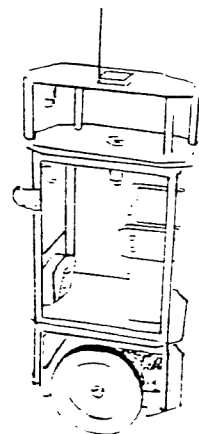


# ROBOT BUILDER

The official publication of the Robotics Society of Southern California  
10471 South Brookhurst, Anaheim, Ca. 92804



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## UPCOMING EVENTS CALENDAR July 1991

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- Jul 11 RSSC Meeting at Orange Coast College: 7-9 pm  
Topic: Robot Hand (Tentative)
  - Jul 13 RSSC Robot Project Workshop, at Jerry Burton's Lab
  - Jul 25 RSSC Board meeting, at Jerry Burton's Lab
  - Jul 28 ACP Swap Meet
  - Aug 8 RSSC Meeting at Orange Coast College: 7-9 pm  
Topic: SHAN and 2nd Anniversary of RSSC
  - Aug 10 RSSC Robot Project Workshop, at Jerry Burton's Lab
  - Aug 27 RSSC Board meeting, at Jerry Burton's Lab
  - Sep 12 RSSC Meeting at Orange Coast College: 7-9 pm  
Topic: RF Wireless Data Link
  - Sep 14 RSSC Robot Project Workshop, at Jerry Burton's Lab
  - Sep 24 RSSC Board Meeting, at Jerry Burton's Lab
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### President's Message by Jerry Burton

During last month's meeting while discussing the concept of a Robot Fair for 1992, it became obvious to me that several of the members have a different perception of the goals of the Robotic Society than what I hold them to be. With the addition of so many new members it may be time to re-examine what the goals and objectives of the society are to be.

When the Society was re-formed in August of 1989 the members at that time discussed at great length what the primary thrust of the Society should be and developed "Section 3 - Purpose" of the bylaws which states "The primary goals of the society are to facilitate the development and construction of robots and to act as an informational resource to the membership and the public".

Although rather broad the key words are DEVELOPMENT and CONSTRUCTION. From the inception of the society the emphasis was

in the area of personal service robots to be used in the home. The idea that the society would encompass ALL facets of robotics was discussed and it was decided at that time the major thrust for now would be on mobile robots, rather than fixed industrial type robots.

The group purchase of the Synpet surplus equipment was responsible for getting RSSCy up and running. At last month's Lab we were able to integrate the COVOX voice response board with the new TSR that was developed by Don Golding and John Mesonides. Don and John came over a week later and further modified the TSR to handle additional MOVE command structures. We now have a fully operational TSR that can be used to interface to a motor control subsystem as well as the COVOX voice subsystem.

I have included a questionnaire in this issue and will also have copies available at the meeting. If you would fill it in as completely as possible, it will help the Board of Directors guide the society

through its third year in the direction the majority of the membership desires.

Remember, the July meeting will be held at Orange Coast College in Costa Mesa on Thursday, July 11th at 7 pm. with the Lab July 13th at my office, 10471 S. Brookhurst St, Anaheim, CA 92804 at 10 a.m.

Hopefully, Gordon Schultz of Odetics, will come and give a presentation on the 3 fingered hand that they developed. NASA is investigating the feasibility of putting the hand on the end of the remote control boom on the space shuttle. It should be a good program....see you there  
.....JB

#### WORKSHOP REPORT

Our Robot Project Workshop, at Jerry Burton's Lab, went very well on Saturday June 8th, we had a huge turn out, and everyone was really enthusiastic, and full of ideas concerning our recent projects. Some motors were disassembled to check the gears. These were used wheel chair motors and could be refurbished for use in our robots. We ask our members to join in with any new ideas that you might feel like sharing as to access to mechanical parts for our machines. I am delighted that our workshop is prospering so well. Jerry took some pictures of the Robot arm, and general pictures of some of our members looking on, watching and conversing with each other. Quite amusing. ....JS

#### CLUB BULLETIN BOARD

The RSSC Bulletin Board is now operational. There is a lot of data and information to load to the disk and it will be done soon. It is to be used to discuss problems and to ask for help, etc. The phone is Jerry's and should be used after 6 o'clock. Phone 714-535-5432, 300/1200/2400 Baud using ProCom software with a protocol of N-8-1. See you there soon.....JJ

#### GENERAL MEETING

The general meeting was well attended with a large crowd. I think this further justifies moving to larger quarters at Orange Coast College (see map this issue).

