

# FIRST ROBOTICS- PARTS AND SUPPLIERS LIST FOR 2013

rev Jan 2, 2013

(adapted from FIRST's Where to Get More database by Team Paragon Robotics-571)  
 This parts list not endorsed or approved by US FIRST, so use with you best judgement  
 Send suggestions for additional parts for the list to parts-571@hotmail.com

## ---ELECTRICAL (WIRING + PARTS)---

Part Description	Supplier	Part Number	2013 KOP	2012 KOP	Where to get more...	Notes	Price (10)
2-wire jumper cable (24in)	PCCables.com	3203		Y (5X)	<a href="http://www.pccables.com">www.pccables.com</a>		\$ 1.65
Adapter, DB9 to RJ12	??	31D1-16400		Y (1X)			
	Amazon	B0058U535Y			<a href="http://www.amazon.com">www.amazon.com</a>		\$ 2.80
	Marlin P Jones	14646PL			<a href="http://www.mpja.com">www.mpja.com</a>		\$ 1.95
Adapter, Ring to QC terminal	TE Connectivity	42214-2					
	DigiKey	A27868-ND			<a href="http://www.digikey.com">www.digikey.com</a>	per 10	\$ 1.70
Battery	EnerSys	NP18-12		Y (1X)	www.enersys.com or www.dantona.com		
		am-0795 (set of 2)			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 83.00
		ES17-12 MK		N	<a href="http://www.mkbattery.com">www.mkbattery.com</a>		
		am-0844 (set of 2)			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 83.00
Battery plug (charge status marker)	AndyMark, Inc	am-0122		Y (4x)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 1.00
Battery Base Kit	AndyMark, Inc	am-0477		Y (1X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 14.00
Battery Charger	Batteries Plus	SC-600A		Rookie	many online retailers have carry this item. No specific outlet has been arranged.		
	Schumacher	SC-600A			<a href="http://www.amazon.com">www.amazon.com</a>		\$ 25.25
Battery Charger (3 bank)	AndyMark, Inc	am-2026			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 189.00
Battery plug and harness (assembled)	AndyMark, Inc	am-0009		Y (3X)	<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 15.00
Battery plug (unassembled) SB50 #6 RED	Anderson Power Products, Delphi	6331G1			helmar fork lift parts	1	
		am-0546			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 3.50
Battery charger plug (unassembled) SB50 #10 RED	Anderson Power Products, Delphi						
		6331G2			helmar fork lift parts		
Cable Assembly, Ethernet	Lyme Computer Systems	(5ft cable)		Y (1X)	ubiquitous		
	PC Cables	02710 (10ft cable)			<a href="http://www.pccables.com">www.pccables.com</a>		\$ 1.90
Cable Assembly, Ethernet crossover	Lyme Computer Systems	(5ft cable)		Y (1X)	ubiquitous		
	PC Cables	02219 (10ft cable)			<a href="http://www.pccables.com">www.pccables.com</a>		\$ 2.99
Cable, RJ12 (6 conductor flat) (100ft spool) (1000ft spool)	??	8102-66107		Y (1X)			
	Digikey	H0061R-100-ND			<a href="http://www.digikey.com">www.digikey.com</a>	6	\$ 20.85
	Marlin P Jones	6286WI			<a href="http://www.mpja.com">www.mpja.com</a>		\$ 69.95
Cable RJ12- 6C x 7ft	Steren	306-707SL		Y (1X)	<a href="http://www.amazon.com">www.amazon.com</a>		\$ 0.99
	Pan Pacific	DC-546P-7-GR			<a href="http://www.cablesandconnectors.com">www.cablesandconnectors.com</a>		\$ 4.99
Cable RJ12- 6C x 25ft	Phillips	SWL6160/17			<a href="http://www.amazon.com">www.amazon.com</a>		\$ 2.09
	Radio Shack	279-422			<a href="http://www.radioshack.com">www.radioshack.com</a>		\$ 12.99
	Pan Pacific	DC-546P-25-GR			<a href="http://www.cablesandconnectors.com">www.cablesandconnectors.com</a>		\$ 12.99
C-Base	AndyMark, Inc	various			<a href="http://www.andymark.com">www.andymark.com</a>		
Circuit breaker (20A)	Snap Action	VB3-A20-F57		Y (5X)	Cooper Bussman	1	
		am-0289			<a href="http://www.andymark.biz">www.andymark.biz</a>		\$ 6.00
Circuit breaker (30A)	Snap Action	VB3-A30-F57		Y (2X)	Cooper Bussman	1	
		am-0290			<a href="http://www.andymark.biz">www.andymark.biz</a>		\$ 6.00
Circuit breaker (40A)	Snap Action	MX5-A40		Y (4X)	Cooper Bussman	1	
		am-0288			<a href="http://www.andymark.biz">www.andymark.biz</a>		\$ 7.00
Circuit Breaker (120A)	Terminal Supply Company	CB3-SM-120		Y (1X)	<a href="http://terminalsupplyco.com/default.aspx">http://terminalsupplyco.com/default.aspx</a>	1	

		am-0282			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 29.00
DC/DC Pwr Converter (12V-5V)		CLL25-24S05		Y (1X)			
DB37 Extension Cable	Cables ToGo	02688		Y (1X)	<a href="http://www.cablestogo.com">www.cablestogo.com</a>		\$ 19.99
DB37 Ribbon Extension Cable (24")	AndyMark, Inc	am-0672			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 35.00
DB37 Ribbon Extension Cable (10")	AndyMark, Inc	am-0504			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 31.00
Encoder Connector (shell) for Jaguar	Digikey	609-2338-ND			<a href="http://www.digikey.com">www.digikey.com</a>		\$ 1.06
	Pololu	1904			<a href="http://www.pololu.com">www.pololu.com</a>		\$ 0.69
Pins for Encoder connector	Digikey	609-2305-ND			<a href="http://www.digikey.com">www.digikey.com</a>		\$ 0.43
	Pololu	1930			<a href="http://www.pololu.com">www.pololu.com</a>	11	\$ 5.95
E-Stop Button	Engraved Pens	am-0515			<a href="http://www.andymark.biz">www.andymark.biz</a>	1,5	\$ 13.00
Jumper	FCI	68786-102LF		Y (4X)	ubiquitous		
		am-0658			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 0.25
Microswitch (large-without roller)	Honeywell	V7-2B17D8-048		Y (2X)	ubiquitous		
	Allied Electronics	642-2173			<a href="http://www.alliedelec.com">www.alliedelec.com</a>		\$ 2.52
	McMaster-Carr	7090K37			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 7.91
Microswitch (mini-with roller)	Radio Shack	275-017			<a href="http://www.radioshack.com">www.radioshack.com</a>		\$ 3.19
Mini-Anderson Connectors		various			<a href="http://www.powerwerx.com">www.powerwerx.com</a>		
Mini-Anderson Connectors		various			<a href="http://www.robotmarketplace.com">www.robotmarketplace.com</a>		
Mini-Anderson Connectors (kit)	AndyMark, Inc	am-2198			<a href="http://www.andymark.biz">www.andymark.biz</a>		\$ 12.00
Panel signal device (signal lamp)	Rockwell Automation	855PB-B12ME522		Y (1X)	<a href="http://shop.rockwellautomation.com">http://shop.rockwellautomation.com</a>	3	
					discontinued- Dec 2011		
Potentiometer (50kohm)	Radio Shack	271-1716			<a href="http://www.radioshack.com">www.radioshack.com</a>		\$ 3.19
Power connector, cRio	LXI Components	CTF040V8		Y (2X)	www.andymark.com or www.ni.com		
		am-0295			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 3.50
Power connector, Wago	Diamond Technologies	734-102		Y (4X)	www.diamonddt.com or 866-837-1931		
		am-0296			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 2.25
Pushbutton switch	Radio Shack	275-1547			<a href="http://www.radioshack.com">www.radioshack.com</a>	4pcs	\$ 3.69
RC Extension cable (??)	Robot Marketplace	RC-218FJ36			<a href="http://www.robotmarketplace.com">www.robotmarketplace.com</a>		
Repl #6 contacts for batt conn	Anderson Power Products, Delphi	903G1			helmar fork lift parts		
Repl #10 contacts for batt conn	Anderson Power Products, Delphi	904G1			helmar fork lift parts		
RJ-12 Modular Plug					<a href="http://www.lowes.com">www.lowes.com</a>	25 pcs	\$ 5.95
	Radio Shack				<a href="http://www.radioshack.com">www.radioshack.com</a>		
	Philmore	TEC3			<a href="http://www.cablesandconnectors.com">www.cablesandconnectors.com</a>	9	\$ 3.99
Rotary Limit Switch	AutomationDirect	AAP2T51Z11			<a href="http://www.automationdirect.com">www.automationdirect.com</a>		\$ 14.25
Rotary Selector Switch (binary-16pos)	C&K	RTAC-22.5BSAD25S					
Serial Cable	Latham Time				not available - do not contact source		
Servo 6" extension cable (PWM cable)		SEA-01			LynxMotion		\$ 1.95
		276-1427 (pack of 4)			<a href="http://www.ifrobotics.com">www.ifrobotics.com</a>		\$ 19.95
Servo 12" extension cable (PWM cable x3cond)	LynxMotion	SEA-02			LynxMotion		\$ 1.95
	Andy Mark	am-0693		Y (1X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 2.50
	Hansen Hobbies	no part number			<a href="http://www.hansenhobbies.com">www.hansenhobbies.com</a>		\$ 2.45
	Pololu	2184			<a href="http://www.pololu.com">www.pololu.com</a>		\$ 2.49
Servo 12" extension cable (PWM cable x2cond)	Andy Mark	am-0693			<a href="http://www.andymark.com">www.andymark.com</a>		
Servo 24" extension cable (PWM cable x3cond)	LynxMotion	SEA-03			LynxMotion		\$ 1.95
	Andy Mark	am-0694			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 2.75

