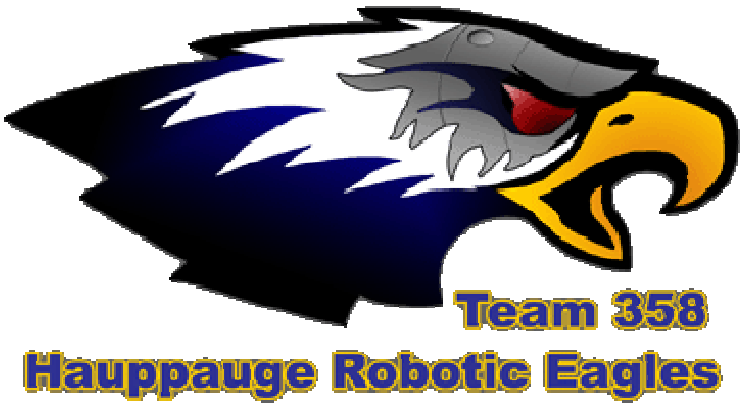
For Inspiration and Recognition of Science and Technology



Team358.org

Handbook Appendices

Updated Summer-2011

Forward

This is a collection of some common topics that were just making the regular handbooks a little longer than we wanted. They are here instead where people could check them out if they were interested, but where they will not get in the way of more critical messages.

Competition Events

What to Expect at Events

- Our Team uniform is a team t-shirt, that we provide, worn with khaki pants or shorts that you provide. The alternative is to wear the eagle mascot outfit! Further, safety conscious attire is a necessity. If you are working around the robot or in the competition pits then no loose jewelry, long loose hair, or open footwear, and of course safety goggles become an integral part of the uniform. Goggles are required anywhere in the Pits and on the field. Our Safety Captain has spares for parents wishing to visit the pit.
- We cheer for our team (*Go 358!*) during the qualifying rounds, but cheer for our whole *alliance (Go Red Alliance!)* during the Finals. Cheer for small teams who don't have much support, cheer for teams you admire and those who just do a good job. Cheering encourages all those students and gives them pride in the work they've done.
- We compete in random alliance pairings, so our *opponent* in one match may be our *partner* in the next. The objective is to play the game hard, but without malice or rancor. We make friends with all teams so they might pick us and we might pick the best of them to partner with for finals.
- Avoid damaging other robots during a game. If you do break another team's robot then visit their pit after the game to apologize and offer assistance in fixing it.
- Official events take 3 days:
    - Thursday – Setup and Practice. We spend the day ironing out mechanical issues and running practice matches. Only the Pit Crew and drive team are essential. The pits are open until 8pm and we stay until the last minute working on our robot and helping with others. Students require excused absences from classes. The robot must pass inspection by the close of the day in order to compete. Early crate opening for three team members (one adult, 2 students) and registration.
    - Friday – Qualifying matches begin after opening ceremonies and run all day. Technical awards are presented at closing. Sometimes there is a team social dinner after awards. Pits close earlier, before the awards ceremony. Students require excused absences from classes. A team scouting meeting is held late in the evening.
    - Saturday – Opening ceremonies are followed by Qualifying matches until noon. Our scouting team meets to finalize partner recommendations. The top 8 teams pick alliance partners to play with them in the Elimination finals during the afternoon, followed by closing ceremonies and award presentations. Pick up participation medals if the team did not win medals (chairman's, champion, finalist).
- We never play alone, but in alliances with other teams. During the qualifying matches alliances are random pairings with different teams each match and final rankings are largely due to how well the different robots and drive teams work together.
- Off-season events hosted by teams are general one day with qualifying matches in the morning, alliance picking at noon, and finals in the afternoon.
- No one is permitted on the field and surrounding area except for badged drive team. Special pit crew members are sometimes also allowed during finals and we'll have people just off the field as runners.
- No communication (cell phones, hand waving, Morse code) with the drive team while our match is in progress (Disqualification will result). They operate alone. What you see happening on the field will sometimes make no sense to the spectators, but there is always a reason – the robot may be malfunctioning, the referees may be giving them cautions or overriding instructions, or the alliance strategy may call for unusual actions.
- *FIRST* awards fall into three groups:
    - Organization: Chairman's Award, Engineering Inspiration
    - Competition: Champion, Finalist
    - Technical & Individual Awards: Woodie Flowers, Quality, Sportsmanship

Student Jobs for Competition

Here we discuss the particular tasks that have to get done by students for the *FIRST* Robotics Competition, both before and during events.