Our scheduled speaker, Roger Roszkowski couldn't be with us at the meeting (see his regret column) and Jerry asked Roland Koluvak to cover the project that he is working on. He did a nice job of filling in with his servo/motor control program on such short notice.

The second part of the meeting covered a discussion of the proposed ROBOT CONTEST or SHOW in AUG of 1992. After all the discussion, there was a challenge match arranged by Jerry Burton and Don Golding to have their ROBOTS compete in a Laser Duel at the 1992 ROBOT event.....JJ

I regret not being able to present the wireless link for RSSCy at the June general meeting. I thank Jerry Burton for filling in on such short notice. Being a volunteer member in the Society I support a family with a full time job like the rest of you. My full time job with Hughes Aircraft did not under stand my recreational activities. As a Field Engineer I some times get to go to the field. I was thinking about the meeting from Kodiak Alaska. On the evening of 4 June it was snowing off and on in Kodiak and I was thinking very much of Southern California.

Jerry has ask me if I would like to try again in July. I believe Hughes wants me to conduct another field trip to Kodiak the week of our July general meeting and I had best not make any plans. Snow or no snow I will travel to Alaska any time I can get paid to do it.

The Society is making plans to let Joe McCord do anniversary honors at the August meeting. I'll offer a motion to present the wireless link at the September meeting.....RR

CPU and if the interface is controlled then all can communicate between the elements.

**6. TI VOICE BOARD REPLACEMENT**  
 There are a number of members that own COVOX units and are evaluating the concept. The COVOX board is now installed and operational in the ROBOT after overcoming some type of interrupt problem.

**7. HEADING SENSOR.** Heading sensor is still required as part of the design of our autonomous ROBOT system. Some thought has been given to RDF, Gyrocompass, or Flux Gate as possible solutions. This is a long term requirement and action remains open at the present time.

These are the action items for July. If you have ideas and/or potential solutions to any of these problems, call Jerry B or myself, set up a SIG or bring the idea to the general meeting.....JJ

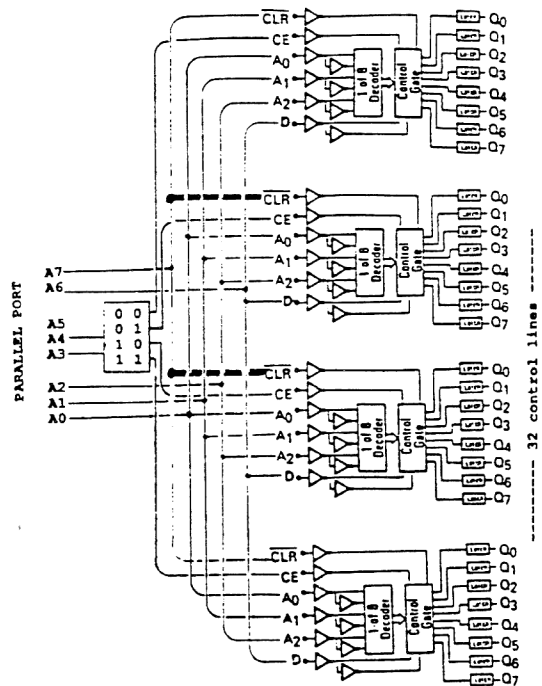
**ERROR-ERROR and CORRECTION**

Last month, I proposed a design of a board that would allow the parallel port of our PC's to control 32 individual and independent lines. I chose a chip that had built in latches to simplify and reduce the parts count. In my haste to get the ROBOT BUILDER out on time, a couple of errors crept in to the schematic. There were two clear (CLR) lines left off the drawing. I have included them this time in bold to indicate the additional wires needed.

I always expect to make some mistakes with the last minute deadlines and the great rush to finish the production of this news letter. I expect YOU, the membership to read what is published. I had only ONE person inform me of the error. WHY?

Are classes needed to assist the membership in

learning at least simple logic design?? There are a number of well qualified designers in the RSSC that could teach the logic design classes. Let Jerry know if this type of classes could be of help to you.....JJ



An item came across my desk the other day which personified the plight of the volunteer organization, and it goes this way:

...THAT'S NOT MY JOB.....

This is a story about four people named Everybody, Somebody, Anybody and Nobody.

