

6 THE KIT

[This section includes all modifications through Team Update 10]

6.1 THE KIT OF PARTS LIST

2004 Kit of Parts Checklist

Team Number

Bearing Bag

Container: **Blue**

<input type="checkbox"/>	<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Category</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
<input type="checkbox"/>	Pillow Block, aluminum	accepts bearing for 5/8" shaft	Rods & Shafts	4	MMH Order form
<input type="checkbox"/>	Radial Ball Bearing With Spherical O.D., RA008RRB	1/2" I.D., Self Locking Collar	Bearings	4	The Timken Company (formerly Torrington)
<input type="checkbox"/>	Flange, Two Bolt Self-Aligning, 40MST	Fits 1/2" Bearing	Bearings	8	The Timken Company (formerly Torrington)
<input type="checkbox"/>	Radial Ball Bearing, S7KDD, with Shields	5/8" I.D. - 1.375 OD - .344 Width	Bearings	12	The Timken Company (formerly Torrington)

CIM/Globe Bag

Container: **Blue**

<input type="checkbox"/>	<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Category</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
<input type="checkbox"/>	Motor, Globe, with Drive Assembly	12Vdc	Motors & Pumps	2	Globe Motors
<input type="checkbox"/>	Motor, CIM (aka Chiaphua or Atwood), 8mm keyed output shaft	8mm keyed output shaft	Motors & Pumps	2	MMH Order form
<input type="checkbox"/>	CIM Motor Bracket	Zinc coated	Motors & Pumps	2	MMH Order Form
<input type="checkbox"/>	Key Stock, Metric	Metric key stock; fits the shaft on the Chiaphua motor only: 0.079" x	Rods & Shafts	1	N/A

Control System Accesories

Container: **Blue**

<input type="checkbox"/>	<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Category</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
<input type="checkbox"/>	Relay Module (Spike)	12V, 20A Max	Control System	4	www.innovationfirst.com
<input type="checkbox"/>	Power Supply for Operator Interface	9 Vdc	Control System	1	www.innovationfirst.com
<input type="checkbox"/>	Speed Controller (Victor 884)		Control System	4	www.innovationfirst.com

Control System Box

Container: **Blue**

<input type="checkbox"/>	<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Category</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
<input type="checkbox"/>	Radio Modem for Robot Controller	RS-422, 9 pin F, rubber antenna	Control System	1	www.innovationfirst.com
<input type="checkbox"/>	Radio Modem for Operator Interface	RS-422, 9 pin F, metal antenna	Control System	1	www.innovationfirst.com
<input type="checkbox"/>	Robot Controller		Control System	1	www.innovationfirst.com
<input type="checkbox"/>	Operator Interface		Control System	1	www.innovationfirst.com

Drive Train Bag

Container: **Blue**

<input type="checkbox"/>	<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Category</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
<input type="checkbox"/>	Key Stock, 3/16" x 12"	3/16" key stock; fits 5/8" shaft	Rods & Shafts	1	ITW Bee Leitzke
<input type="checkbox"/>	Key Stock, Step, 1/8"+3/16" x 6"	1/8" and 3/16" step key stock; the 1/8" side fits the 1" and 2" gears;	Rods & Shafts	1	ITW Bee Leitzke

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<input type="checkbox"/>	(GB), Gearbox, Pillow Block Half	Injection Molded	Rods & Shafts	8	MMH Order form
<input type="checkbox"/>	(GB), Gearbox, Pillow Block Mounting Plate Used in Pairs	Injection Molded	Rods & Shafts	4	MMH Order form
<input type="checkbox"/>	(GB), Gearbox, Clamping Plate for 2" x 4" Frame (can be used on smaller stock)	Injection Molded	Rods & Shafts	2	MMH Order form
<input type="checkbox"/>	Gear, 2" Helical, 5/8" Keyed Bore, Right Hand		Rods & Shafts	2	www.msdirect.com
<input type="checkbox"/>	Gear, 1" Helical, 5/8" Keyed Bore, Right Hand		Rods & Shafts	2	www.msdirect.com
<input type="checkbox"/>	Chain, 10'	#35	Rods & Shafts	1	www.msdirect.com
<input type="checkbox"/>	Master Link for Chain	#35	Rods & Shafts	2	www.msdirect.com
<input type="checkbox"/>	Half Link (Offset Link) for Chain	#35, two pitch	Rods & Shafts	2	www.msdirect.com

Electrical Bag (small)