	Pololu	2185			<a href="http://www.pololu.com">www.pololu.com</a>		\$ 3.49
Servo 36" extension cable (PWM cable x3cond)		am-0695		Y (8X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 3.00
		276-1976 (pack of 4)			<a href="http://www.ifrobotics.com">www.ifrobotics.com</a>		\$ 19.95
	Pololu	788 (modified, plastic covers removed)		Y (2X)	<a href="http://www.pololu.com">www.pololu.com</a>		\$ 3.25
Servo Y-splitter cable (PWM cable x3cond)		276-1423 (pack of 2)			<a href="http://www.ifrobotics.com">www.ifrobotics.com</a>		\$ 14.95
					<a href="http://www.andymark.com">www.andymark.com</a>		
Servo 12" cable (connector 1 end) (PWM cable x3cond)	Hansen Hobbies	no part number			<a href="http://www.hansenhobbies.com">www.hansenhobbies.com</a>		\$ 1.70
Solderless Breadboard	Twin Industries	TW-E40-1020		Rookie	<a href="http://www.twinind.com">www.twinind.com</a>		\$ 6.99
Terminal blocks (12pos, 10A, 8mm centers)	AutomationDirect	BM-M092CS (pack of 50)		Y (2X)	<a href="http://www.automationdirect.com">www.automationdirect.com</a>		\$ 51.00
	Radio Shack	274-680 (similar)			<a href="http://www.radioshack.com">www.radioshack.com</a>		\$ 2.99
Terminal Lug (bag of 8) (copper,screw compression terminal)	BURNDY	KPA4CUNPL		Y (8x)	BURNDY is not yet ready to take orders, in process <a href="http://www.homedepot.com">www.homedepot.com</a>		
Terminal Lugs (#6AWG, 1/4" lug)	BURNDY	YAZV6CTC14FX		Y (8x)	BURNDY is not yet ready to take orders, in process		
		am-0805			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 1.25
Terminal lugs- assorted				Y			
Tie wraps, 4"	BURNDY	CT18075C		Y (100x)	BURNDY is not yet ready to take orders, in process	11	
Tie wraps, 4"	Cables to Go	43036			<a href="http://www.amazon.com">www.amazon.com</a>	11	\$ 2.11
Tie wraps, 8"	BURNDY	CT50175C		Y (100x)	BURNDY is not yet ready to take orders, in process	11	
Tie wraps, 8"	Gardner Bender	46-308			<a href="http://www.amazon.com">www.amazon.com</a>	11	\$ 5.08
Window Motor Connector Housing		12129487		Y (4X)			
Window Motor Connector Pin		12110845		Y (4X)			
Wire- #6AWG red	Wire and Supply	MTW-6G (red)		Y (2ft)	<a href="http://www.wireandsupply.com">www.wireandsupply.com</a>	13	\$ 0.68
Wire- #6AWG black	Wire and Supply	MTW-6G (black)		Y (2ft)	<a href="http://www.wireandsupply.com">www.wireandsupply.com</a>	13	\$ 0.68
Wire- #10AWG red	Wire and Supply	MTW-10G (red)			<a href="http://www.wireandsupply.com">www.wireandsupply.com</a>	13	\$ 0.30
Wire- #10AWG white				Y (10ft)			
Wire- #10AWG black	Wire and Supply	MTW-10G (black)		Y (10ft)	<a href="http://www.wireandsupply.com">www.wireandsupply.com</a>	13	\$ 0.30
Wire- #12AWG red	Wire and Supply	MTW-12G (red)			<a href="http://www.wireandsupply.com">www.wireandsupply.com</a>	13	\$ 0.19
Wire- #12AWG black	Wire and Supply	MTW-12G (black)			<a href="http://www.wireandsupply.com">www.wireandsupply.com</a>	13	\$ 0.19
Wire-#12AWG red/blk zip cord		OC-12gZIP			<a href="http://www.robotmarketplace.com">www.robotmarketplace.com</a>	13	\$ 0.99
Wire- #14AWG red	Wire and Supply	MTW-14G (red)		Y (10ft)	<a href="http://www.wireandsupply.com">www.wireandsupply.com</a>	13	\$ 0.16
Wire- #14AWG black	Wire and Supply	MTW-14G (black)		Y (10ft)	<a href="http://www.wireandsupply.com">www.wireandsupply.com</a>	13	\$ 0.16
Wire-#14AWG red/blk zip cord		OC-14gZIP			<a href="http://www.robotmarketplace.com">www.robotmarketplace.com</a>	13	\$ 0.65
Wire- #18AWG red	Wire and Supply	MTW-18G (red)		Y (10ft)	<a href="http://www.wireandsupply.com">www.wireandsupply.com</a>	13	\$ 0.08
Wire- #18AWG black	Wire and Supply	MTW-18G (black)		Y (10ft)	<a href="http://www.wireandsupply.com">www.wireandsupply.com</a>	13	\$ 0.08

---ELECTRICAL (CONTROL)---

Part Description	Supplier	Part Number	2013 KOP	2012 KOP	Where to get more...	Notes	Price
Analog Breakout	Diversified Systems	A003266 am-0867		Y (1X)	<a href="http://www.andymark.com">www.andymark.com</a>	1	\$ 24.00
Breakout Mounting Screw (4-40x3/4")		1ME99		Y (4X)			
	McMaster-Carr	90272A113			<a href="http://www.mcmaster.com">www.mcmaster.com</a>	11	\$ 2.16
Analog Input Module	National Instruments	9201			<a href="http://www.ni.com/FIRST">www.ni.com/FIRST</a>	1 & 3	
Camera, Axis 206	Anixter	288635			many online retailers have carried this item, however it has been discontinued. No outlet has been arranged.		