There was an important job to be done and Everybody was sure that Somebody would do it. Anybody could have done it, but Nobody did it.

Somebody got angry about that, because it was Everybody's job. Everybody thought Anybody could do it, but Nobody realized that Everybody wouldn't do it.

It ended up that Everybody blamed Somebody when Nobody did what Anybody could have.

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Sad, but true, so lets all pitch in and help the group as a whole , and we'll all benefit.....JJ

## SECOND ANNIVERSARY MEETING

This coming August, our ROBOT CLUB members will be celebrating the second anniversary of the founding of RSSC. We are hoping for our biggest turnout of the year. Bring your spouses, girl friends, boy friends (for you girls) and join in for a fun event. We're going to make this meeting a Mini ROBOT Fair. Bring the projects your working on for every one to see. Jerry will bring his ROBOT, Joe Mccord and Peter Movsesian may bring theirs for all to see. The club will be serving refreshments and hope to see you there.....JS

### ACTION ITEMS

These are the current items that are needed for the completion or expansion of the club ROBOT development. There was discussion at the RSSC meetings and some have been assigned a task leader.

1. The "DOCKING STATION" has been assigned to Tim Lewis. This station will be used for charging and will have an automatic interconnect. Tim reports that there are four or five potential designs. Final decision of what functions the docking station will incorporate has to be determined. Tim solicits help in making the final design decisions before undertaking construction.

2. An "RF LAN" or computer to computer interconnection. This requirement was needed to assist in the debugging and monitoring of the operation of the mobile ROBOT's computer program. This item has been worked in two areas. The first was to construct a hard wire link with "PC Always" communicating between the ROBOT and the Terminal monitor. The second was to generate a RF link via a wireless phone. Roger R. has finished the project and was to demonstrate the link at the last meeting, however his company

wanted him elsewhere and he could not attend. Demonstration now scheduled for September meeting.

3. SONAR BEAM FOCUSING. The present Polaroid transducers have a rather wide (30 degrees) beam spread. To better locate an obstacle, the beam width needs to be focused and reduced to a narrow beam. Kim has been working with the sonar demonstration kit and should have some results to report shortly.

4. SONAR RETURN SIGNAL AMPLITUDE. Jerry B proposed this action item. He wants amplitude information from the sonar return to allow more exact determination of the pointing angle to the reflector or obstacle. A sonar board from Jerry B's Hero Jr. has been installed in the ROBOT, interfacing through a parallel port. This will allow the electrical group to generate an A/D design to read the amplitude of the sonar return signal into the onboard computer.

5. INTERFACE ARCHITECTURE. This is not a new action item. It is a combination of a few old ones all rolled into one. The first one was the HPC alternate problem. The source for any additional HPC boards seems to be exhausted. The other members and new members that would like to start a ROBOT project need the HPC functionally. The second problem was the selection of a common Micro Processor or single board computer (SBC) for the club. It seemed like a good idea at the time to generate some order of commonality throughout the membership in the projects so we could help each other etc. There was no consensus with in the group as to a standard CPU. Further discussion of the problems leading to selection of a club standard CPU for the various distributed functions implemented on the ROBOT seemed to indicate that a selection of a common interface was the more appropriate requirement. Every one can use his or her favorite

Robotics Society of Southern California

The results of this questionnaire will be used by the Board of Directors to guide the direction of the society and its programs for the coming year. Please take the time to fill in the questions as completely as possible and turn them in before the August meeting.

1- The Society has focused on the area of mobile robots for personal/service use. Do you think -

- a) This is the proper focus, continue this direction.
- b) Expand the scope to include all aspects of robotics.
- c) I would like to see the focus on \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2- The meetings currently have the following format.

- 10-15 min: Introduction
- 45 min: Technical presentation
- 15 min: Break
- 45 min: Random Access

- a) I like this format as is.
- b) I would like to see the meetings change as follows  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3- The thing I like most about the society is