Container: **Blue**

<input type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Servo	42 oz./in. peak torque, 0.19 sec./60°	Control System	2	N/A
<input type="checkbox"/>	LED, Panel Mount	white, 5V, 5MM 1.7V-2.1V	Electrical	2	N/A
<input type="checkbox"/>	LED, Panel Mount	Amber, 5V	Electrical	2	N/A
<input type="checkbox"/>	LED, Panel Mount	Green, 5V	Electrical	1	N/A
<input type="checkbox"/>	Breaker Panel	ATC, 100A. max	Electrical	2	www.connectorconcepts.com
<input type="checkbox"/>	Breaker, Buss, Ckt Breaker / Disconnect Switch	120A., automotive style	Electrical	1	www.connectorconcepts.com
<input type="checkbox"/>	Muffin Fan (Tiny)	12 Vdc	Electrical	6	www.ebmpapst.us
<input type="checkbox"/>	Snap-Action Circuit Breaker	30 amp, 12 volt, Auto-Resetting	Electrical	6	www.innovationfirst.com
<input type="checkbox"/>	PWM/Relay Cable	Hitec/JR-style, 36" Long	Control System	8	www.innovationfirst.com
<input type="checkbox"/>	PWM/Relay Y Cable	Hitec/JR-style, 24" Long	Control System	2	www.innovationfirst.com
<input type="checkbox"/>	Snap-Action Circuit Breaker	20 amp, 12 volt, Auto-Resetting	Electrical	6	www.innovationfirst.com.
<input type="checkbox"/>	Snap-Action Circuit Breaker	40 amp, 12 volt, Auto-Resetting	Electrical	4	www.innovationfirst.com
<input type="checkbox"/>	Feed-Through Terminal Block	one #6 on one side; four #10 other side	Electrical	1	www.rockwellautomation.com look for Allen Bradley product
<input type="checkbox"/>	25-Pin Solder Cup Connector	DB25 Male	Control System	2	www.tycoelectronics.com
<input type="checkbox"/>	15-Pin Solder Cup Connector	DB15 Female	Control System	2	www.tycoelectronics.com

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Loose

Container: **Blue**

<input type="checkbox"/>	<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Category</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
<input type="checkbox"/>	Quick-Disconnect Power Connector (with 1 leads)	#6 AWG Red/Black Wire, pair	Electrical	2	N/A
<input type="checkbox"/>	LED Light Cluster	Replaces the revolving light	Electrical	4	N/A
<input type="checkbox"/>	Tiagene, Power Sliding Door Motor		Motors & Pumps	1	N/A
<input type="checkbox"/>	Pneumatics, Pressure Transducer	0-130 psig transducer; has 1/4-18 NPT input port	Sensors	1	Texas Instruments
<input type="checkbox"/>	Muffin Fan (Large)	12 Vdc	Electrical	2	www.ebmpapst.us
<input type="checkbox"/>	9-Pin Cable (M-F) (Black)	DB9 Male to Female, 6', Shielded	Control System	3	www.innovationfirst.com
<input type="checkbox"/>	9-Pin Cable (F-F) (Red)	DB9 Female to Female, 6', Shielded	Control System	1	www.innovationfirst.com
<input type="checkbox"/>	Wheel, Wheelchair, 6"	6" Ø, 5/16" I.D. Bearings, 1-1/2" Wide Flange	Wheels	2	www.skywaywheels.com
<input type="checkbox"/>	Wheel, 12.5" Pneumatic Assembly, Skyway	5/8" keyed hub	Wheels	2	www.skywaywheels.com
<input type="checkbox"/>	Ball, 34", Yellow, BIGENS Kit Ball	34" BIGENS Ball	Game piece for kit	1	www.sportfun.com

Pneumatics - SMC

Container: **Blue**

<input type="checkbox"/>	<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Category</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
<input type="checkbox"/>	Pneumatics Kit, Double Solenoid Base Ported Valve, SMC		Pneumatics	2 1	www.smcusa.com
<input type="checkbox"/>	Pneumatics Kit, Flow Control, SMC		Pneumatics	6	www.smcusa.com
<input type="checkbox"/>	Pneumatics Kit, Fitting, Straight 1/4" Tube, SMC		Pneumatics	20	www.smcusa.com
<input type="checkbox"/>	Pneumatics Kit, Fitting, 90 Elbow 1/4" Tube, SMC		Pneumatics	20	www.smcusa.com
<input type="checkbox"/>	Pneumatics Kit, Fitting, Tee Union 1/4" Tube, SMC		Pneumatics	5	www.smcusa.com
<input type="checkbox"/>	Pneumatics Kit, Fitting, Male Run T 1/8 NPT ~ 1/4" Tube, SMC		Pneumatics	5	www.smcusa.com
<input type="checkbox"/>	Pneumatics Kit, 1/4" OD Tubing, SMC	20 meters	Pneumatics	1	www.smcusa.com