- Analyze and track game rules and interpretations/clarifications
  - *FIRST* rules and updates have to be known by heart.
  - *FIRST* Q&A system – game rules are clarified and explained here. Our questions may only be submitted by our lead advisor, but we can see questions from all teams along with the Game Committee's responses.
  - chiefdelphi.com – team community forums. Please join and participate.

- Online awards submission
  Submitted by officers or award group leaders through STIMS (Student Team Information Management System). Awards and criteria are described in the *FIRST* rules released with the game each year.
  - Chairman's Award - due end of February
  - Woodie Flowers Award - due end of February
  - Autodesk CAD - due end of February
  - Animation – Safety animation due in December, regular animation due end of February.
  - Website Award

- Events
  - Scouting – The Scout Master will organize every student attending competitions into scouting teams with specific assignments. When your assigned turn for duty comes, report to the Scout Master. Primary tasks are to watch and fill out scouting reports on all competing robots in all matches, enter the scouting reports into our computer-based scouting analysis system, visiting pits for robot photos and visual confirmation of objective robot design criteria (# and type of motors used, drive train type, manipulator solution, wheel/tread type, etc.). Experienced scouters/mentors will judge robustness and suitability of the overall robot designs, as well as, compatibility with our strategy and drive team.
  - Robot inspection (weight, size, rules, safety) on Thursday with re-inspection at noon on Saturday for Finals (Pit Crew and Drive Team).
  - Judge interviews in the pits – students knowledgeable about our Team, our outreach, our robot technology represent our team and talk to roaming judges making random visits to the pits. These are for technical awards presented Friday and Saturday. An important component of getting recognized for awards is effective and energetic communication. Show your excitement!
  - Pit Chief – manages all tools, parts, and materials. Rotates and charges the batteries and is responsible for choosing the batteries for each match. In the pit at all times during working hours to locate needed tools, suggest materials, and to make sure tools/parts/materials get properly stored after use so they can easily be found.
  - Pit Crew – Pit technical set-up and organization, redesigns/improvements, repairs, maintenance (check bolt tightness between matches), programming fine tuning and autonomous strategy, etc.
  - Safety Captain – insures a safe working environment in the pits and on the field. Reminds those who forget personal safety goggles, has spares for visitors. Handles special *FIRST* safety promotions, such as the safety tokens last year.
  - Pit display team – designs, prepares and sets up our team pit display of banners, art work, etc.
  - Chairman's interviews
    - 3 students – at least one underclass member dedicated to doing the award next year to provide continuity.

- Drive team - requires special badges to be on the field. The field is off-limits to all others. Responsible for strategy and tactics working with the field competition mentors. Autonomous strategy is the responsibility of the programmers and programming mentors, but will complement the chosen drive team strategy.
- Socialize with other teams – organize a game of Frisbee during down time.

❖ Off-season events
- Both more laid back and can be rougher play since no one is saving their robot and drivers are often new.
- Drivers are rotated through matches to get freshmen exposure and a chance as a member of the drive team.
- We help other teams whenever and wherever possible. If someone comes looking for parts or expertise please drop unimportant tasks and help them. They need to get their robot working so they can play. See the Pit Chief, Pit Crew member, an officer, or a mentor if you need assistance and feel free to enlist others to help.

Travel

- Peer-to-peer mentoring visits to other teams rookies and rebuilding older teams.

- Long Island Regional at the Hofstra University Arena
  We meet in the Teacher's parking lot at 7:00am to board the school bus. Completed Field Trip Permission Slips must be in-hand to board the bus. Without it you will be remaining at the school. Returns are at different times the three days of competition. Families can meet the buses at the arena, or come and go later in the day.