Camera, Axis M1011	Axis Communications	M1011 (0302-004)		Rookie	<a href="http://www.axis.com">www.axis.com</a>		
	Andy Mark	am-0667			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 189.00
Camera-Axis Case	NH Precision	Axis Case		Rookie	www.andymark.biz, drawings available at www.usfirst.org		
	Andy Mark	am-0700			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 8.00
Camera Tilt Base	NH Precision	Axis Case		Rookie	www.andymark.biz, drawings available at www.usfirst.org		
	Andy Mark	am-0527			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 9.50
Camera Pan Plate	NH Precision	MI-00013		Rookie	www.andymark.biz, drawings available at www.usfirst.org		
	Andy Mark	am-0525			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 11.00
Camera Servo Brace	NH Precision	Axis Case		Rookie	www.andymark.biz, drawings available at www.usfirst.org		
	Andy Mark	am-0526			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 7.50
Camera- complete mtg kit less camera	Andy Mark	am-568			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 64.00
Camera-110V power supply				Rookie			
Camera- power connector							
Classmate Netbook	Intel/CTL Corp	NBC2GO89A		Rookie	<a href="http://www.ctlcorp.com/shop">www.ctlcorp.com/shop</a>	1	
Classmate battery							
Cypress Breakout PCB		am-0543			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 22.00
Digital I/O Module	National Instruments	9403			<a href="http://www.ni.com/FIRST">www.ni.com/FIRST</a>	1 & 3	
Digital SideCar	Diversified Systems	A003333 am-0866		Y (1X)	<a href="http://www.andymark.biz">www.andymark.biz</a> <a href="http://www.andymark.com">www.andymark.com</a>	1	\$ 82.00
Digital Sourcing Module	National Instruments	9472			<a href="http://www.ni.com/FIRST">www.ni.com/FIRST</a>	1 & 3	
FirstTouch I/O Module	Cypress			Rookie	www.cypress.com > buy > development kits (use PSoC-U code for discount)		
		am-0564			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 30.00
FRC Controller and I/O kit (8slot)	National Instruments	NI-cRIO-FRC			<a href="http://www.ni.com/FIRST">www.ni.com/FIRST</a>	1 & 3	\$ 750.00
FRC Controller and I/O kit (4slot)		NI-cRIO-FRC II		Rookie			\$ 525.00
Joystick, Attack 3	TigerDirect	963291-0403		Rookie	<a href="http://www.tigerdirect.com">www.tigerdirect.com</a>		\$ 21.76
	Andy Mark	am-0598			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 24.00
NI Rookie packet	National Instruments			Rookie	<a href="http://www.ni.com/FIRST">www.ni.com/FIRST</a>		
Power Distribution Board	Diversified Systems	A003206 am-0865		Y (1X)	<a href="http://www.andymark.biz">www.andymark.biz</a>	1	\$ 189.00
Radio, Driver Station	Insight/Calence	WRT160N			ubiquitous	1	
Radio, Robot	TigerDirect/Insight	WGA600N			<a href="http://www.tigerdirect.com">www.tigerdirect.com</a>	6	
	Linksys	WGA600N					
Radio, Robot	D-Link	DAP-1522		Rookie	many online retailers have carry this item. No specific outlet has been arranged.		
	Amazon				<a href="http://www.amazon.com">www.amazon.com</a>		\$ 65.88
	Andy Mark	am-0839			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 89.00
	New Egg				<a href="http://www.newegg.com">www.newegg.com</a>		\$ 76.99
Relay Module (Spike)	Innovation First	SPIKE-RELAY-H 217-0220		Y (1X)	<a href="http://www.vexrobotics.com">www.vexrobotics.com</a> <a href="http://www.ifirobotics.com">www.ifirobotics.com</a>	1	\$ 34.95 \$ 34.95
Solenoid Breakout	Diversified Systems	A003265 am-0868		Rookie	<a href="http://www.andymark.biz">www.andymark.biz</a>	1	\$ 24.00
Speed Controller (Jaguar)	Texas Instruments (fma Luminary Micro)	MDL-BDC 726-1189ND am-0878		Y (2X)	<a href="http://www.luminarymicro.com/jaguar">www.luminarymicro.com/jaguar</a> Digikey <a href="http://www.andymark.com">www.andymark.com</a>	3	\$ 99.00
Speed Controller kit (motor/jag/wire)	Andy Mark	am-0990			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 129.00
Speed Controller (Talon)	Talon Speed Controller	am-2195			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 59.00
Speed Controller (Victor 884)	Innovation First	FR-VIC884		Rookie	<a href="http://www.vexrobotics.com">www.vexrobotics.com</a>		

		VICTOR			<a href="http://www.ifirobotics.com">www.ifirobotics.com</a>	\$ 89.99
USB 4-port hub	Targus	ACH74US (?)		Rookie	<a href="http://www.targus.com">www.targus.com</a>	\$ 26.99
VEX Motor Controller 29	Vex Robotics	276-2193		Y (1X)	<a href="http://www.vexrobotics.com">www.vexrobotics.com</a>	\$ 9.99

---MOTORS FANS SERVOS---

Part Description	Supplier	Part Number	2013 KOP	2012 KOP	Where to get more...	Notes
2½" CIM Motor	Vertical Engineering Sales, LLC	FR801-001		Y (4X)	<a href="http://www.andymark.com">www.andymark.com</a> , <a href="http://www.banebots.com">www.banebots.com</a> , <a href="http://www.robotshop.ca">www.robotshop.ca</a> , or <a href="http://www.trossenrobotics.com">www.trossenrobotics.com</a>	
		am-0255			<a href="http://www.andymark.com">www.andymark.com</a>	\$ 28.00
		217-2000			<a href="http://www.ifirobotics.com">www.ifirobotics.com</a>	\$ 25.00
		M4-R0062-12			<a href="http://www.banebots.com">www.banebots.com</a>	\$ 28.00
9015 Motor (RS-500 series)	Andy Mark	am-0912		Y (1X)	<a href="http://www.andymark.com">www.andymark.com</a>	\$ 13.00
Compact Fan (Large)	ebm papst	4212/12H		Y (2X)	Contact Dottie Reeve @ 860.284.4801 or <a href="mailto:dottie.reeve@us.ebmpapst.com">dottie.reeve@us.ebmpapst.com</a>	
Compact fan (mini)	ebm papst	412		Y (6X)	Contact Dottie Reeve @ 860.284.4801 or <a href="mailto:dottie.reeve@us.ebmpapst.com">dottie.reeve@us.ebmpapst.com</a>	
Mabuchi motor	Mabuchi	RS555SH-2670			not available - do not contact source	
Mabuchi motor	Mabuchi	RS555VC-3754			not available - do not contact source	
Window Motor - Left	Denso International America, Inc.	262100-3040		Y (1X)	not available - do not contact source	
Window Motor - Right	Denso International America, Inc.	262100-3030		Y (1X)	not available - do not contact source	
Window Motor- Right	Keyang	16227960	Y			
Window Motor- Right	Keyang	fc13-071			<a href="http://www.andymark.com">www.andymark.com</a>	15 First CH
FisherPrice Motor (2011-12)	FisherPrice/PowerWheels	am-0821		Y (2X)	<a href="http://www.andymark.biz">www.andymark.biz</a>	\$ 13.00
FisherPrice Motor (2009-10)		am-0316			<a href="http://www.andymark.biz">www.andymark.biz</a>	\$ 13.00
Mounting screw (M3x0.5 x 30mm)		0801-0198D		Y (4X)		
Mounting screw (M3x0.5 x 30mm)	McMaster-Carr	92005A132			<a href="http://www.mcmaster.com">www.mcmaster.com</a>	11 \$ 3.72
PG-27 Planetary Gearbox with RS775 Motor	Andy Mark	am-0915			<a href="http://www.andymark.com">www.andymark.com</a>	\$ 69.00
PG-71 Planetary Gearbox with RS775 Motor (2012)	Andy Mark	am-0914		Y (1X)	<a href="http://www.andymark.com">www.andymark.com</a>	\$ 75.00
PG-71 Planetary Gearbox with 9015 Motor (2011)	Andy Mark	am-2084			<a href="http://www.andymark.com">www.andymark.com</a>	\$ 89.00
PG-188 Planetary Gearbox with RS775 Motor	Andy Mark	am-2193			<a href="http://www.andymark.com">www.andymark.com</a>	\$ 79.00
RS-375 Motor	Bane Bots	M5-RS550-12		Y	<a href="http://www.banebots.com">www.banebots.com</a>	\$ 5.25
RS-500 Motor	Bane Bots	M5-RS550-12		Y	<a href="http://www.banebots.com">www.banebots.com</a>	\$ 7.25
RS-775 Motor (12V nominal)	Bane Bots	M7-RS775-12		Y	<a href="http://www.banebots.com">www.banebots.com</a>	\$ 12.75
RS-775 Motor (18V nominal)	Bane Bots	M7-RS775-18			<a href="http://www.banebots.com">www.banebots.com</a>	\$ 17.50
Servo	Hitec RCD	HS-322HD		Rookie	<a href="http://www.hitecrhd.com">www.hitecrhd.com</a>	
		LXDEL7			<a href="http://www.towerhobbies.com">www.towerhobbies.com</a>	\$ 9.99
Snow Blower Motor/Gearbox	Andy Mark	am-2235	Y		<a href="http://www.andymark.com">www.andymark.com</a>	TBD
Throttle Control Motor	Denso International America, Inc.	AE235100-0160		Y (2X)		
Throttle Control Motor	Andy Mark	FC13-020	Y		<a href="http://www.andymark.com">www.andymark.com</a>	15 First Ch
Two Wire Motor 393	VEX	276-2177		Y (1X)	<a href="http://www.vexrobotics.com">www.vexrobotics.com</a>	\$ 19.99