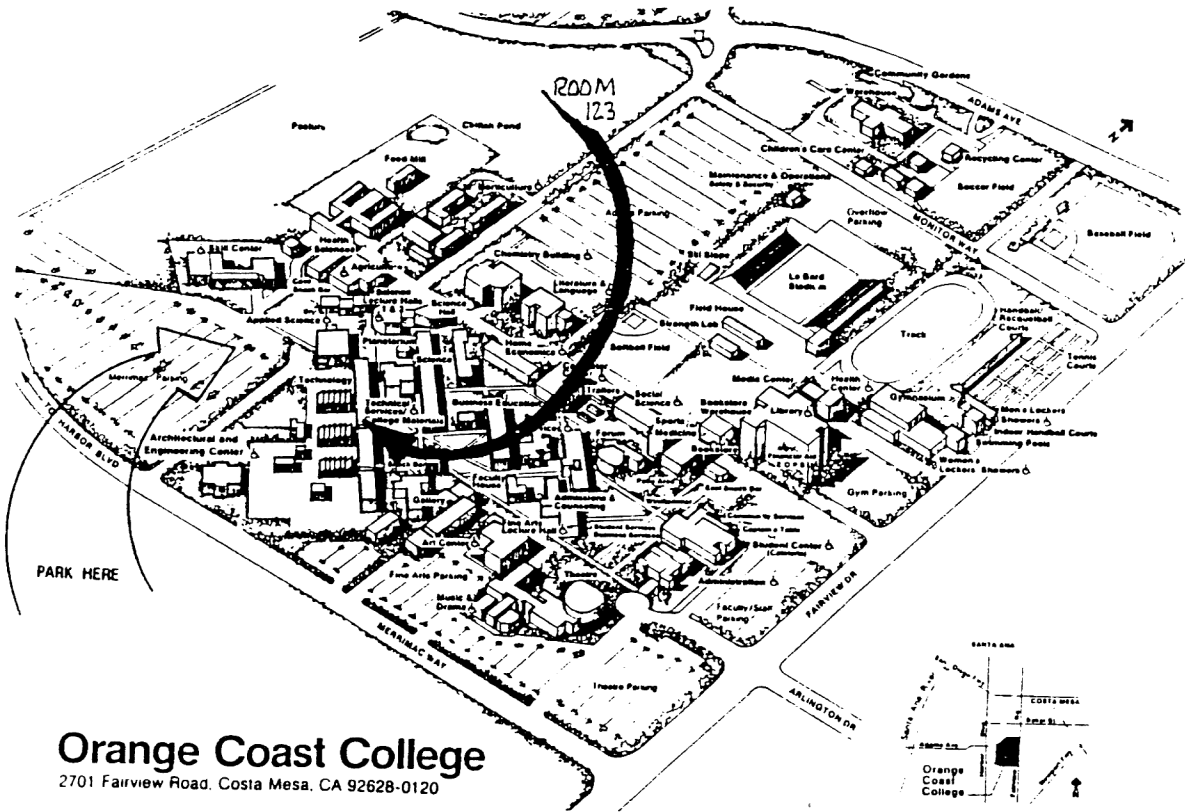
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

4- The thing I like least about the society is

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5- Please make any comments, suggestions, or criticisms about the society and what we can do to improve it. \_\_\_\_\_

\_\_\_\_\_  
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\_\_\_\_\_



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 10471 South Brookhurst,  
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Roger Ruszkowski member  
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### Find Capacity of NiCd Batteries

Because NiCd batteries maintain a constant output voltage, it is difficult to determine how much of the battery's charge remains. The circuit shown provides a way of determining the capacity of a battery by draining it at a preset current to its depleted voltage of 1V/cell. You measure the discharge time of the cells and perform a simple calculation to obtain the battery's capacity.

You set the drain current ( $I_D$ ) to 0.5C (where C = battery capacity in mAhr) by selecting an appropriate value for  $R_4$ . Choose  $R_5$  such that  $I_D \times R_5 = 1V$ .  $V_{REF}$  is set so the comparator turns off the drain current and timer when the battery reaches its depleted voltage,  $V_B$  (usually 1V/cell). You calculate  $V_{REF}$  by the following formula;