- High School Field Trip Permission Slips
  - Signed by all teachers whose class will be missed due to travel on school days. Make arrangements for missed classwork.
  - Signed by parent or guardian.

- *FIRST* consent and release
  - Students register in STIMS, then parents must register in TIMS and give their consent
  - *FIRST* doesn't want to be held at fault if you run over yourself with your own robot
  - Right to use photos or videos you may appear in for promotional purposes

- Transportation Release form
  - If you wish to pickup your child from an event this release from school transportation is required. Mostly so the count comes out right and we aren't searching for students who decided to go home without telling us or left unsupervised.

- Away Trips
  - If trip attendance must be limited, then priority is given to essential personnel or skills, e.g., drive team, pit crew, scouters, followed by commitment during the 6 week Build period.
  - Luggage – tag all pieces, early morning drop-off at school office, luggage will be inspected by school Security, then will not be accessible until we reach the hotel, so do NOT add your photo ID, books or CD's to read or listen to on the bus or plane, or anything else you will need before we reach our destination.
  - Photo ID – required for airline travel
  - Hotel
    - Rooms – students room are generally four to a room
    - Noise – Please be considerate of other hotel or restaurant guests. Remain as quiet as possible in the hallways and rooms. The hotel is not a playground (other than any play room or the pool) and there are other business guests around us.
    - Curfew – A time, generally 10:30 or 11:00, will be set for the students to be back in their own rooms and a room check is done by the advisors/chaperones. No student may leave their room after the room check. Not even for the ice machine. In case of emergency, or just a dire need for ice, immediately contact the advisors or chaperones.
    - Traveling as a Team means you must be up, showered and ready on time to leave the school, hotel, competition as a group. Please don't keep us all waiting. Take everything you need when you leave the hotel, you won't return except as a group in the evening.
    - Dating issues – Keep contact modest and romance low-key while traveling with the team.
  - Off-Island trips can be canceled under certain circumstances. For example, in 2003 the Federal terrorist alert went high and District policy caused all off-island field trips, including our Championship trip, to be cancel.

- General travel notes
  - The team travels together since it is a school sponsored field trip.
  - The Advisors are responsible at all times for students. Students may not leave the team at any time without approval from an Advisor, even with parents or guardians, especially not to return to the hotel. If a parent or guardian wishes to take a student home with them from an event a special student release form must be submitted to the advisors. The Advisors must know where students are at all times.
  - The advisors should be made aware of any special physical or medical issues, well in advance of any travel. Medications will be administered by the trip advisors or chaperones only with doctor/parent written instructions.
  - Advisor and chaperone contact phone numbers will be distributed. The advisors must also have all student cell phone numbers.
  - The Advisors are there to help you work out any problems that may arise.
  - Serious disregard of the rules or conduct that endangers others will result in dismissal from the team and an immediate trip home at your expense.

Team Rules

Robotics Club Rules & Expectations

In order to be in the robotics club you must read, agree and abide by the following rules, or rules created throughout the year by the advisors, as well as the standard District Code of Conduct. The newest copy of these rules as well as the standard District rules are available on our website at http://www.team358.org/rules. Rules not explicitly stated within this document may be put into effect by either advisors or officers if necessary.