Seat/Window Bag

Container: **Blue**

<input type="checkbox"/>	<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Category</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
<input type="checkbox"/>	Motor, Seat, Keyang	12 Vdc	Motors & Pumps	1	N/A
<input type="checkbox"/>	Worm Gear Actuator-Right Hand	2 inch linear movement	Rods & Shafts	1	N/A
<input type="checkbox"/>	Worm Gear Actuator-Left Hand	2 inch linear movement	Rods & Shafts	1	N/A

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<input type="checkbox"/>	Nippon-Denso Motor, Window, Right		Motors & Pumps	2	N/A
<input type="checkbox"/>	Flexible Motor Shaft	13.5" Long, Fits Seat Motor	Rods & Shafts	2	www.grcontrols.com

Sensor Bag

Container: **Blue**

<input checked="" type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	IR Beacon - Vector Board	Vector board "circbord" 4.5" x 6.50"	Sensors	1	N/A
<input type="checkbox"/>	Current Sensor - Tantalem Capacitors		Electrical	2	N/A
<input type="checkbox"/>	IR Beacon - FET's		Sensors	2	N/A
<input type="checkbox"/>	IR Beacon - LED's	Clear/White	Sensors	10	N/A
<input type="checkbox"/>	IR Beacon - Resistors	33 Ohm	Sensors	8	N/A
<input type="checkbox"/>	IR Beacon - 3pin Connectors	black	Sensors	2	N/A
<input type="checkbox"/>	Current Sensor	75 Amp current sensor w/analog output	Sensors	2	www.allegromicro.com.
<input type="checkbox"/>	World-Beam Diffuse Sensor w/screws		Sensors	2	www.bannerengineering.com
<input type="checkbox"/>	IR Beacon - Photo Detector (Receiver)	Vishay P/N - TSOP34840	Sensors	5	www.newarkinone.com
<input type="checkbox"/>	Current Sensor - Printed Circuit Board	40mm x 50mm x 1.575mm, FR4 material.	Electrical	2	www.newarkinone.com

Terminal Supply Bag

Container: **Blue**

<input checked="" type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Stud, Insulated	3/8" dia	Electrical	1	www.terminalsupplyco.com
<input type="checkbox"/>	Nylon ring terminal	Connects AWG #6 cable to 3/8" stud	Electrical	4	www.terminalsupplyco.com
<input type="checkbox"/>	Nylon ring terminal	Connects AWG #6 cable to 1/4" stud	Electrical	4	www.terminalsupplyco.com
<input type="checkbox"/>	Nylon ring terminal	Connects AWG 22-18	Electrical	12	www.terminalsupplyco.com
<input type="checkbox"/>	Nylon ring terminal	Connects AWG 16-14	Electrical	12	www.terminalsupplyco.com
<input type="checkbox"/>	Nylon ring terminal	Connects AWG #12-10	Electrical	12	www.terminalsupplyco.com
<input type="checkbox"/>	Nylon ring terminal	Connects AWG #6	Electrical	12	www.terminalsupplyco.com
<input type="checkbox"/>	Nylon insulated Quick Disconnect	Connects AWG #22-18	Electrical	6	www.terminalsupplyco.com
<input type="checkbox"/>	Nylon insulated Quick Disconnect	Connects AWG #16-14	Electrical	6	www.terminalsupplyco.com
<input type="checkbox"/>	Nylon insulated Quick Disconnect	Connects AWG #12-10	Electrical	12	www.terminalsupplyco.com

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<input type="checkbox"/>	Wire Nut	Red	Electrical	8	www.terminalsupplyco.com
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Metal Box

Container: **Metal Box**

<input checked="" type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Shaft, 5/8" Keyed	5/8" keyed x 36"	Rods & Shafts	1	N/A
<input type="checkbox"/>	Pipe, 1" Aluminum	1" x 24" schedule 40	Structural	2	N/A
<input type="checkbox"/>	(TR), Threaded Rod , 3/8"	3/8" Ø x 36", 20 Pitch Coarse Thread	Structural	2	N/A
<input type="checkbox"/>	Frame, 2" x 4" Extruded Aluminum	2" x 4" x 36"	Structural	2	N/A
<input type="checkbox"/>	Aluminum, Solid, 1" Hex OD 6" Long	Part of 3-piece assembly for 8mm Chiaphua shaft	Rods & Shafts	1	N/A

