	Skyway Wheel Bearing	S3KDD	8
	N/A	Screw Kit (contains 4 each - 8/32" flat head screws)	Hardware for mounting Gear tooth sensor.	JSU-229	1

INNOVATION FIRST, INC. ITEM 4 BOX UPC: 356

DRIVE KIT				FRC-KIT-DRIVE-001	
	Pix	Part Name	Description	Part Number *	Qty
	IF66	Output Sprocket	Output Sprocket	FRC-2005-112-009	2
	IF65	Wheel Sprocket	Wheel Sprocket	FRC-2005-120-01	2
	IF614	Hardware Pack	Hardware Pack	Hardware-TranPk-01	1
	N/A	Hardware Pack	Hardware Pack	Hardware-TranPk-02	1
	IF64	Cover	Cover	FRC-2005-112-002	2
	IF613	Hex Cluster Shaft	Hex Cluster Shaft	FRC-2005-112-003	2
	IF612	Hex Output Shaft	Hex Output Shaft	FRC-2005-112-004	2
	IF69	Hex Shaft Cluster Gear	Hex Shaft Cluster Gear	FRC-2005-112-005	2
	IF610	Small Hex shaft Gear	Small Hex shaft Gear	FRC-2005-112-006	2
	IF68	CIM Motor Input Gear	CIM Motor Input Gear	FRC-2005-111-007	4
	IF611	Large Hex Shaft Output Gear	Large Hex Shaft Output Gear	FRC-2005-112-008	2
	IF64	Transmission Housing	Transmission Housing	FRC-2005-112-001	2
	IF63	Master Link, Chain	# 35 Link	ROBOT-MLINK-35	1
	IF62	Chain, 10'	Browning # 35	ROBOT-CHAIN-35-10	1
	IF22	Bearing, Transmission- 39KDD		39KDD	6
	IF23	Bearing, Transmission-9103KDD		9103KDD	2

- - Reference: 2005 FIRST Robotics Competition Kit Transmission Manual

5.4.2.4 Kickoff Supplied Materials

KICKOFF MATERIALS					
	Pix	Part Name	Description	Part Number	Qty
	N/A	Google Digital Camera	Shipped to Kick-off site		1
	IF118	Battery Charger for 7.2V Battery	7.2V NiCad Charger	CHARGER-7.2	1

5.4.3 Replacement Parts Requests

After receiving your Kit of Parts (KOP), *FIRST* will be using a similar system as implemented last year for teams to submit a "Replacement Parts Request" within a short period of time after the kickoff. Any parts requested will be sent to teams via this online request system only. The Replacement Parts Request link will be posted on the Team Information Management System (TIMS) at http://www.usfirst.org/robotics/res_art2.htm after the Kickoff event.

To begin the process of submitting a Replacement Parts Request (after the kickoff), teams will: