RB Robotics
5519 Clairemont Mesa Blvd #214
San Diego, CA 92117
(877) 634-5139 Toll Free
(858) 964-4642 (In San Diego)
Email: rb5x@rbrobotics.com

"RECORD TIME!
Software Module
Version 1.0
By Mark A. Fox

"Record Time!" gives new life to a good, old-fashioned foot race. RB5X gets the race off to a clean start with the sound of a starting pistol, and then times the event and forms an invisible finish line with its sonar. When a runner returns to the starting line and crosses the sonar beam, RB5X announces his or her time and prepares for the next racer. The robot keeps track of each runner's score, announces the time at the end of each race, and broadcasts any new record set.

Equipment
To use your "Record Time!" software module, you need the following equipment:
One RB5X personal robot
RB5X voice/sound synthesis option

Age Level
"Record Time!" is a great activity for all ages and requires little or no adult supervision.

Operation
1. Make sure RB5X is switched off.

2. Check to make sure that the voice/sound synthesis package has been installed according to the instructions that come with it.

3. Insert the software module into the socket on the RB5X's interface panel, making sure the guide marks on the socket and on the module match up. Push the module firmly into the socket.

4. Check the label on your "Record Time!" module and set the module switch located to the right of the socket to the proper position of 4K.

5. Place RB5X in an area large enough to accommodate a foot race. The robot should be about six feet from a wall or other solid object.
If you wish to draw an actual starting line on the floor or pavement or to mark it with tape, make sure that you place the line so that when runners step up to begin the competition, their bodies or legs are directly between the robot's sonar and the wall.

6. Switch RB5X on. The robot's light-emitting diodes (LEDs) flash and RB5X sounds the familiar trumpet call that begins horse races. (If this does not happen, check to be sure the software module is installed correctly, that the robot is adequately charged, and that the switch located to the right of the module socket is set to the proper position. If the LEDs still do not flash and the trumpet does not sound, see Section G, "Troubleshooting Your RB5X," in the RB5X Reference Manual.)

7. RB5X instructs you to "Please adjust the starting gate." Depending on its position, RB5X says "Closer" or "Backup" until you have moved the robot (or the object you are using as the other side of the starting gate) into the "perfect" starting position.

8. When the starting gate is properly positioned, RB5X says, "The starting gate is in perfect position. Runners take your places." The first runner should then step up to the starting gate, making sure RB5X's sonar can "see" him or her. (Don't step up to the starting line until RB5X instructs you to do so. RB5X makes frequent checks to ensure that

the starting gate has not been moved. If you step up too soon, RB5X tells you to "Please adjust the starting gate." Simply step aside again until RB5X says, "Runners take your places.")

9. The first runner should step up to the starting line and get ready to race. RB5X sounds beeping tones until the runner steps up to the line.

10. RB5X then says, "On your mark, get set" and sounds a starting gun. If the runner starts before the sound of the gun, RB5X blows a whistle and says, "False start. Please return to your starting position."

11. Once the runner is off to a good start, RB5X begins timing the event. When the runner returns and crosses the finish line, RB5X uses its sonar to detect the end of this runner's race and sounds three blasts of a whistle.

12. RB5X says, "May I have your attention please," and announces the runner's time in minutes (if the race was more than 60 seconds long), seconds, and tenths of seconds. If the runner's time was better than any of the previously run times, RB5X says, "We have a new record." RB5X then announces the old record time followed by the new record from the latest race.

13. RB5X congratulates the runner and then prepares for the next race by saying, "Next runner please." The racing continues as long as the players wish.

14. To hear what the current record time is, press any of RB5X's bumpers while the robot is waiting for the next runner to step up to the starting lane (while the robot is sounding the beeping tones between races).

15. To end this series of races, switch RB5X off. Be sure to switch the robot off before removing the software module from its socket.

Game Variations

There's no need to limit this activity to the typical foot race. RB5X can also time races with bicycles, skateboards, wagons, go-carts, or any other method of movement. Or, find out who can run the fastest while dribbling a basketball or balancing an egg on a teaspoon. Use your imagination to get everyone in on the fun!

How "Record Time!" Works

The most important thing to know about the workings of. this software module is that RB5X's clock is not really a clock at all. RB5X counts the number of sonar pulses from the beginning to the end of the race. As soon as the race begins, RB5X rapidly fires its sonar across the starting gate to form an invisible finish line. As the runner passes over the finish line, RB5X detects the interruption of sonar pulses. The total number of pulses can now be converted into minutes and seconds. With the starting gate set up as RB5X instructs, each sonar pulse takes about 1/10 of a second. As an example, 2036 sonar pulses represents 203.6 seconds. Divide by 60 seconds per minute to get 3.39333 minutes. Multiply 60 seconds per minute by the decimal remainder to get 23.6 seconds. So the final answer is 3 minutes 23.6 seconds.

There is only one problem with this formula. RB5X's computer uses only integer math -- it cannot calculate decimal figures. So let's try the sample problem again.
Divide 2036 sonar pulses by 600 pulses per minute -- you get 3 minutes with a remainder of 236 (RB5X can determine remainders when dividing). Since there are 10 sonar pulses per second, divide the 236 remainder by 10 to get 23 with a new remainder of 6. We're finished. The final answer is 3 minutes, 23 seconds, with a remainder of 6 sonar pulses or 6/10 of a second. Easy! Now you should understand why RB5X's tames may vary slightly from those you get by using a stopwatch. RB5X is counting sonar pulses, not the actual passage of time.