---MECHANICAL---

Part Description	Supplier	Part Number	2013 KOP	2012 KOP	Where to get more...	Notes	
Bearing-Pillow Block 1/2" shaft	Triangle Manufacturing	BD1508P		Y (2X)	<a href="http://www.triangleOshkosh.com/robotics">www.triangleOshkosh.com/robotics</a>		
Bearing-Flange mount for 3/8" shaft	Triangle Manufacturing	FMN6		Y (2X)	<a href="http://www.triangleOshkosh.com/robotics">www.triangleOshkosh.com/robotics</a>		
Bearing-Flange mount for 5/8" shaft	Triangle Manufacturing	FMN10		Y (2X)	<a href="http://www.triangleOshkosh.com/robotics">www.triangleOshkosh.com/robotics</a>		
Bearing Block (1.5"squ x 3/8" bore)	Bane Bots	PB-S3751-BB			<a href="http://www.banebots.com">www.banebots.com</a>		\$ 10.00
Bearing Block (2.5"squ x 1/2" bore)	Bane Bots	PB-S5002-BB			<a href="http://www.banebots.com">www.banebots.com</a>		\$ 12.50
Bearing, 3/8ID, 7/8OD  (industry type R6ZZ)	AndyMark, Inc	am-0516		Y	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 4.50
	McMaster-Carr	60355K703			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 5.88
	ENCO	327-7950			<a href="http://www.use-enco.com">www.use-enco.com</a>		\$ 20.50
	Bane Bots	MB-S375B-1			<a href="http://www.banebots.com">www.banebots.com</a>		\$ 1.25
Bearing, 1/2ID, 1-1/8OD, flanged (industry type FR8ZZ)	AndyMark, Inc	am-0030		Y (2X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 7.00
	Amazon	FR8ZZ			<a href="http://www.amazon.com">www.amazon.com</a>		\$ 12.83
Bearing 1614ZZ (3/8"ID 1-1/8"OD)	AndyMark, Inc	am-0209		Y (12x)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 5.00
	McMaster-Carr	6384K58			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 7.25
Bearing (1/2"ID 1-1/8"OD)	AndyMark, Inc				<a href="http://www.andymark.com">www.andymark.com</a>		\$ 5.00
	McMaster-Carr				<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 7.25
	Bane Bots	MB-S500B-1			<a href="http://www.banebots.com">www.banebots.com</a>		\$ 1.75
Bearing (1/2" ID flanged nylon)	AndyMark, Inc	am-0947		Y (2X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 0.50
Belting - custom order	Gates Corporation	<a href="http://www.gates.com">www.gates.com</a>			<a href="http://www.gates.com/FIRST">www.gates.com/FIRST</a>	2	
Belting + drive pulleys - FIRST kit	Gates Corporation			Y (1X)	<a href="http://www.gates.com/FIRST">www.gates.com/FIRST</a>		
Brass Bushing/Spacer (0.250ID, .335OD)	AndyMark, Inc	am-0300			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 0.50
	Hardware store item						
Bronze Bearing- 56pc Assortment	Grainger	1X968			<a href="http://www.grainger.com">www.grainger.com</a>		\$ 69.10
Chain, #25, 10ft length	MSC Direct	58636853			<a href="http://www.mscdirect.com">www.mscdirect.com</a>		\$ 40.75
	McMaster-Carr	6261K171			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 37.30
Chain, #35, 10ft length 10ft length 10ft length 20ft length	MSC Direct	58636671		Y (10ft)	<a href="http://www.mscdirect.com">www.mscdirect.com</a>		\$ 29.58
	Jack's Small Engines	250001			<a href="http://www.jackssmallengines.com/gochain.cfm">www.jackssmallengines.com/gochain.cfm</a>		\$ 35.15
	AndyMark, Inc	am-0367			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 24.00
	McMaster-Carr	6261K172			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 62.80
Coupler, Denso motor	Pelham Plastics	Denso-6		Y (4X)	an outlet has not been arranged - do not contact source		
Double Doozy Motor Adapter	AndyMark, Inc	am-0629			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 120.00
DryLin N Linear Guide System	igus	NK02-40-2-610			<a href="http://www.igus.com">www.igus.com</a>	3	
DryLin S Aluminum Shaft (5/8")	igus	AWI-10			<a href="http://www.igus.com">www.igus.com</a>	3	
Energy Chain Cable Carrier	igus	05-4-038-0		Y (1X)	<a href="http://www.igus.com">www.igus.com</a>	3	
Energy Chain Cable Carrier (1.5W x1H)	igus	I-475			<a href="http://www.reidsupply.com">www.reidsupply.com</a>	13	\$ 14.40
Energy Chain Mounting Bracket Set	igus	050-20-12		Y (1X)	<a href="http://www.igus.com">www.igus.com</a>	3	
FisherPrice Gearbox	FisherPrice/PowerWheels	00968-2821		Y (2X)	not available - do not contact source		
Gears (misc)	Boston Gear				<a href="http://www.bostongear.com">www.bostongear.com</a>		
	McMaster-Carr				<a href="http://www.mcmaster.com">www.mcmaster.com</a>		
	PIC Design				<a href="http://www.pic-design.com">www.pic-design.com</a>		
	AndyMark, Inc				<a href="http://www.andymark.com">www.andymark.com</a>		
Gear 19T, 32DP	AndyMark, Inc	am-0604			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 10.00
Gear 20T, 32DP	Boston Gear	GE-3220			<a href="http://www.reidsupply.com">www.reidsupply.com</a>		\$ 13.29

