DPRG
DALLAS PERSONAL ROBOTICS GROUP

February 1994 A Newsletter for Personal Robot Enthusiasts Vol. 2 No. 2

"Thanks for the memories..."

As the hundreds of those in attendance at our January meeting will attest to, we exercised that time-honored democratic tradition of the peaceful transfer of power and the reigns of leadership. With little or no oil-shed and few broken bolts, Roger Arrick, our president and inspiration for most of, 1993, stepped down to assume a role in the private sector as Chief Engineer and Flat Tire Changer on the D-Bot Express. Eric Yundt, the starry-eyed newcomer to our group assumed the ominous duties of Chief Executive Officer and was sworn in as the new President with a small ceremony over in the corner as Bud Litman demonstrated the finer points of "look before you leap" with Luther's new dual-ultrasonics. We wish Roger great success in his new ventures and speaking for our robust and hardy group, "Thanks, Roger, for all the laughs, encouragement, tire tracks on our carpet, and especially the all important Freebies that you were able to scrounge up during your term..." - *Ed.*

Scandal Rocks Administration

In a late breaking story, sources inside the Infomart, confirmed that the administration's Minister of Human Interface, Sur Swid, has been suffering from Eprom Kludge and has quite possibly NEVER worked properly. If reports are true that Sur Swid has never been able to do more than randomly blink green LEDs, industry sources say the administration will be forced to seek outside help.

New World Record Attempt !!!

When the crowds gather for the DPRG February 19th, 1994, meeting at the Infomart (see map on back) this upcoming Saturday at 2:00 PM CST, they will be witnessing a second attempt to break the existing world record in the 20-meter Start to Start Sprint of 17.06 seconds as held by last year's winner, D-Bot.

This month's competition promises to be brutal and all contestants are encouraged to be there or B^2. The last contest was marred by traction difficulties and wheel slippage. Many are anxiously awaiting February's contest to see if these problems will continue to plague the stalwart and worthy 'Bots and their 'Botmen.

Lest we forget and sink, once again, into the chipless ultraviolet void, transmit with parity after me...

I. A Robot may not injure a Human Being or, through inaction, allow a human being to come to harm.

II. A Robot must obey the orders given it by human beings, except where such orders would conflict with the First Law.

III. A Robot must protect its own existence, as long as such protection does not conflict with the First or Second Law.

Bumpers That Can Take a Bump

By Roger Arrick

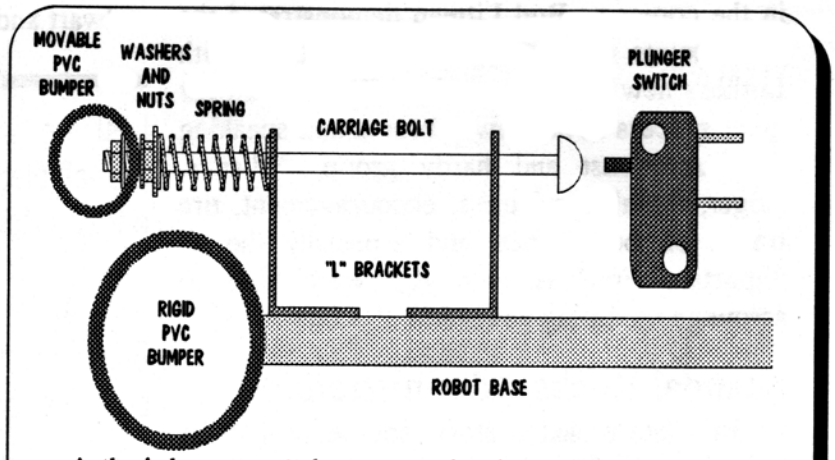
This article will deal with a subject that almost every robot hobbyist has encountered -- Bumper Switches. Bumper switches are those strange protrusions located around the perimeter of a mobile robot. Their function is obvious, collision detection. It's important to remember 'detection' not avoidance. The fact that these sensors will only be activated when they come in contact with an object dictates a great deal about their construction. Bumper switches must be able to withstand a healthy 'BUMP' without getting destroyed in the process. When their encounter is complete, they must quickly be ready for the next one.

The most common variety of bumper switch is the mechanical lever-style switch. Other types exist such as resistive-tape and capacitive type sensors, but the mechanical switch reigns supreme due to its cost, availability and simplicity. After all, it's just a switch!