Battery Box

Container: **Red**

<input checked="" type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Battery	12 volt, 18 AH Deep Cycle Non-Spillable	Electrical	2	www.batteriesplus.com Manchester, NH Store

Coupler Bag

Container: **Red**

<input checked="" type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Flexible Shaft Coupling	Black	Rods & Shafts	2	MMH Order Form
<input type="checkbox"/>	Coupler to Nippon-Denso Motor Gear	Injection molded	Motors & Pumps	2	MMH Order Form
<input type="checkbox"/>	Coupling, 1/2" Drill Motor, Aluminum, accepts 1/2" Drill Shaft. 1" Hex OD	accepts 1/2" Drill Shaft, 1" Hex OD	Rods & Shafts	2	MMH Order Form
<input type="checkbox"/>	Coupling, 1/2" Drill Motor, Aluminum, accepts 5/8" Keved Shaft. 1" Hex OD	accepts 5/8" Keyed Shaft, 1" Hex OD	Rods & Shafts	2	MMH Order Form
<input type="checkbox"/>	Coupling, Plastic, Round, Accepts 1" Hex Both Sides	Can insert 4 types: 1/2" drill motor unit: 8mm Chiaphua unit:	Rods & Shafts	4	MMH Order Form
<input type="checkbox"/>	Coupling, Aluminum, accepts 8mm Chiaphua Shaft. 1" Hex OD	3-piece assembly for 8mm Chiaphua shaft	Rods & Shafts	2	MMH Order Form

Drill Bag

Container: **Red**

<input checked="" type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Rubber Bands	2" x 1/2" Broccoli bands	Fasteners	10	Any office supply store
<input type="checkbox"/>	Mount for 1/2" Drill Motor; 4 Pieces	Injection molded	Motors & Pumps	2	MMH Order form
<input type="checkbox"/>	Screw, Left-Hand for Bosch 1/2" Drill Drive Assembly		Motors & Pumps	4	MMH Order Form
<input type="checkbox"/>	Motor Assembly, 1/2"	0.87Nm @ 127A stall, 19670RPM No-Load	Motors & Pumps	2	www.boschtools.com
<input type="checkbox"/>	Drill Drive Assembly (Transmission), 1/2"	2 Speed -12.07:1 & 42.62:1 Gear Ratios	Motors & Pumps	2	www.boschtools.com

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Hardware Bag

Container: **Red**

<input checked="" type="checkbox"/>	<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Category</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
<input type="checkbox"/>	Retaining Rings for 5/8" Keyed Shaft	Gearbox	Rods & Shafts	1 bag	www.fastenal.com
<input type="checkbox"/>	(TR), Nut, NYLOCK NE 3/8-16Z	3/8" nut for threaded rod	Structural	1 bag	www.fastenal.com
<input type="checkbox"/>	(TR), Washer, Flat, 3/8" Hole, USS F/W 3/8	Frame Washers	Structural	1 bag	www.fastenal.com
<input type="checkbox"/>	(GB), Washer, Flat, 1/4" Hole, USS F/W 1/4	Gearbox Washers	Rods & Shafts	1 bag	www.fastenal.com
<input type="checkbox"/>	(GB), Bolt, 307AHB 1/4-20 x 6.5Z, Hex Head	For gear box	Rods & Shafts	1 bag	www.fastenal.com
<input type="checkbox"/>	(GB), Nut, NYLOCK NE 1/4-20Z	For gear box bolts	Rods & Shafts	1 bag	www.fastenal.com
<input type="checkbox"/>	(MM), Bolt, Motor Mount, 1/4-20 x 1"; 307AHB 1/4-20 x 1Z	Bolt (rear)	Motors & Pumps	1 bag	www.fastenal.com
<input type="checkbox"/>	(MM), Bolt, Motor Mount, 10-32 x 2"; SHCS 10-32 x 2	Bolt (clamp)	Motors & Pumps	1 bag	www.fastenal.com
<input type="checkbox"/>	(MM), Nut, Motor Mount, 10-32; NYLOCK NM 10-32Z	Nuts (clamp)	Motors & Pumps	1 bag	www.fastenal.com
<input type="checkbox"/>	(MM), Nut, Motor Mount, 1/4-20; NYLOCK NE 1/4-20Z	Nuts	Motors & Pumps	1 bag	www.fastenal.com
<input type="checkbox"/>	(MM), Washer, Motor Mount, 1/4-20; SAE F/W 1/4Z	Flat Washers	Motors & Pumps	1 bag	www.fastenal.com
<input type="checkbox"/>	(MM), Washer, Motor Mount, 10-32; SAE F/W (#10) Z	Washers (clamp)	Motors & Pumps	1 bag	www.fastenal.com
<input type="checkbox"/>	(MM), Bolt, Motor Mount, 1/4-20 x 3-1/4"	Bolt (front)	Motors & Pumps	1 bag	www.fastenal.com
<input type="checkbox"/>	Latex Tubing	1/4" I.D., 3/8" O.D., 5'	Springs	2	www.kentelastomer.com