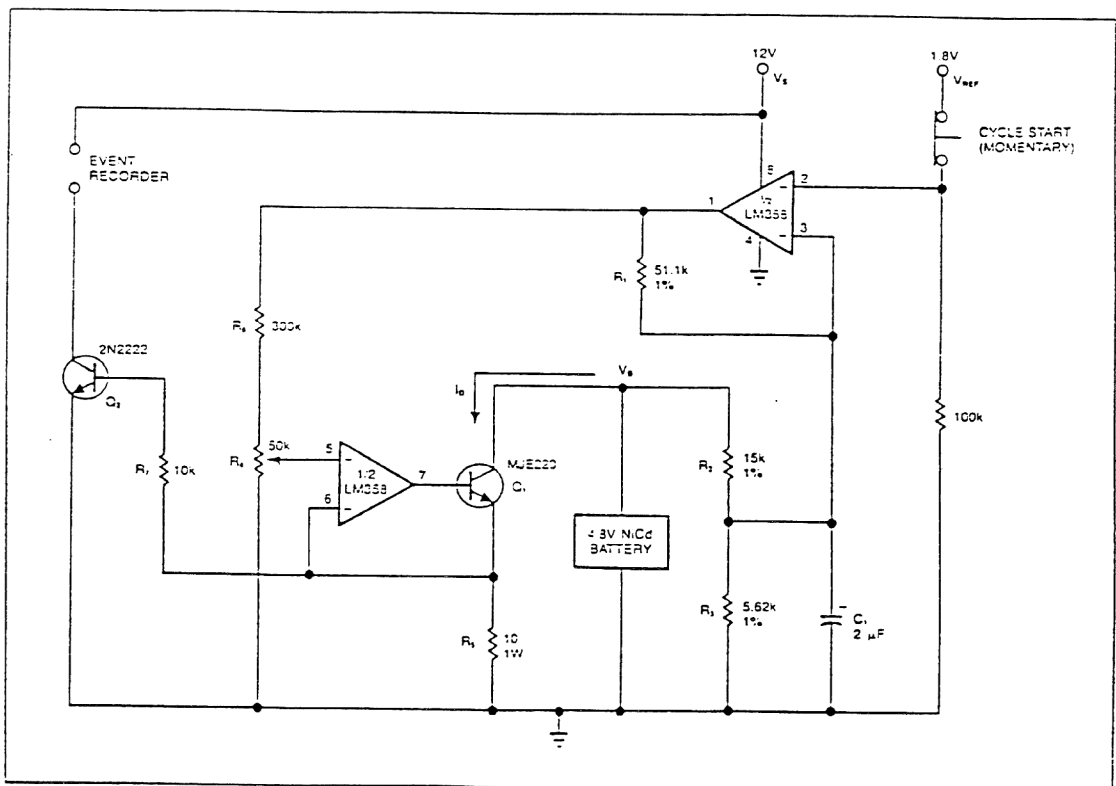
$$V_{REF} = \frac{R_3 [R_2 (V_s - 1.3) + R_1 V_B]}{R_1 R_2 + R_2 R_3 + R_1 R_3}$$

With the battery in place, activate the circuit by grounding  $V_{REF}$  with the momentary switch. The battery drains at  $I_D$  until it reaches  $V_B$ , turning off the drain circuit and the timer. Hysteresis keeps the circuit from restarting.

Determine the battery's capacity using the following equation;

$$C_{(mAhr)} = \text{Time of Cycle} \times I_D$$

The circuit shown tests 4.8V, 180 mAhr batteries.  $I_D$  is 100 mA and  $V_B$  is 4V.



CFP&C GUIDE TO ESTIMATE ACCURACY  
(To be used only by Qualified Personnel)

Type	Accuracy ±	Time Required
1. Crystal ball figure	900%	At once
2. Shotgun estimate	750%	1/2 second
3. Thin air figure	650%	1 second
4. Instant engineering estimate *	500%	5 seconds
5. Chin-stroking figure	300%	7-15 seconds
6. Wet thumb estimate	250%	20 seconds
7. Seat-of-pants estimate	150%	1 minute
8. Arm-waving estimate	125%	5 minutes
9. Educated guess *	100%	7 minutes
10. Un-educated guess	(Your choice)	(No guarantee)
11. Ball park figure	75%	1 hour
12. Order of magnitude	45%	3 hours
13. Talking figure *	40%	8 hours
14. Consulting engineer estimate	Same as Item 9.	
15. "We'll go from there" estimate	(Depends on starting point)	
16. Approximate figure*	30%	3 weeks
17. Estimated cost *	20%	1 month
18. Preliminary estimate*	15%	3 months
19. Detailed engineers estimate*	10%	6 months
20. Up-dated estimate	(No guarantee)	(Any estimate x 2)
21. Top management estimate	5%	6 mos - 1 year
22. Certified estimate	2%	(See if you can get one)
23. Final estimate	1%	3 months after job is complete

\* Requires Engineering Department involvement.

Thanks to Trus Joist for sharing this.

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