

FEBRUARY 1998 ISSUE OF THE DPRG NEWSLETTER



Check out the crowd at the meeting!!

Upcoming Events

Louis Sanjo who is project manager for the Aerial Robotics Contest entry for the University of Texas at Arlington (UTA) will be the guest speaker at our 16 May meeting. Mr. Sanjo will be bringing their robot to the meeting to demonstrate its features and to answer any questions about the robot, the contest and the development process in general. Hope to see a good crowd at the meeting!

DPRG has been asked by the Library to put together a display to foster interest in personal robotics. The display will feature robots of DPRG members and will display information about DPRG. The robots will be on display for a whole month at the library in a wall mounted glass front case for the general public to view as they enter the building. Jim Brown is in charge of the project's organization.

The Helping Hands Pepsi Kid-Around event will be held this year in September over the Labor Day weekend. The event will be held in the Turtle Creek area. Kipton Moravic discussed the event and suggested that DPRG might want to get involved with a robot display/booth to show off our members robots and generate interest among the kids for personal robotics. Kids at the event range from very young to teenagers.

Jim Brown brought up the issue of the new T-shirt designs. New designs ideas are still welcome.

Kevin Carter was kind enough to bring some free laminated 8031 instruction set "cheat sheets" to the meeting. The sheets were a gift from Roger Arrick who could not be present for the meeting. The sheets were well received.

The Prez Sez

This month has been both thrilling and a little stressful. It started when I got up on a Saturday morning to check my email. At about 10AM I read an email from Stuart Yarus stating that DFW-Xchange Corp will be filming our DPRG contest this month and would be having a meeting at 10AM. Egad 10AM! Anyway, I threw on some clothes, tried to comb down the unruly hair, jumped in the car, and made it down to the Infomart by 10:45. The meeting lasted until after 2PM. It looks as though there is a good possibility that (not 100%, but close) that they will actually make videos of the March 21st SuperSaturday meeting. I guess we won't know for sure until that day. Anyway, since that time I announced their intentions to the DPRG members, and everyone has just came to life. What appeared to be only a few robots for the contest suddenly became several robots for the contest. Everyone has just kicked in and joined the call to action. Hey, even I got my act together and built a robot - gee, hooda thank it. I think this could be the biggest DPRG contest meeting ever. I can't wait to see it.

Also, this month, we placed some of our robots in a local Library display case. The Library was a branch library near James Vroman's house. I was so excited about the display case, because I knew it would give the DPRG a little visibility. Anyway, we had a little mishap setting up the display, I broke their glass shelves. At first, I really stressed out about it since it was my fault. It really took a lot of steam out of me like poking a balloon with a pin. Now, I realize that this is just a small problem and a very little setback. If this is the worst setback we have, then I think we're doing pretty good. This is a good reminder to get excited about stuff, but to keep our heads on straight. On a similar note, our contest should be exciting, but we should keep our wits about us so that our contest goes off smoothly without any hitches.

Don't Miss the March 21st DPRG robotics contest meeting, it'll be one not to miss!
Jim Brown



RBNO: A Huge Success



February's RBNO (Robot Builder's Night Out) was held at the house of Bradley's stepfather, Jerry D. Merryman. Mr. Merryman is an inventor who has taken part in the invention of many well known devices including the first four function calculator (now located in the Smithsonian) and thermal printer paper! He has over 60 patents in all for his various inventions. The group was given a tour of his very elaborate workshop and had the opportunity to discuss many of his past and present scientific investigations. Some of these experiments included an ongoing measurement of the tidal effects of the moon on the land (turns out that the distance from the center of the earth to the outer edge increases by about 3.5 - 4" due to the passing of the moon) and measurement of the gravitational effect of two lead spheres on a brass rod suspended from a fine tungsten wire.



In addition, Mr. Merryman showed off his precision measurement equipment. He had a laser interferometer for distance measurement, a Tesla coil that was vacuum tube based and put out a beautiful 2-3" blue corona, a precision Kelvin bridge and a homemade scanner that used a motor and some sort of homemade encoder wheel. It displayed its image on an oscilloscope!



In addition to all this, Mrs. Merryman spoiled everyone with an outstanding meal (as Eric Yundt says, " a far cry from cold Cici's pizza"!) and the gracious manner in which she treated her guests overwhelmed everyone. She was a GEM!!

In short, this is going to be one RBNO to remember and will be tough to beat in the future!

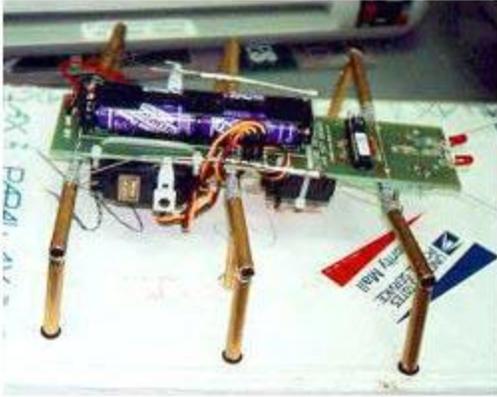
This was a banner month for robots at the DPRG meeting. We had a total of six robots that brought their human counterparts to the February get-together for show & tell. Some very interesting demonstrations of robot capabilities and discussions of their inner workings ensued.