Loose

Container: **Red**

<input checked="" type="checkbox"/>	<u>Part Name/Description</u>	<u>Dimensions</u>	<u>Category</u>	<u>Qty /Kit</u>	<u>Product Supplier</u>
<input type="checkbox"/>	(GB) Spacer, Steel	Spacer for 2" x 4" material;	Rods & Shafts	8	N/A
<input type="checkbox"/>	(MM) Spacer, Steel	Spacer for 2" x 4" material;	Motors & Pumps	4	N/A
<input type="checkbox"/>	(TR) Spacer, Steel	Spacer for 2" x 4" material;	Structural	4	N/A
<input type="checkbox"/>	(GB), Spacer, Pipe, for Gear Box, Aluminur	0.652 ID; 0.75 OD; 0.049 wall x 0.250"	Rods & Shafts	8	N/A
<input type="checkbox"/>	(GB), Spacer, Pipe, for Gear Box, Aluminur	0.652 ID; 0.75 OD; 0.049 wall x 0.750"	Rods & Shafts	2	N/A
<input type="checkbox"/>	(GB), Spacer, Pipe, for Gear Box, Aluminur	0.652 ID; 0.75 OD; 0.049 wall x 3.1875"	Rods & Shafts	2	N/A
<input type="checkbox"/>	(GB), Spacer, Pipe, for Gear Box, Aluminur	0.652 ID; 0.75 OD; 0.049 wall x 1.210"	Rods & Shafts	4	N/A
<input type="checkbox"/>	Valve - Single Solenoid		Pneumatics/Hydraulic	1	www.boschrexroth.com Pneumatics division

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<input type="checkbox"/>	Fisher-Price 10 Web Jeep Driver (NO AXLE)	Black	Motors & Pumps	2	www.fisher-price.com/powerwheels
<input type="checkbox"/>	Motor/Gearbox, Fisher-Price	12 Vdc stall torque (mNm) 532.19+/- 10%	Motors & Pumps	2	www.fisher-price.com/powerwheels
<input type="checkbox"/>	Joystick , Analog	AVB Top Shot Analog	Control System	2	www.innovationfirst.com CH Analog Joystick only
<input type="checkbox"/>	Ball, 13", Red, Kit Ball	Kit ball	Game piece for kit	1	www.palossports.com

Pneumatics 1

Container: **Red**

<input checked="" type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Pneumatics Kit, Volume Tank, Clippard	16 cu. in., 2" x 8"	Pneumatics	2	www.clippard.com
<input type="checkbox"/>	Pneumatics Kit, Valve Kit, Solenoid, With Fittings, Festo		Pneumatics	1	www.festo.com
<input type="checkbox"/>	Pneumatics Kit, Cylinder, Parker	1.5" bore x 8" stroke; rear pivot mount	Pneumatics	1	www.parker.com
<input type="checkbox"/>	Pneumatics Kit, Pivot Bracket Set, Cylinder, Parker		Pneumatics	1	www.parker.com
<input type="checkbox"/>	Pneumatics Kit, Rod Clevis, Cylinder, Parker		Pneumatics	1	www.parker.com