Gear 60T, 32DP	AndyMark, Inc	am-0927			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 15.00
GEM Planetary Gearbox (3.67:1)	AndyMark, Inc	am-0449			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 77.00
GEM Planetary Gearbox (13.5:1)	AndyMark, Inc	am-0270			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 120.00
GEM Planetary Gearbox (49.4:1)	AndyMark, Inc	am-0401			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 163.00
igus bag (assortment)	igus			Y	<a href="http://www.igus.com">www.igus.com</a>		
iglide bearing (5/8" sleeve)	igus	JSI-1012-08			<a href="http://www.igus.com">www.igus.com</a>	3	\$ 2.60
iglide bearing (5/8" flanged)	igus	JFI-1012-08			<a href="http://www.igus.com">www.igus.com</a>	3	\$ 3.09
iglide bearing (5/8" thrust)	igus	MTI-10			<a href="http://www.igus.com">www.igus.com</a>	3	\$ 2.70
iglide bearing (3/8" bushing)	igus	MCI-06-02			<a href="http://www.igus.com">www.igus.com</a>	3	\$ 1.62
igubal Flange Bearing (1/4") (adjustable flanged bearing-2 hole)	igus	EFOI-04R			<a href="http://www.igus.com">www.igus.com</a>		
		4LFN8			<a href="http://www.grainger.com">www.grainger.com</a>		\$ 3.87
igubal Flange Bearing (3/8") (adjustable flanged bearing-2 hole)	igus	EFOI-06R			<a href="http://www.igus.com">www.igus.com</a>		
		4LFP1			<a href="http://www.grainger.com">www.grainger.com</a>		\$ 4.69
igubal Flange Bearing (1/2") (adjustable flanged bearing-2 hole)	igus	EFOI-08R			<a href="http://www.igus.com">www.igus.com</a>		
		4LFP2			<a href="http://www.grainger.com">www.grainger.com</a>		\$ 5.76
igubal Flange Bearing (5/8") (adjustable flanged bearing-2 hole)	igus	EFOI-10			<a href="http://www.igus.com">www.igus.com</a>	3	\$ 10.28
		4LFP3			<a href="http://www.grainger.com">www.grainger.com</a>		\$ 7.00
igubal Rod End Bearing (3/8-24)	igus	EBRI-06R			<a href="http://www.igus.com">www.igus.com</a>		
		4LFL3			<a href="http://www.grainger.com">www.grainger.com</a>		\$ 6.00
igubal Rod End Bearing (5/8-18)	igus	EBRI-10R			<a href="http://www.igus.com">www.igus.com</a>	3	quote
		4LFL6			<a href="http://www.grainger.com">www.grainger.com</a>		\$ 13.20
Key 2mm x 2mm x 10mm	AndyMark, Inc	am-1121		Y (4X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 0.50
Key 2mm x 2mm x 10mm	McMaster-Carr	96717A065			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 3.73
Key 1/8" x 1/8" x 0.70"	AndyMark, Inc	am-1043		Y (2X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 0.70
Key 1/8" x 1/8" x 0.75" (10pack)	Grainger	5WE31			<a href="http://www.grainger.com">www.grainger.com</a>	9	\$ 4.51
Key 1/8" x 1/8" x 12" (cut to length)	McMaster-Carr	98535A130			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 2.07
Key 4mm x 4mm x 12mm	AndyMark, Inc	am-1249			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 0.75
Key 4mm x 4mm x 12in (cut to length)	McMaster-Carr	92288A110			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 3.81
Key, 2x2mm and 1/8"x1/8" pack	AndyMark, Inc	am-2219			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 5.50
Key, assorted imperial sizes	Harbor Freight	67540			<a href="http://www.harborfreight.com">www.harborfreight.com</a>		\$ 7.99
Latex Tubing (1/8" ID, 0.094wall)	Kent Elastomer			Y (5ft)	ubiquitous		
Lazy Susan (3in square)	Triangle Manufacturing	3C			<a href="http://www.triangleOshkosh.com/robotics">www.triangleOshkosh.com/robotics</a>		
Lazy Susan (4in square)	Triangle Manufacturing	4C			<a href="http://www.triangleOshkosh.com/robotics">www.triangleOshkosh.com/robotics</a>		
Lazy Susan (6in square)	Triangle Manufacturing	6C			<a href="http://www.triangleOshkosh.com/robotics">www.triangleOshkosh.com/robotics</a>		
Lazy Susan (6in round)	Triangle Manufacturing	6C2501			<a href="http://www.triangleOshkosh.com/robotics">www.triangleOshkosh.com/robotics</a>		
Lazy Susan (9in round)	Triangle Manufacturing	9C			<a href="http://www.triangleOshkosh.com/robotics">www.triangleOshkosh.com/robotics</a>		
Lazy Susan (12in round)	Triangle Manufacturing	12C			<a href="http://www.triangleOshkosh.com/robotics">www.triangleOshkosh.com/robotics</a>		
Lazy Susan (12in round-ring style)	McMaster-Carr	18635A52			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 31.59
Lazy Susan (17-1/2in round-ring style)	Rockler	12451			<a href="http://www.rockler.com">www.rockler.com</a>		\$ 76.39
Lazy Susan (23-5/8in round-ring style)	Rockler	56875			<a href="http://www.rockler.com">www.rockler.com</a>		\$ 177.49
Lead Screw w/ nut	Haydon Kerk Motion Products	BZ8M16 X 15"			<a href="http://www.haydonkerk.com">www.haydonkerk.com</a>		
Master Link for #35 Chain	MSC Direct	58639006		Y (4X)	<a href="http://www.mscdirect.com">www.mscdirect.com</a>		\$ 0.87
	Jack's Small Engines	250084			<a href="http://www.jacks-smallengines.com/gochain.cfm">www.jacks-smallengines.com/gochain.cfm</a>		\$ 1.64
	AndyMark, Inc	am-0368			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 0.75
	McMaster-Carr	6261K191			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 0.72
One-pitch link	PEER Chain	??			<a href="http://www.peerchain.com">www.peerchain.com</a>		
Output sprocket, double, 15 tooth	AndyMark, Inc	S35-15DHE					

		am-0421			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 10.00
Output sprocket, double, 12 tooth	AndyMark, Inc	am-0736		Y (2X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 9.00
P60 Planetary Gearbox (for 375 motor)	Bane Bots	various			<a href="http://www.banebots.com">www.banebots.com</a>		\$44-74
P60 Planetary Gearbox (for 500 motor)	Bane Bots	various			<a href="http://www.banebots.com">www.banebots.com</a>		\$44-74
P60 Planetary Gearbox (for 775 motor)	Bane Bots	various			<a href="http://www.banebots.com">www.banebots.com</a>		\$44-74
P80 Planetary Gearbox (for CIM motor)	Bane Bots	various			<a href="http://www.banebots.com">www.banebots.com</a>		\$79-157
PG-71 Planetary Gearbox Only (2011)	Andy Mark	am-0939			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 60.00
Reflective Material	Reflexite	GP020		Y (28ft)			
	AndyMark, Inc	am-0905			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 20.00
Shaft- 3/8" x 36" keyed	McMaster-Carr	1497K22			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 34.52
Shaft- 1/2" x 36" keyed	McMaster-Carr	1497K32			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 37.19
Shaft- 5/8" x 36" keyed	McMaster-Carr	1497K42			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 41.45
Shaft Collar assortment	Ruland			Y	<a href="http://www.ruland.com">www.ruland.com</a>		
Shaft Collar- 3/8" bore steel	Ruland	CL-6-F			<a href="http://www.ruland.com">www.ruland.com</a>		
Shaft Collar- 1/2" bore steel	Ruland	CL-8-F			<a href="http://www.ruland.com">www.ruland.com</a>		
Spacer- plastic, 0.505ID x 3/16in long	AndyMark, Inc	am-1181		Y (2X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 0.20
Spacer- plastic, 0.42ID x 2.5in long	AndyMark, Inc	am-0244		Y (6X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 1.50
Spacer- plastic, 0.42ID x 1.86in long	AndyMark, Inc	am-0243		Y (6X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 1.50
Spacer- Alum, 3/4"OD, 1-1/4in long	McMaster-Carr	92511A106			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 4.34
Sprocket, double, 15 tooth	AndyMark, Inc	S35-15DHE					
		am-0421			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 10.00
Sprocket, #35, dbl, 12 tooth, alum	AndyMark, Inc	am-0736		Y (2X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 9.00
Sprocket, #35, 26 tooth, alum	AndyMark, Inc	am-0737		Y (4X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 9.00
Sprockets - custom order	Gates Corporation	www.gates.com			<a href="http://www.gates.com/FIRST">www.gates.com/FIRST</a>	2	
Sprocket, #35, 22-tooth, alum	AndyMark, Inc	am-0245			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 9.00
Sprocket, #35, 22-tooth, steel	BandB Manufacturing	35A22 (min bore)			<a href="http://www.bbman.com">www.bbman.com</a>		\$ 6.70
Sprocket, #35, 22-tooth, steel	Martin Sprocket	35BS22			<a href="http://www.martinsprocket.com">www.martinsprocket.com</a>		
Sprocket, assorted, alum	Jack's Small Engines	various			<a href="http://www.jacks-smallengines.com/gokart_alumsprkt_35f.cfm">www.jacks-smallengines.com/gokart_alumsprkt_35f.cfm</a>		
Transmission (AM Toughbox)	AndyMark, Inc	various			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 66.00
Transmission (CIMple Box)	AndyMark, Inc	am-0734		Y (2X)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 50.00