General Rules

1. There must always be an advisor in the room you are in at all times.
2. You are not allowed to be in the halls.
    a. If you need to leave the room you *must* sign out and sign back in.
3. Computers will be used for robotics use only.
    a. You may not play games.
    b. Do not download anything or install programs on the computers.
4. There will be no horseplay or inappropriate behavior while at robotics.
    a. If you are not sure if you should be doing it – don't do it!
5. Do not order food.
    a. If food is to be ordered (if that is what we are having for dinner/lunch) you must have an advisors permission.
6. If you do not have work to do then ask an advisor or a senior member for a job.
    a. If you cannot find a job to do, watch others and learn from what they are doing.
    b. You may not just "hang out" at robotics. You must be doing work.
    c. If you are not content with that, go home.
7. Put away tools and clean your area after you are done working.
8. Do not touch parts on the "New Parts" shelf unless specifically instructed to.
9. Members are expected to respect one another.
    a. If you have a problem with another team member talk to an advisor or officer.
10. You must be dropped off and picked up from robotics from the back of the school.
    a. You may not be dropped off in the North parking lot and walk through the school.
11. Hours will be kept starting from Kickoff.
    a. Members must sign in and out each day.
        i. Members must sign out and back in if they are leaving and coming back.
        ii. Members receive zero hours if they do not sign out.
    b. Members can lose hours for misbehavior.
    c. Hours will be used if three is a limited number of spots available for a trip.
    d. Hours will be rounded to every five minutes.
    e. Total hours will be kept by an officer.
        i. Unproductive hours will not be counted.
        ii. Total hours will be released at the discretion of the advisors/officers.
12. Robotics club members must know the rules to the year's game.
    a. Club members can be tested to see how much of the game rules they know.
    b. Drivers and Human Players will be tested.
13. All applicable sections of the "Hauppauge School District Code of Conduct" must be followed. See:
    a. The School website: http://www.hauppauge.k12.ny.us/new%20web/web2/High%20School/hs.htm
    b. The Team 358 website: http://www.team358.org/rules

Safety Rules

1. Safety glasses or goggles must be worn at all times while working.
    a. Sun glasses do not count.
    b. Prescription glasses with added side shields may count.
2. Power Tools:
    a. May not be used unless you have permission.
    b. May not be used unless you have been instructed on how to use them.
    c. May not be used unless an advisor or mentor is in the room.
    d. Make sure the tool is running the correct way.
        i. The lathes, drill press, grinder and band saw do not all run on the same polarity outlet.
3. Do not run in the shop or throw things or horse around.
4. Do not tighten vices all the way.
    a. Tighten them almost all the way, then loosen so they hang down.
5. Drill press:
    a. Clamp the part down you are drilling.
    b. If necessary surround the part with wood, especially underneath, to avoid damage.
6. Lathe:
    a. Never leave the chuck key in the chuck, keep your hand on it at all times while it's inserted.
    b. Check that the chuck clears all parts of the lathe before turning it on-turn it by hand to check.
7. Welding:
    a. Do not look at the welder while someone is welding without a welding mask.
    b. Keep the curtain closed around the welding area so passersby will not accidentally see the bright arc.
    c. Use caution when handling pieces that were recently welded.
        i. Check for temperature.
        ii. Check to see that the welder is off before touching the piece or the welding table
8. Band Saw
    a. Allow the blade to cut the metal, do not force it through.
    b. Do not cut steel on the band saw.
    c. When cutting small pieces use a guide/jig.

9. Robot Operation
    a. Never reach into the robot when it is on unless you are VERY careful and know what parts are safe.
    b. Always "Kill" the robot when not in use.
    c. Never run the robot without know how to Disable it-there are multiple ways.

Rules for Competitions

1. All members must wear a Team 358 t-shirt and khaki pants/shorts.
2. Be respectful of other teams.
    a. Do not make fun of other teams and/or robots.
    b. Do not say negative things online or offline.
        i. Chief Delphi Forums
        ii. In our shop
        iii. Especially at Competition
    c. Remember you represent not only yourself, but our team, school, sponsors, advisors, parents, mentors.
3. Help out other teams whenever possible.
    a. If you cannot help them yourself, find someone on our team who can.
4. Members are expected to watch matches and be able to discuss them intelligently.
    a. All matches we are in are to be watched.
        i. Cheer for our team.
        ii. Cheer for other teams.
    b. Do not boo under any circumstances.
    c. All members will help scout.
        i. A rotating schedule will be made
5. You may not leave a competition without a release form signed by a parent/guardian.
    a. School website: http://www.hauppauge.k12.ny.us/new%20web/web2/High%20School/hs.htm
    b. Team 358 website: http://www.team358.org/rules
    c. Before you leave you must tell an advisor (not an adult) that you are leaving.
    d. You may not go back to a hotel before the group goes back even if it's right next door.
6. Safety glasses or goggles are to be worn at all times while in the pit.
    a. If the robot needs work done and you are not helping then clear the pit area.
7. Do not walk beyond the barrier near the playing field during competitions.
8. A curfew is in place by the advisors that you must be in, and stay in, your room. Not even crossing the hallway to knock on your friend's door is allowed after curfew.
9. Members may not leave the hotel without an advisor.
10. Members may not roam the hotel without an advisors permission.
11. Respect all *FIRST* volunteers, employees and officials.