Pneumatics 2

Container: **Red**

<input checked="" type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Pneumatics Kit, Teflon Tape, 1/4" x 100'		Pneumatics	1	Various
<input type="checkbox"/>	Pneumatics Kit, 0-160psi Gauge for Norgren Regulator, Wika		Pneumatics	1	Wika
<input type="checkbox"/>	Pneumatics Kit, Secondary Pneumatic Regulator, Monnier		Pneumatics	1	www.monnier.com
<input type="checkbox"/>	Pneumatics Kit, Regulator Mounting Bracket and Nut, Monnier		Pneumatics	1	www.monnier.com
<input type="checkbox"/>	Pneumatics Kit, Pressure Switch Opens @ 115psi; Closes @ 95psi, Nason		Pneumatics	1	www.nasonptc.com
<input type="checkbox"/>	Pneumatics Kit, Main Regulator with 60psi Max Output, Norgren		Pneumatics	1	www.norgren.com
<input type="checkbox"/>	Pneumatics Kit, 0-160psi Gauge for Norgren Regulator, Norgren		Pneumatics	1	www.norgren.com
<input type="checkbox"/>	Pneumatics Kit, Regulator Mounting Bracket and Nut, Norgren		Pneumatics	1	www.norgren.com
<input type="checkbox"/>	Pneumatics Kit, Manual 2-Way Plug Valve, Parker		Pneumatics	1	www.parker.com
<input type="checkbox"/>	Pneumatics Kit, Union Tee, Parker		Pneumatics	4	www.parker.com
<input type="checkbox"/>	Pneumatics Kit, Adaptor 1/4" Female to 1/8" Male, Parker		Pneumatics	6	www.parker.com
<input type="checkbox"/>	Pneumatics Kit, Hex Nipple 1/8" NPT, Parker		Pneumatics	6	www.parker.com
<input type="checkbox"/>	Pneumatics Kit, Bushing 1/8" Female to 1/4" Male, Parker		Pneumatics	12	www.parker.com

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<input type="checkbox"/>	Pneumatics Kit, Plug 1/8", Parker		Pneumatics	6	www.parker.com
<input type="checkbox"/>	Pneumatics Kit, Plug 1/4", Parker		Pneumatics	6	www.parker.com

Wire Bag

Container: **Red**

<input checked="" type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	2 Conductor Jacketed Wire	35', #16 AWG	Electrical	1	N/A
<input type="checkbox"/>	3 Conductor Shielded Wire	30', #24 AWG	Electrical	1	N/A
<input type="checkbox"/>	2 Conductor Jacketed Wire	30', #24 AWG	Electrical	1	N/A
<input type="checkbox"/>	1 Conductor Wire	20', #10 AWG, Red	Electrical	1	N/A
<input type="checkbox"/>	1 Conductor Wire	20', #10 AWG, Black	Electrical	1	N/A
<input type="checkbox"/>	1 Conductor Wire	10', #6 AWG, Black	Electrical	1	N/A
<input type="checkbox"/>	1 Conductor Wire	10', #6 AWG, Red	Electrical	1	N/A

Documentation Bag

Container: **Separate Box**

<input checked="" type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Pneumatics FIRST Pamphlet		Documentation	1	
<input type="checkbox"/>	FedEx Airbills		Documentation	3	FedEx
<input type="checkbox"/>	FedEx Envelope - Introduction Letter		Documentation	1	FedEx
<input type="checkbox"/>	FedEx Pouch		Documentation	3	FedEx
<input type="checkbox"/>	FIRST Educational Robotics Kit CDROM		Documentation		N/A
<input type="checkbox"/>	Discovering Fluid Power CDROM		Documentation	1	N/A
<input type="checkbox"/>	Newark In One CDROM		Documentation	1	N/A
<input type="checkbox"/>	Allegro Microsystems envelope		Documentation	1	N/A
<input type="checkbox"/>	Magazine, Nut and Volts		Documentation	1	www.nutsvolts.com
<input type="checkbox"/>	Magazine, SERVO		Documentation	1	www.servomagazine.com
<input type="checkbox"/>	Infrared Beacon 1 Pager		Documentation	1	www.usfirst.org
<input type="checkbox"/>	Current Sensor 1 Pager		Documentation	1	www.usfirst.org

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Team Number

Loose

Container: **Separate Box**

<input type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Visio		Software	1	Microsoft
<input type="checkbox"/>	Visual Studio C		Software	1	Microsoft
<input type="checkbox"/>	Front Page		Software	1	Microsoft

Miscellaneous Bag

Container: **Separate Box**

<input type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Stickers - Various Suppliers		Documentation	4	
<input type="checkbox"/>	Maxi-Fuse holder for 40A breakers, 4 Positions	Brass, gold-plated	Electrical	1	N/A
<input type="checkbox"/>	Sprocket	45 tooth, 5 1/2" diameter 5/8" keyed hub	Rods & Shafts	2	www.msdirect.com
<input type="checkbox"/>	Sprocket	10 tooth, 1 3/8" diameter 5/8" keyed hub	Rods & Shafts	2	www.msdirect.com
<input type="checkbox"/>	Idler Sprocket		Rods & Shafts	2	www.msdirect.com