---SOFTWARE---

Part Description	Supplier	Part Number	2013 KOP	2012 KOP	Where to get more...	Notes
Autodesk Software Tools	Autodesk				<a href="http://www.autodesk.com/first">www.autodesk.com/first</a>	2
Designer software	Altium	n/a			<a href="http://www.altium.com">www.altium.com</a>	2
FRC Software Bundle	National Instruments				<a href="mailto:frcparts@usfirst.org">frcparts@usfirst.org</a>	
Java Postcard	Sun Microsystems	n/a			<a href="http://first.wpi.edu/FRC/frcjava.html">http://first.wpi.edu/FRC/frcjava.html</a>	
Mathcad	PTC				<a href="http://www.ptc.com/go/first">www.ptc.com/go/first</a> or <a href="mailto:firstsupport@ptc.com">firstsupport@ptc.com</a>	2
Pro/ENGINEER	PTC	for creating CAD models		Y	<a href="http://www.ptc.com/go/first">www.ptc.com/go/first</a> or <a href="mailto:firstsupport@ptc.com">firstsupport@ptc.com</a>	2
ProductView	PTC	for visualizing your robot design		Y	<a href="http://www.ptc.com/go/first">www.ptc.com/go/first</a> or <a href="mailto:firstsupport@ptc.com">firstsupport@ptc.com</a>	2
Restoration Key (USB)	TigerDirect.com				<a href="http://www.tigerdirect.com">www.tigerdirect.com</a> to purchase a drive, <a href="mailto:frcparts@usfirst.org">frcparts@usfirst.org</a> to have it reimaged	
Windchill	PTC	for team collaboration		Y	<a href="http://www.ptc.com/go/first">www.ptc.com/go/first</a> or <a href="mailto:firstsupport@ptc.com">firstsupport@ptc.com</a>	2



---SENSORS---

Part Description	Supplier	Part Number	2013 KOP	2012 KOP	Where to get more...	Notes
Encoder, 360PPR, kit of 2 sets	US Digital	am-0791			<a href="http://www.andymark.com">www.andymark.com</a>	\$ 62.00
Encoder, 250PPR, kit of 1 set	US Digital	am-0180			<a href="http://www.andymark.com">www.andymark.com</a>	\$ 33.00
Encoder, 250PPR, 1 set, no cable	US Digital	am-0174			<a href="http://www.andymark.com">www.andymark.com</a>	\$ 23.00
Encoder -Base	US Digital	E4P-360-250-S4149			<a href="http://www.usdigital.com/first">www.usdigital.com/first</a>	
Encoder - Codewheel	US Digital	E4P-360-250-S4149			<a href="http://www.usdigital.com/first">www.usdigital.com/first</a>	
Encoder - Cover	US Digital	E4P-360-250-S4149			<a href="http://www.usdigital.com/first">www.usdigital.com/first</a>	
Encoder - Installation Tool	US Digital	E4P-360-250-S4149			<a href="http://www.usdigital.com/first">www.usdigital.com/first</a>	
Magnetic encoder, board	austria microsystems	AS5030			<a href="http://www.austriamicrosystems.com/eng/Products/Magnetic-Encoders">http://www.austriamicrosystems.com/eng/Products/Magnetic-Encoders</a>	
Magnetic encoder, magnet	austria microsystems				<a href="http://www.austriamicrosystems.com/eng/Products/Magnetic-Encoders">http://www.austriamicrosystems.com/eng/Products/Magnetic-Encoders</a>	
Miscrosoft Kinect	Microsoft	LPF-00068		Y (1X)		
	Amazon				<a href="http://www.amazon.com">www.amazon.com</a>	\$ 109.99
Sensor panel	Analog Devices/Diversified Systems	Gyro		Y (1X)	The gyro is unique and is not available for purchase. Comparable gyro is available at <a href="http://www.digikey.com">www.digikey.com</a>	
Sensor panel	Analog Devices/Diversified Systems	Accelerometer		Y (1X)	<a href="http://www.digikey.com">www.digikey.com</a>	
Sonar Range Finder	Max Botix Inc	LV-MaxSonar-EZ1		Y (1X)	<a href="http://www.maxbotix.com">www.maxbotix.com</a>	\$ 29.99

---PNEUMATIC---

Part Description	Supplier	Part Number	2013 KOP	2012 KOP	Where to get more...	Notes
Air Compressor	Gardner Denver Thomas, Inc.	405ADC38/12			<a href="http://www.drillspot.com">www.drillspot.com</a>	\$ 365.81
	Viair	am-2005		Rookie	<a href="http://www.AndyMark.com">www.AndyMark.com</a>	\$ 64.00
Accumulator (16cu in)	Clippard	AVT-32-16			<a href="http://www.clippard.com">www.clippard.com</a>	\$ 29.60
Accumulator (32cu in)	Clippard	AVT-32-32		Y (1X)	<a href="http://www.clippard.com">www.clippard.com</a>	
Accumulator (30cu in)	Andy Mark	am-2007			<a href="http://www.AndyMark.com">www.AndyMark.com</a>	\$ 14.00
Accumulator mtg bracket (lg)	Andy Mark	am-2008			<a href="http://www.AndyMark.com">www.AndyMark.com</a>	\$ 3.00
Bimba Cylinders - custom order	Bimba Manufacturing			Y	<a href="http://www.bimba.com">www.bimba.com</a>	2
Brass bag	Parker - Brass Division	PKT12326		Y	to find distributors, click <a href="http://www.parker.com/portal/site/PARKER/menuitem.5f7d57d9c19d0b688621d68a237ad1ca/?vgnextoid=2f2880961f66e010VgnVCM100000308a8c0RCRD&amp;vgnnextfmt=default">http://www.parker.com/portal/site/PARKER/menuitem.5f7d57d9c19d0b688621d68a237ad1ca/?vgnextoid=2f2880961f66e010VgnVCM100000308a8c0RCRD&amp;vgnnextfmt=default</a> . Follow <i>Product Selection: FITTINGS &gt; INDUSTRIAL FITTINGS &gt; BRASS AND PLASTIC INDUSTRIAL FITTINGS &gt; BRASS AND PLASTIC INDUSTRIAL FITTINGS - INCH &gt;</i>	
Brass Elbow 1/8F x 1/8M (90deg)	Parker - Brass Division	2-2-SE-B			<a href="http://www.amazon.com">www.amazon.com</a>	\$ 11.59
	Watts	A-712			<a href="http://www.homedepot.com">www.homedepot.com</a>	\$ 3.12
Brass Elbow 1/8F x 1/8M (45deg)	Parker - Brass Division	2-2-SVE-B			<a href="http://www.amazon.com">www.amazon.com</a>	\$ 6.61
Brass Reducer 1/4F x 1/8M		6MN88			<a href="http://www.grainger.com">www.grainger.com</a>	9 \$ 18.04
Brass Reducer 1/4M x 1/8M	Andy Mark	am-2025			<a href="http://www.AndyMark.com">www.AndyMark.com</a>	\$ 4.00
	Parker - Brass Division	4-2-RB-B			<a href="http://www.amazon.com">www.amazon.com</a>	\$ 4.10
	Watts	A-738			<a href="http://www.homedepot.com">www.homedepot.com</a>	\$ 1.75
Brass Reducer 1/4F x 1/8M	Parker - Brass Division	4-2-RA-B			<a href="http://www.amazon.com">www.amazon.com</a>	\$ 8.13
Bulkhead Connector	NITRA	FB14-18N				
	Andy Mark	am-2033			<a href="http://www.AndyMark.com">www.AndyMark.com</a>	\$ 5.00
	Automation Direct	FB14-18N			<a href="http://www.automationdirect.com">www.automationdirect.com</a>	5 pack \$ 14.25
Brass Coupling 1/8F x 1/8F	Watts	A-706			<a href="http://www.lowes.com">www.lowes.com</a>	\$ 3.29
Dump Valve	Andy Mark	am-2023			<a href="http://www.AndyMark.com">www.AndyMark.com</a>	\$ 7.50
	Andy Mark	am-2257			<a href="http://www.AndyMark.com">www.AndyMark.com</a>	\$ 3.50