My signature represents that I have read and agree to follow the above rules of the Hauppauge Robotics Club.

Print Name _____

Signature _____ Date ___/___/_____

Parent's Signature _____ Date ___/___/_____

Shipping/Bag & Tag Details for 2011

These are specific details of the chain of events for shipping the robot, and in the case of Championship, our tools to and from the official *FIRST* events we attended. Off-season we just throw it in a mini-van.

1) Preliminary
    a. Investigate the latest shipping procedure. It changes a bit each year.
    b. Understand which are shipping required events and which are Bag & Tag events.
    c. Receive FedEx donated shipping forms with KOP if at least one of our events is a shipping one. Treat them like gold as they cannot be replaced.
2) Shipped via FedEx donated shipping from Hauppauge H.S. to WPI
    a. Scheduled FedEx pickup a week ahead of time (have been able to notify them as late as a day ahead, but that's risky). Provide them:
        i. Drayage address
        ii. Estimated weight of crate ~400 lbs is good enough
        iii. Crate size - 48" x 48" x 70" tall
        iv. Lift-gate is Necessary
    b. Pickup at H.S. was within a four hour window. Set it early enough in the day to catch problems.
    c. Had students lift create onto the higher deck of the 18-wheeler from the loading dock.
    d. Crate had FIRST labels for WPI drayage on all four sides
    e. No batteries, just robot & bumpers
    f. Obtain a Bill of Lading from the carrier (evidence of shipment)
        i. Showing date and time the crate left your possession.
        ii. Write your Team number on the Bill
        iii. Keep for your records and to track the shipment
        iv. Check TIMS as additional shipping proof is sometimes required, e.g., the tracking #
3) Shipped from WPI to SBPLI
    a. This is how to go from a shipping event to a Bag & Tag event
        i. First, the robot must be bagged with the Lead Robot Inspector certifying the closure of the bag. Make sure there all corners that could puncture the bag are wrapped/padded before bagging the robot. Bumpers must also be bagged (secure them OFF the robot so doorways don't become problematical).
        ii. Second, the bagged robot gets put in the crate for shipping.
        iii. The robot crate is then shipped home to our school where we uncrate the bagged robot
        iv. The robot must be kept bagged until we transport it to the SBPLI Regional and the Robot Inspector there certifies the bag has remained closed.
        v. We must supply our own robot/bag transportation. Be very careful that the bag doesn't get abraded during transport.
    b. Side note: if not using FedEx then contract with the *FIRST* contracted drayage services, or whoever has the Regional site contract.
        i. Work with the local drayage contactors to fill out the proper paperwork. Filled out paperwork at the WPI drayage desk. Specify that a **Lift-gate is Necessary**.
    c. Used donated *FIRST* FedEx (may want to reserve for longer Championship shipment)
        i. Use for home-to-Regional and Regional-to-Championship (not for Championship-to-home)
    d. FedEx shipping label on front
    e. Labeled all four sides with high school delivery address
4) Shipped from SBPLI to Atlanta
    a. Robot is again bagged while at the event with the Lead Robot Inspectors certification and oversight.