Direct

Container: **Shipped from**

<input type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Inventor Professional 7, Autodesk	3D mechanical design software; includes Autodesk Inventor +	Software	1	Autodesk
<input type="checkbox"/>	3D Studio Max 6, Autodesk	Includes Character Studio - see separate record	Software	1	Autodesk
<input type="checkbox"/>	Mechanical Desktop, Autodesk	Included with Inventor Professional 7	Software	1	Autodesk
<input type="checkbox"/>	Character Studio, Autodesk	Included with 3D Studio Max 6	Software	1	Autodesk
<input type="checkbox"/>	Animations from 2003, DVD	1 DVD	Software	1	Autodesk

Direct

Container: **Shipped from IFI**

<input type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	FIRST Educational Robot Replacement Board	Replacement board with upgraded processor and	Control System		www.innovationfirst.com

1&2 Yr. Teams ONLY

Container: **Year 1 +2 Teams**

<input type="checkbox"/>	Part Name/Description	Dimensions	Category	Qty /Kit	Product Supplier
<input type="checkbox"/>	Battery Charger, Automatic	6 amp	Electrical	1	Midtronics (Exide spinoff)
<input type="checkbox"/>	Pneumatics Kit, Compressor, Thomas		Pneumatics	1	MMH Order Form
<input type="checkbox"/>	Pneumatics Kit, Vibration Isolators for Compressor, Lord Corp		Pneumatics	3	www.lord.com

6.2 KIT ISSUES

6.2.1 Missing part supply problem

Please DO NOT e-mail FRC parts directly for any missing or broken parts. FIRST asks that you please follow the instructions listed in section 5.3.1 of “The Robot” in your manual. You will only have until January 16th to inventory your kit and notify FIRST. After that, parts will no longer be available.

FRC Parts has received several Kit of Parts Checklists from teams that are missing parts and we apologize for the mistakes and thank you for your patience and understanding. The remaining items will be coming to you shortly.

FIRST is having a problem with supplies of some parts that teams seem to be missing and we ask for your continued patience.

- SMC Pneumatics parts – These came pre-bagged directly from SMC. We will try to accommodate any missing items from this bag if possible.
- Spacer Bag – We have a very limited supply left and have found that many teams are missing these items. Please be patient and we will get them to you soon.
- LED’s from the Small Electrical Bag – These are not a crucial part to the kit and can be purchased anywhere if needed.

6.2.2 Documents on website

The following documents will be posted on the FIRST website:

- MMH Order Form
- Batteries Plus Order Form
- Spec Sheets
- List of parts that will NOT be available at any FIRST event

6.2.3 Yellow back-up battery

The yellow back-up battery is not part of the kit. This is the battery from the FIRST Educational Robot Kit. Additional ones can be purchased from: <http://www.innovationfirst.com/FIRSTRobotics/>

6.2.4 Pneumatic rotary actuator

The pneumatic rotary actuator is **not** part of the kit. It can be ordered using the order form in the Pneumatics Manual.

6.2.5 Ordering Balls

- Part #10089, a red 13” playground ball (2-ply rubber; **not** nylon wound) can be ordered from Palos Sports by calling Jessica at 800-233-5484. Palos is located at 11711 S. Austin Avenue, Alsip, IL 60803. There is no minimum order quantity. **NOTE:** The 13” purple or 13” yellow balls featured at the 2004 Kickoff **are not available** to teams.
- A 34” yellow (inflate to 30”) ball can be ordered from SportFun (they are in California) by calling Marcy at SportFun at 888-386-8998, x116 or e-mail Marcy at mwatters@sportfun.com.

SportFun has agreed that teams can order the 34” yellow ball as follows:

- One box (6 balls) at a cost of \$43.50 (\$7.25 per ball)
- Two boxes (12 balls) at a cost of \$78 (\$6.50 per ball)

6.2.6 Battery Charger additional source

The equivalent battery charger is a 6A, 12V, automatic type, NAPA charger, item # NBC85315. The approximate price in 2003 was \$52.