	Parker Hannifin	MV709-2			<a href="http://www.parker.com">www.parker.com</a>		
		CMVL-25			midwest control?		
Main Regulator, adjustable	Norgren	R07-100-RNEA am-2020		Y (1X)	<a href="http://www.norgren.com/usa">www.norgren.com/usa</a> <a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 28.00
Main Regulator Mounting Kit	Norgren	18-025-003		Y (1X)	<a href="http://www.norgren.com/usa">www.norgren.com/usa</a>		
Metering Control Valve	Parker - Brass Division	FCC731-4-2		Y	<a href="http://www.parker.com">www.parker.com</a>		
Pneumatics base kit	various	am-2000			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 269.00
Pneumatic fitting pack	various			Y			
Pneumatic tubing	Freelin-Wade	1J-151-48P-FW			<a href="http://www.protubing.com">www.protubing.com</a>	3	
Pneumatic fitting- 1/8NPT x 1/4 tube	Parker - Brass Division	W68PLP-4-2		Y	<a href="http://www.parker.com">www.parker.com</a>		
Pneumatic fitting- 1/4 tube elbow	Parker - Brass Division	W369PLP-4-2		Y	<a href="http://www.parker.com">www.parker.com</a>		
Pneumatic fitting- 1/4 tube elbow	SMC	SMC-220			<a href="http://www.reidtool.com">www.reidtool.com</a>		\$ 4.24
Pneumatic fitting- 1/4 tube splice	SMC	SMC-115			<a href="http://www.reidtool.com">www.reidtool.com</a>		\$ 3.23
Pneumatic fitting- 1/4 tube tee	Parker - Brass Division	364PLP-4		Y	<a href="http://www.parker.com">www.parker.com</a>		
Pneumatic fitting- 1/4 tube tee	SMC	SMC-390			<a href="http://www.reidtool.com">www.reidtool.com</a>		\$ 4.64
Pneumatic fitting- for Festo valve (M7 x 1/4" tube)	FESTO	183740		Rookie			
	PLCCenter	183740			<a href="http://www.plccenter.com">www.plccenter.com</a>		\$ 2.92
Pressure Gauge	Norgren	18-013-212		Y (2X)	<a href="http://www.norgren.com/usa">www.norgren.com/usa</a>		
		am-2003			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 15.00
Pressure Switch	Nason	SM-2B-115R/443		Y (1X)	<a href="http://www.nasonptc.com">www.nasonptc.com</a>		
		am-2006			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 29.00
Relief Valve	Norgren	16-004-011		Y (1X)	<a href="http://www.norgren.com/usa">www.norgren.com/usa</a>		
		am-2002			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 32.00
Secondary Regulator (1/8" ports, 100PSI, yellow ring)	Monnier	101-3002-1		Y (1X)	<a href="http://www.monnier.com">www.monnier.com</a>		
Secondary Regulator Bracket	Monnier	13536		Y (1X)	<a href="http://www.monnier.com">www.monnier.com</a>		
Solenoid valve (24VDC-double coil)	FESTO	VUVG-L10-B52-T-M5		Rookie	<a href="http://www.festo.com/cms/en-us_us/9697.htm">www.festo.com/cms/en-us_us/9697.htm</a>		
Solenoid valve (24VDC-double coil)		VUVG-L10-B52-T-M7					
Solenoid valve (12VDC-double coil)	FESTO	am-0888			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 112.00
Solenoid valve (12VDC-single coil)	FESTO	13026684			none?	6	\$ 31.95
Solenoid Valve Harness (FESTO)	FESTO	566654		Rookie			
	PLCCenter	566654			<a href="http://www.plccenter.com">www.plccenter.com</a>		\$ 2.04
Solenoid Valve e-block (FESTO)	FESTO	566716		Rookie			
	PLCCenter	566716			<a href="http://www.plccenter.com">www.plccenter.com</a>		\$ 7.93
Teflon tape	HPE Automation			Y (1X)	<a href="http://www.hpeco.com">www.hpeco.com</a>		
Teflon tape (1/4"W x 43ft)	Amazon	FRA900063			<a href="http://www.amazon.com">www.amazon.com</a>		\$ 4.63
Teflon tape (1/4"W x 50ft)	McMaster-Carr	4591K11			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 2.31

---RAW MATERIALS---

Part Description	Supplier	Part Number	2013 KOP	2012 KOP	Where to get more...	Notes	
Aluminum angle (1"x1"x1/8" x 8ft) (sharp corner)	Home Depot	56760					\$ 13.28
	Metals Depot	A3118-6063			<a href="http://www.metalsdepot.com">www.metalsdepot.com</a>		\$ 10.16
	On Line Metals	none			<a href="http://www.onlinemteals.com">www.onlinemteals.com</a>		\$ 8.19
Aluminum C-channel (chassis part)	AndyMark	am-0202		Y (6x)	<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 18.00
Aluminum extrusion (1"x1")	80-20	10-10			<a href="http://www.80-20.net">www.80-20.net</a>		
Aluminum extrusion (1"x1" x8ft)	McMaster-Carr	47065-T101			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 26.36
Aluminum extrusion (1"x1" x8ft)	Reid Tool	AES-1010			<a href="http://www.reidtool.com">www.reidtool.com</a>		\$ 22.08
Aluminum extrusion (1"x1")	T-Slots	TS10-10GR			<a href="http://www.tslots.com">www.tslots.com</a>	3	
Aluminum extrusion (1"x2")	80-20	10-20			<a href="http://www.80-20.net">www.80-20.net</a>		
Aluminum extrusion (1"x2" x8ft)	McMaster-Carr	47065-T107			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 44.64
Aluminum extrusion (1"x2" x12ft)	Reid Tool	AES-1020-145			<a href="http://www.reidtool.com">www.reidtool.com</a>		\$ 56.55
Aluminum extrusion (1"x2")	T-Slots	TS10-20GR			<a href="http://www.tslots.com">www.tslots.com</a>	3	
Aluminum Hex tube (1/2")	AndyMark	am-0756		Y (1x)	<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 5.00
Alum shaft 3/8" dia x 24", 3/32" key	McMaster-Carr	1570K33			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 32.87
Alum shaft 1/2" dia x 36", 1/8" key	McMaster-Carr	1570K43			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 35.85
Alum shaft 5/8" dia x 36", 3/16" key	McMaster-Carr	1570K53			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 38.51
Aluminum sq tube 1"x1"x1/16" x6ft	Home Depot	42330					\$ 21.64
	Metals Depot	T31116			<a href="http://www.metalsdepot.com">www.metalsdepot.com</a>		\$ 23.36
	On Line Metals	none			<a href="http://www.onlinemteals.com">www.onlinemteals.com</a>		\$ 8.60
Bumper Fabric (Blue)	Seattle Fabrics	FC1-4345 Mariner Blue			<a href="http://www.seattlefabrics.com">www.seattlefabrics.com</a>	7,8	\$ 13.50
	AH&H Fabrics				<a href="http://www.ahh.biz">www.ahh.biz</a>	7,8	\$ 15.30
Bumper Fabric (Red)	Seattle Fabrics	FC1-1500 Red			<a href="http://www.seattlefabrics.com">www.seattlefabrics.com</a>	7,8	\$ 13.50
	AH&H Fabrics				<a href="http://www.ahh.biz">www.ahh.biz</a>	7,8	\$ 15.30
Polycarbonate (1/16" x 24x24)	AndyMark	am-0982			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 12.00
	McMaster-Carr	8574K51			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 13.59
	Home Depot						
Polycarbonate (1/8" x 24x24)	AndyMark	am-0980			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 20.00
	McMaster-Carr	8574K53			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 22.39
	Home Depot						
Pool Noodles (bumper core)	Ocean State Job Lot						\$ 1.99
	Aqua World				<a href="http://www.amazon.com">www.amazon.com</a>		\$ 2.45
Steel shaft 10mm dia x 30", 4mm key	AndyMark	am-2393			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 33.00
Steel shaft 3/8" dia x 36", 3/32" key	McMaster-Carr	1497K22			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 34.52
Steel shaft 1/2" dia x 36", 1/8" key	McMaster-Carr	1497K32			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 37.19
Steel shaft 1/2" dia x 24", 1/8" key	ENCO	327-8801			<a href="http://www.use-enco.com">www.use-enco.com</a>		\$ 12.36
Steel shaft 5/8" dia x 36", 3/16" key	McMaster-Carr	1497K42			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 41.45
Steel shaft 5/8" dia x 36", 3/16" key	ENCO	319-4278			<a href="http://www.use-enco.com">www.use-enco.com</a>		\$ 18.00
Strut nut (1x 1/4-20)	80-20	3382			<a href="http://www.80-20.net">www.80-20.net</a>		
	McMaster-Carr	47065-T142			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 2.30
Strut nut (1x 1/4-20) and screw	Reid Tool	AES-3386			<a href="http://www.reidtool.com">www.reidtool.com</a>		\$ 0.46
Strut nut (2x 1/4-20)	80-20	3280			<a href="http://www.80-20.net">www.80-20.net</a>		
	McMaster-Carr	47065-T147			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 4.29
	Reid Tool	AES-3280			<a href="http://www.reidtool.com">www.reidtool.com</a>		\$ 0.69