   b. The 6 teams qualifying for Championship receive an additional FedEx form and Bag for the robot. Be sure to ask for them! (3) champions, (1) Chairman's Award, (1) Engineering Inspiration, (1) Rookie-All-Star
   c. If not already, you must register and pay for Championship in TIMS even if you qualify.
   d. Transport the Bagged robot home.
   e. Crate up the robot
   f. Call FedEx and arrange for shipment pickup
   g. FedEx shipping label on front
   h. Labeled all four sides with Championship drayage address (from *FIRST* website)
   i. Added one battery to crate weight came up to 390 lbs
5) Ship from Championship back to Hauppauge
   a. An additional FedEx air bill will be supplied in the Championship registration packet
   b. Labeled all four sides with Hauppauge H.S. address (500 Lincoln)
   c. Filled out paperwork at Championship drayage desk
6) Tool pallet
   a. Shipped by JP Express from Hauppauge to pickup location in Championship city
   b. Return shipping has to be via *FIRST* drayage contractor or FedEx from the Convention Center (cost $1100).
      i. Filled out paperwork at Championship drayage desk
      ii. Provided a credit card
      iii. Put Hauppauge shipping address on all four sides of pallet
      iv. Put "Battery-inside" signs on all four sides of pallet
   c. Alternative was to ship home using available space in a neighboring team's trailer if someone drove. Several Long Island teams prefer to drive their equipment down (and get volunteer drivers).

Inspection Bill-of-Materials

A specific required format is provided by *FIRST* on their website. Bring a paper copy for the inspectors and an electronic copy on a thumb drive for *FIRST*.
This is required to pass inspection at each *FIRST* event. *FIRST* uses it to track how expensive it's getting to build the robots. Each year's game rules specify the individual item $ limit (e.g., $200) and the total cost limit (usually $3,500).

Team 358 Materiel Cost Accounting (example only-format may change)

Material	*Supplier*	*Qty in in2 ea*	*Cost/ unit*	*Total*
Frame & ball tracks				
1" x 1" x .062 wall alum. tube	McMaster	22	$1.52	$33.44
Aluminum sheet	McMaster	1	$7.50	$7.50
Miscellaneous Parts	Sears			$15.00
3/4" Aluminum 90 deg. angle	McMaster	15	$1.53	$22.95
1/4" dia. Aluminum rod	McMaster	15	$0.92	$13.80
Luan	Home Depot	10	$0.72	$7.20
Drive train				
Pillow block	McMaster	8	$5.50	$44.00
1/2" shaft, steel	McMaster	4	$7.60	$30.40
shaft sprockets	Andy-Mark	2	$20.00	$40.00
2-speed Transmissions	Andy-Mark	2	$330.00	$660.00
#35 sprockets 18 tooth	AndyMark	4	$14.00	$56.00
#35 chain & master link		8	$2.68	$23.00
Traction 6" wheel/hub	AndyMark	2	$89.00	$178.00
Wheelchair 6" wheels	Skyway	2	$5.80	$11.60
Encoder gears	Small Parts	4	$2.60	$10.40
Miscellaneous Parts	McMaster			$50.00
Shooter				
Bosch 20x20 Ext		98	$0.20	$19.60
Bearings	SDP	11	$6.20	$68.20
3/16 Al plate	McMaster	95	$0.20	$19.00
3/16 Al 90 degree angle	McMaster	22	$0.50	$11.00
1/4 dia steel shaft	SDP	29	$0.26	$7.54
Gears	SDP			$42.74
Pulleys	SDP	4	$8.14	$32.56
Timing belt	SDP	2	$3.56	$7.12
Drum grip tape	Sports Authority	1	$5.99	$5.99
Turret				
#25 Chain	Beardslee	2	$2.40	$4.80
Pan Sprocket	Beardslee	1	$5.20	$5.20
Track Roller	McMaster	12	17.31	$207.72
12"x12"x3/4" Delrin Sheet, Black	McMaster	1	57.67	$57.67
Alum 12"x24"x.190"	McMaster	1	47.04	$47.04