ALLEN BREDON

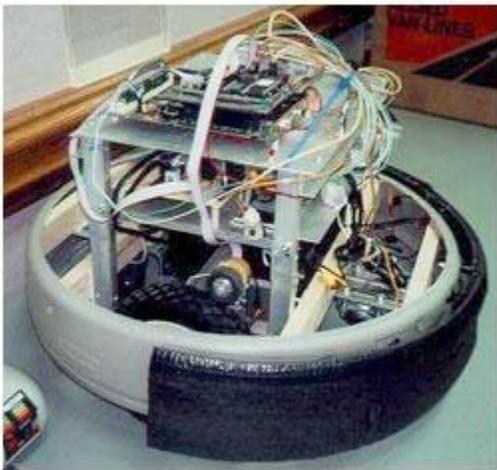
Allen's robot (named OTTO) hands out candy at halloween and greets the trick-or-treaters as they arrive at the door with a friendly verbal greeting. He stands about 5.5 feet tall (as you can see relative to Allen in the photo) and is controlled via a control pannel connected with a pendant cable. OTTO possesses an arm with a large gripper. The arm can be raised and lowered parallel to the body (straight up and down on a track) and extended about 2.5 feet via a telescoping track (a car antenna power extender) in a pure "Z-axis" mode. The gripper is a parallel closing type with a wrist that has 360+ degrees of freedom due to a slip ring assembly made from a stereo phono jack and plug. The slip ring, of course, passes power to the gripper motor. The robot has four dc motors controlled by individual FETs with relays being used for direction control. The motors use a custom designed pulse-width modulation (PWM) that utilizes a shift register scheme to generate the PWM. OTTO also sports a voice simulator and an LED array that simulates a "mouth" in motion when he speaks.

Allen says that he first started on OTTO in 1972 and that some of the technology is old compared with today's electronics, but, hey Allen, he works and he's very cool!!



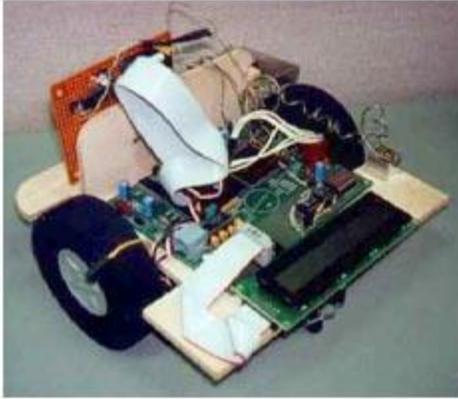
KEVIN CARTER

Kevin brought his hexapod made from a Parallax Basic Stamp kit. The bot has a couple of red LEDs added to the front for "show" according to Kevin. The unit runs using three servos. Kevin had the bot walk around a little to demonstrate the hexapod motion scheme of the Parallax kit. Nice job, Kevin!



DANIEL HARRINGTON

Daniel's robot (named Herky-Jerky) is a circular, low-lying design that eventually will feature a clear plexiglass dome top. The outer ring of the circular base is made from a cross-section of a trash can that has been reinforced with wood crossmembers. Shelves for holding the electronics are mounted above this level using aluminum posts. The unit uses a rubber tire drive wheel that transfers torque to the main drive wheels by friction (like a bicycle generator connects to the main wheel). Herky, so named because one drive motor is malfunctioning and causing a "jerky" motion, uses an embedded 386 processor board with a PC 104 expansion system. He uses an LM629 motor controller for drive motor control. Herky also contains an infrared obstacle avoidance system that is controlled by an Atmel AT90S1200 512x16 RISC processor. Sensed objects are reported back to the 386 for corrective action. The 386 is programmed in Borland "C" and uses flash memory configured as drive "A". Since the system is DOS-based, it has an autoexec.bat routine to get up and running with. The bot also features bump switches. Daniel plans to add a custom designed 40KHz sonar system to Herky in the near future that uses Murata transducers and draws inspiration from the Murata application circuits for the transducers.



BLAINE LEE

Blaine's robot uses one of Marvin Greene's BOTBOARD II HC11 boards for its controller. The robot features an LCD display system using the HC574 expansion chip. The main drive is made from two "hacked" used servos that Blaine bought surplus and are driven from the BOTBOARD II's PWM outputs. The system features 4 infrared sensors pulsed at 40 KHz that are sensitive to approximately 2 feet (that's right, TWO FEET!!). The system is designed to seek out a wall and then to follow it. The bot runs on 6 volts derived from a 5-cell NICAD pack.



ED KOFFMAN

Ed's robot is a line-follower that Ed is designing to be able to handle large attack angles to the line (as illustrated in the photo). Since Ed's design is strictly passive using ambient light, he says it suffers from the usual ambient light problems including the "follow the sun" photo phobia effect. His system uses a look-ahead sensor array that allows the steep angle handling capability. The system has been optimized to follow black tape but did a very nice job following the semi-white tape on the dark carpet shown in the photo. The bot currently has no motor speed control but Ed plans to add that soon which will help in preventing "losing the line" due to sharp turns and speed combinations. The robot uses a 16 MHz PIC processor and direct-drive to the motors (no H-bridges).



JOHN WADLEY

John's creation is a low-rider line-follower that uses cadmium sulfide cells for sensors. His design is completely processor-less using a system of multiplexers for control. The system follows a line using ambient light and if it "loses the line" it backs up sharply and tries to reacquire at slow speed. His power system is 8 "AA" batteries. John's robot gave a very nice accounting of itself at the last DPRG RoboRama contest. The bot is shown in the photo without tires since the tires tend to put the sensors too far from the line for effective following.