---TOOLS ETC---

Part Description	Supplier	Part Number	2013 KOP	2012 KOP	Where to get more...	Notes	
Arbor Press (manual 1ton)	ENCO	805-1010			<a href="http://www.use-enco.com">www.use-enco.com</a>		\$ 60.40
	Palmgren	890-8803			<a href="http://www.use-enco.com">www.use-enco.com</a>		\$ 85.03
	Grizzly Tools	G-4018			<a href="http://www.grizzly.com">www.grizzly.com</a>		\$ 59.95
	Dayton	4Z328			<a href="http://www.grainger.com">www.grainger.com</a>		\$ 104.95
Broach, 2mm (to mate gears to CIM)	McMaster-Carr	8805A11			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 44.62
	Grainger	12V230			<a href="http://www.grainger.com">www.grainger.com</a>		\$ 72.75
Broach, 4mm (to mate gears to PG-xx)	McMaster-Carr	8805A13			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 53.66
	Grainger	12V232			<a href="http://www.grainger.com">www.grainger.com</a>		\$ 93.95
Bushing, 8mm dia x 2mm slot	McMaster-Carr	8804A71			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 11.29
Bushing, 10mm dia x 4mm slot	McMaster-Carr	none?			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		
Caliper 6in digital	Fowler (54-101-150-2)	317-0430			<a href="http://www.use-enco.com">www.use-enco.com</a>		\$ 46.43
	Harbor Freight	47257			<a href="http://www.harborfreight.com">www.harborfreight.com</a>		\$ 29.99
CD - Basic Electronic Measurement	Fluke Industrial				use <a href="http://www.fluke.com">www.fluke.com</a> , "Where to Buy", enter zip code or online		
Chain Breaker (#25-60)	McMaster-Carr	6051K15			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 26.65
Chain Break/Splice Tool	Dave's Discount Motors	Dark Soul Chain Tool			<a href="http://www.davesmotors.com">www.davesmotors.com</a>	6	\$ 26.99
	221 Robotic Systems	Dark Soul Chain Tool			<a href="http://www.team221.com">www.team221.com</a>		\$ 30.00
Crimper- #6AWG lugs	Burndy	Y1MRTC					
		am-0806			<a href="http://www.AndyMark.com">www.AndyMark.com</a>		\$ 199.00
Crimper- #8-#2AWG Wire		360-646			<a href="http://www.parts-express.com">www.parts-express.com</a>		\$ 39.71
Crimper- #20-#6AWG Wire		360-644			<a href="http://www.parts-express.com">www.parts-express.com</a>		\$ 39.59
Crimper- #22-#10AWG Wire		360-642			<a href="http://www.parts-express.com">www.parts-express.com</a>		\$ 19.55
Crimper- RJ11/RJ12 Connectors	Radio Shack	279-405			<a href="http://www.radioshack.com">www.radioshack.com</a>	6	\$ 39.99
Crimper- RJ11/RJ45 Connectors	Ideal	30-696			<a href="http://www.homedepot.com">www.homedepot.com</a>		\$ 54.99
	Ideal	30-496			<a href="http://www.amazon.com">www.amazon.com</a>		\$ 39.64
Crimper- mini Anderson Conn		TRICRIMP			<a href="http://www.powerwerx.com">www.powerwerx.com</a>		\$ 39.99
Debur Tool (with 10 spare cutters)	Vargus/Shaviv	540-0469			<a href="http://www.use-enco.com">www.use-enco.com</a>		\$ 36.78
Digital Multimeter	Fluke Industrial	2100135D			use <a href="http://www.fluke.com">www.fluke.com</a> , "Where to Buy", enter zip code or online		
Gear Puller (2T, 2+3 jaws)	Enco	891-4057			<a href="http://www.use-enco.com">www.use-enco.com</a>		\$ 40.98
	McMaster-Carr	6340K41			<a href="http://www.mcmaster.com">www.mcmaster.com</a>		\$ 54.83
Gear Puller (5T, 2+3 jaws)	Sears	9-46906			<a href="http://www.sears.com">www.sears.com</a>		\$ 49.99
Gloves, pair	Grainger	2RA69		Y (1X)	ubiquitous		
Hand Tools- Misc	ACE Hardware Stores						
	Enco						
	Grainger						
	Home Depot						
	Lowe's						
	McMaster-Carr				<a href="http://www.mcmaster.com">www.mcmaster.com</a>		
	MSC						
True Value Hardware Stores							
Heat Gun							
PTC Sticker	PTC				<a href="http://www.ptc.com/go/first">www.ptc.com/go/first</a> or <a href="mailto:firstsupport@ptc.com">firstsupport@ptc.com</a>	2	
PVC Pipe Cutter (1-5/8" max)	Brass Craft	T-012X			<a href="http://www.homedepot.com">www.homedepot.com</a>		\$ 14.28
	Wolverine	PST002			<a href="http://www.amazon.com">www.amazon.com</a>		\$ 16.87
Soldering Iron (40W with stand)	Weller	WLC-100			<a href="http://www.amazon.com">www.amazon.com</a>		\$ 42.95

Soldering Gun (200/260W gun)	Weller	D550-PK			<a href="http://www.amazon.com">www.amazon.com</a>		\$ 46.32
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---WHEELS---

Part Description	Supplier	Part Number	2013 KOP	2012 KOP	Where to get more...	Notes	Price (10)
FIRST Wheel, acetal, 8"	AndyMark, Inc	am-0494			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 12.00
FIRST Wheel, rubber, 8"	AndyMark, Inc	am-0420			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 12.00
HiGrip Wheel, 6"	AndyMark, Inc	am-0940		Y (6x)	<a href="http://www.andymark.com">www.andymark.com</a>		\$ 10.00
Mechanum Wheel, 6"	AndyMark, Inc	am-0137			<a href="http://www.andymark.com">www.andymark.com</a>	14	\$ 253.00
Omni Wheel, 6" plastic	AndyMark, Inc	am-0013			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 28.00
Omni Wheel, 6" aluminum	AndyMark, Inc	am-0097			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 45.00
Pneumatic Wheel, 8"	AndyMark, Inc	am-0970			<a href="http://www.andymark.com">www.andymark.com</a>		\$ 37.00
Skyway wheel (various sizes)	Skyway				<a href="http://www.skywaywheels.com">www.skywaywheels.com</a>	16	

- NOTES: 1) Per the game rules, this is the only permitted part of its kind in the FIRST Robotics Competition in order to facilitate a fair and even-handed competition.  
2) These items were not physically in the kit, but were donated to each FRC team through FIRST. To take advantage of the donation, please follow the link.  
3) This item may be available at a discount for FRC participants. The discount may be limited in availability, please contact supplier for details.  
4) Please note that terminals, hardware, and wire are ubiquitous and are not included on this list.  
5) Not used in 2012 game  
6) Not presently available (Dec 2012) from this supplier  
7) Price per yard  
8) 1000 Denier Cordura fabric  
9) Bag of 10 pieces  
10) Prices for reference only, not guaranteed- accurate at the moment they were investigated. Check price and availability.  
11) Pack of 100 pieces  
12) Send suggestions for additions to the list to [parts-571@hotmail.com](mailto:parts-571@hotmail.com)  
13) Price per foot  
14) Price per set of 4  
15) Presently available as part of First Choice program only  
16) Call supplier for list for FIRST parts available