1.5 SQ. Tube x 36"	McMaster	1	22.18	$22.18
3/4" Dia Alum Round	McMaster	1	13	$13.00
12" x 12" x .19	McMaster	2	31.29	$62.58
1/2" OD x .25ID Alum	McMaster	1	26.56	$26.56
1/2" Hex Alum	McMaster	1	11.76	$11.76
20 tooth spur gear, brass, 1/4" ID	Stock Drive Products	2	11.18	$22.36
40 tooth spur gear, brass, 1/4" ID	Stock Drive Products	2	17.79	$35.58
3/4" ID x 1" OD flange bushing	Stock Drive Products	4	5	$20.00
1/4" ID x 1/2"OD flange bearing	Stock Drive Products	10	6.2	$62.00
1/4" Thrust Busing	Stock Drive Products	10	0.82	$8.20
Delrin Spur Gear, 24Pitch, 20 Teeth	Stock Drive Products	2	1.94	$3.88
Delrin Spur Gear, 24Pitch, 40 Teeth	Stock Drive Products	2	1.94	$3.88
Conveyor				
Belting	McMaster	12 12	$0.06	$68.68
Shaft	McMaster	2	$16.06	$32.12
Rollers	McMaster	27	$7.04	$190.08
Sprockets	McMaster	4	$6.17	$24.68
#25 Chain	Beardslee	3	$2.40	$7.20
Plastic (guide)	Home Depot			$10.00
aluminum brackets	McMaster			$20.00
Pneumatics				
All KOP				$0.00
Electrical				
Grayhill 63K128 encoders	Digikey	2	$52.	$104.00
Potentiometer	Digikey	2	$1.19	$2.38
ADX300 gyro	Analog Devices	1	$50.	$50.00
Breaker Panel	Innovation First	1	$84.95	$84.95
Limit switch	Digikey	2	$5.00	$10.00
Project box	Radio Shack	2	$2.69	$5.38
BCD switch	Digikey	1	$16.99	$16.99
Rocker switch	Radio Shack	1	$3.49	$3.49
Momentary switches	Radio Shack	3	$1.65	$4.95
SubD connector	Radio Shack	2	$1.59	$3.18
Wire #10, #12, #18, #22				$45.00
Miscellaneous				
Flag pvc	Home Depot	1		$2.00
Bumper fabric	Donated			$15.00
Pool Noodles	Donated	6	3.5	$21.00
Luan	Home	60		$2.75

	Depot	0		

Total	$2,755.28

Team Library

Reference Books

Robot Builders Bonanza - 99 Robot Projects
Gordon McComb

Robot DNA series
Building Robot Drive Trains
Dennis Clarke & Michael Owings

The Personal Robot Navigator
Merl Miller, Nelson Winkless, Joe Bosworth

Robot Mechanisms and Mechanical Devices
Paul Sandin

Robot DNA series
Programming Robot Controllers
Myke Predko

The C Programming Language(1st edition)
Kernighan and Ritchie

The C Programming Language(ANSI version)
Kernighan and Ritchie

The C Answer Book
Tondo and Gimpel

Videos

Some of these are available on our website and others in DVD or VHS formats in the robotics room.

DVDs

Team 2006
Team 2005
Team 2004
Team 2003
Team 2002
2003 team highlights (loop DVD)
2005 FIRST Promo and News videos
2007 SBPLI Promo videos
2008 FIRST Promo videos
2009 SBPLI 10th Anniversary video

VHS

2004 Philly Regional
2003 LI regional
02, 03, 04 clips + game animation 13 minutes (loop tape)
02, 03, 04 clips 10 minutes (loop tape)
2002 CNN on FIRST
2002 FIRST Promo and News videos

CDs

2004 animation entries
2002 animation entries
2001 game manual

Digital Files

1993 ABC News
2001 FIRST Promo
2001 FIRST Kickoff (After Ten Years)
2002 FIRST Corp.
2002 FIRST Chairman's Concept
2002 Will Smith FIRST Promo
2002 ABC News
2002 CNN
2002 National Geographic
Dean Kamen on 60 Minutes
2003 Championship Wrap-up
2003 Discovery Channel
2003 Headline News
2004 FIRST Kickoff
2004 Championship Wrap-up
2004 CNN
2005 FIRST Promo
2005 Championship Wrap-up

2006 FIRST Promo (BE FIRST)
2006 News 12
2006 PBS

YouTube now has quite a lot.

Product Catalogs

Mechanical

McMaster
Grainger
Brodhead Garrett
IGUS energy chain Systems
Iglide plastic bearings
Frame work - aluminum framing components
Small Parts
Misumi
Martin sprocket & gear
Bosch
IKO bearings
MSC

Electronics

Allied Electronics
Mouser
Newark in one
Jameco
Acroname