The mounting of this switch and its linkage (if any) is the most difficult issue. You would think a roll of duct tape or maybe a stick of hot glue would take care of this but it normally doesn't. Remember the switch (or its linkage) must be able to withstand a collision with a stationary object such as a table, wall, or heaven forbid, a grandmother! Rolling down a stair case is not uncommon to the adventurous robotics hobbyist either! And when these catastrophes occur, the bumper switch must simply notify the computer and continue on unaffected, eagerly awaiting more disasters. If it doesn't, life for the robot will temporarily cease awaiting repairs from a more superior being.

This leads us to the central question, HOW do we make bumper switch take a hit and keep on ticking? The most common solution to this dilemma is a mechanical linkage which shields the small plastic switch from the harsh realities of the landscape. This linkage should be able to withstand any hit, twist and roll while simply transmitting a mechanical signal to the unsuspecting switch. The linkage should also return to its normal position after the encounter, usually via a spring or rubber band.

With ALL of this in mind, let's construct a simple bumper switch using standard hardware, and of course, a switch. This example was constructed using 'L' brackets from a hardware store. The carriage bolt is the main linkage element and is spring loaded. As the object approaches, the PVC bumper will push the bolt against the spring tension to depress the switch. At this point, the object will also come in contact with the stationary bumper. This dual-bumper method protects the switch and its linkage against certain destruction. Alignment of the 'L' brackets take some time to ensure smooth sliding of the carriage bolt. The switch used in this example is a standard plunger-style made by Microswitch.



Author's bumper switch constructed with standard hardware and able to withstand a multitude of bumps, twists, rolls and tumbles.

The electronics involved are simple enough. Tie one side of the switch to ground and the other to a digital input pin along with a 10K ohm pull-up resistor to +5VDC. Many switches can be tied (OR'ed) together if input bits are at a premium. The direction of travel can be used in software to determine which switch was pressed.

Now it's your turn, grab tomorrow's lunch money and head off to the hardware store!

February's Meeting...

► At the February meeting we'll continue our Robot Competition that started in November. November's contest was good for a warm-up, now let's gear up for SERIOUS competition. All able-based bots -- we really need you!

► We'll continue the scheming and dreaming about the H-bridge PCB design, prototyping, and construction. Roger's bringing the design, parts list, and (gulp!) possibly a prototype?!?!

► We're starting a scrapbook with pictures and articles of as many of our 2, 3, 4, & 6 wheeled friends as we can. If you've something you'd like to add to our collection, BRING IT! (hmm... do we have any non-wheeled bots?)

► A couple of things we've started to add to our library that could use your input:

- Parts Locator Guide, a compendium of stores, junkyards, crash sites, and dumpsters that are good sources for Robot parts;
- Technical Article Reference, a collection of any magazine or trade journal articles we find that have good ideas, schematics, or helpful hints worth keeping.

► It's been suggested that this month to encourage meeting attendance, we divvy up the DPRG bank account between all those who show up. It's not for sure, but why chance it?

ROBOFEST is almost upon us!

For those of you who missed it last year, now's your chance to reprogram and make your plans for the pilgrimage down to visit our long-haired (you know that's a compliment!) brethren in the Austin Robotics Group. Several of us made the road-trip last year and witnessed a FANTASTIC 2 day event complete with robotic blimps, robot rock-n-rollers, virtual reality games, an auction for a pneumatic alligator and much, much, more...

Seriously, it's a chance to sit around and sing kum-ba-ya with a bunch of other Robot Enthusiasts and steal some of their designs! Breaker! Breaker! Let's make us a convoy...

AI/RoboticsBBS (214) 258-1832

Upcoming Feature Presentations:

- Subsumption Architecture and how it can make you rich.
- Roll your own EPROM programmer.
- DC/DC Converters... what to do with those neat-o little modules we got
- Are you overwhelmed by the possibility of potentially constructing the world's first Artificially Intelligent Life Force? And why you shouldn't let that slow you down...

Upcoming Regular Columns:

- "'Bot of the Month," a short write up about one of our own mechanical friends.
- "Did You Read This?" a brief summary of some of the good articles to look for in the high-tech mags of the month.
- "Heard on the Net," a glimpse into some of the heavy robotics discussions going on through the Internet.

For all who are wondering how they too can participate or get published in a high-tech scientific journal such as this, send all stories, ideas, articles, write ups about your bot, or even suggestions, comments, and miscellaneous scraps of papers to:

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NEWSLETTER

Inside:

Next Meeting:

February 19th, 1994
Inside the InfoMart
2:00 PM CST