6.2.7 Maxi-style fuse panel additional sources

Terminal Supply Co, Troy, MI, has some that are equivalent to ours, but a different brand. Their part number is JEF-531-D, Maxi Fuse Block. They sell for ~ \$16.80. They can be reached at 800-989-9632, x153, ask for Carrie. Their fax is 800-989- 7289. Their web address is: <http://www.TerminalSupplyCo.com>

A Stinger SFB1MAXPT is generally available at auto sound system retailers at a street price of around \$10.00 per unit. Individual units can be easily ganged together. A set of 4 weighs approximately the same as the Maxi-Fuse panel provided in the Kit. A typical retailer is: <http://www.sounddomain.com/sku/STISFB1MAX>
Other retailers are available.

6.2.8 Discussion on 13” Balls

The incredible demand for balls has literally wiped out all available wholesale sources of an equivalent competition ball.

The 13” red Champro PG13 (2-ply rubber, not nylon wound) ball packed in your Kit of Parts is identical to the 13” purple and the 13” yellow balls that FIRST will use at the competitions. We have found the various balls to vary from 1.5 lbs to 1.7 lbs. Other balls that teams find at local retailers may be the same or similar. FIRST has discovered an issue with the 13" balls that all teams need to know about.

The 13" ball that you received in your kit of parts has the same specifications as the 13" balls you will encounter in the regional competitions. Some of the balls sent by Palos Sports may be slightly different.

This was caused by the fact that the demand for 13" balls wiped out the supply of the exact ball and Palos Sports substituted a ball that was very close. Palos Sports has been informing teams that ordered balls in the last couple of days but teams that ordered last week may not know they have received a substitute. Because these balls are produced in China and other distant lands, replenishment in a timely manner is difficult to impossible.

The substitute ball shipped by Palos Sports is slightly heavier and a bit firmer than the ball that will be used at the regional competitions (and included in your kit). These differences can potentially affect a team in some of the following ways (this is not meant to be all of the potential effects):

- Shooting by the human player - the ball is heavier and firmer;
- Robots pushing balls - robots may ride up on the softer competition ball and not on the firmer ball;
- Robot mechanisms that pick up balls - the difference in firmness could affect these mechanisms.

6.2.9 Notice from Skyway regarding wheels

Skyway Wheels has received numerous requests for large diameter wheels with keyway drive hubs similar to the 12.5" wheel assembly in the kit. Because of these requests, Skyway is setting up production for 16", 20" and 24" overall diameter wheel assemblies.

Please be advised that supplies of these wheels are limited and Skyway will be manufacturing these on an as-needed basis, therefore, longer delivery lead times may be required for these items.

6.2.10 Source for Anderson power connectors

Teams can purchase additional Anderson power connectors from Terminal Supply Co at 800-989-9632, ext. 153. The Terminal supply part number is SY6331G1, which is made up of one plastic housing and a pair of contacts that can be crimped to #6 wire.

6.2.11 Missing Parts Concerns.

Critical missing parts for many of our teams were shipped on or before 1/26/2004. FIRST will be working over the weekend to package up the remainder of the “critical missing parts” and will send them on Monday 2/2/2004 for arrival by Wednesday 2/4/2004.

FIRST apologizes for the missing parts issue that has confronted you. We thank you for your patience, understanding, and Gracious Professionalism in dealing with this issue.

6.2.12 Important supplier information - Exide Batteries.

Teams can locate Exide battery dealers by going to:

http://www.exide.com/products/trans/na/exide_branches.html#AL

By contacting your nearest Exide Branch on the list, you will either be provided with a specific dealer location to call or arrangements can be made to have batteries shipped to you by the Branch. Exide has alerted all of its branch locations that FIRST teams may be contacting them and their need for ES18-12 batteries.

6.2.13 Important supplier information – Batteries Plus.

They have agreed to carry Exide batteries. A revised order form has been posted.

6.2.14 Clarification on servos.

~~Servos are treated as motors so the 2 servos provided in the kit are the only 2 allowed on the robot.~~ Teams that wish to obtain spares (Hitec servo HS-311 or HS-322) may purchase them from Tower Hobbies at:

<http://www.towerhobbies.com> We had previously answered Electronics. This was an incorrect answer.

6.2.15 New information regarding the Hitec servos.

You have convinced us. We will allow you to use more than 2 Hitec servos on your robot. They will still be treated as motors, however, with regards to modifications.

6.2.16 Maxi-Fuse panel option.

A Stinger SFB1MAXPT is generally available at auto sound system retailers at a street price of around \$10.00 per unit. Individual units can be easily ganged together. A set of 4 weighs approximately the same as the Maxi-Fuse panel provided in the Kit. A typical retailer is: <http://www.sounddomain.com/sku/STISFB1MAX>

Other retailers are available.