

## Santa's Shop (Abstract)

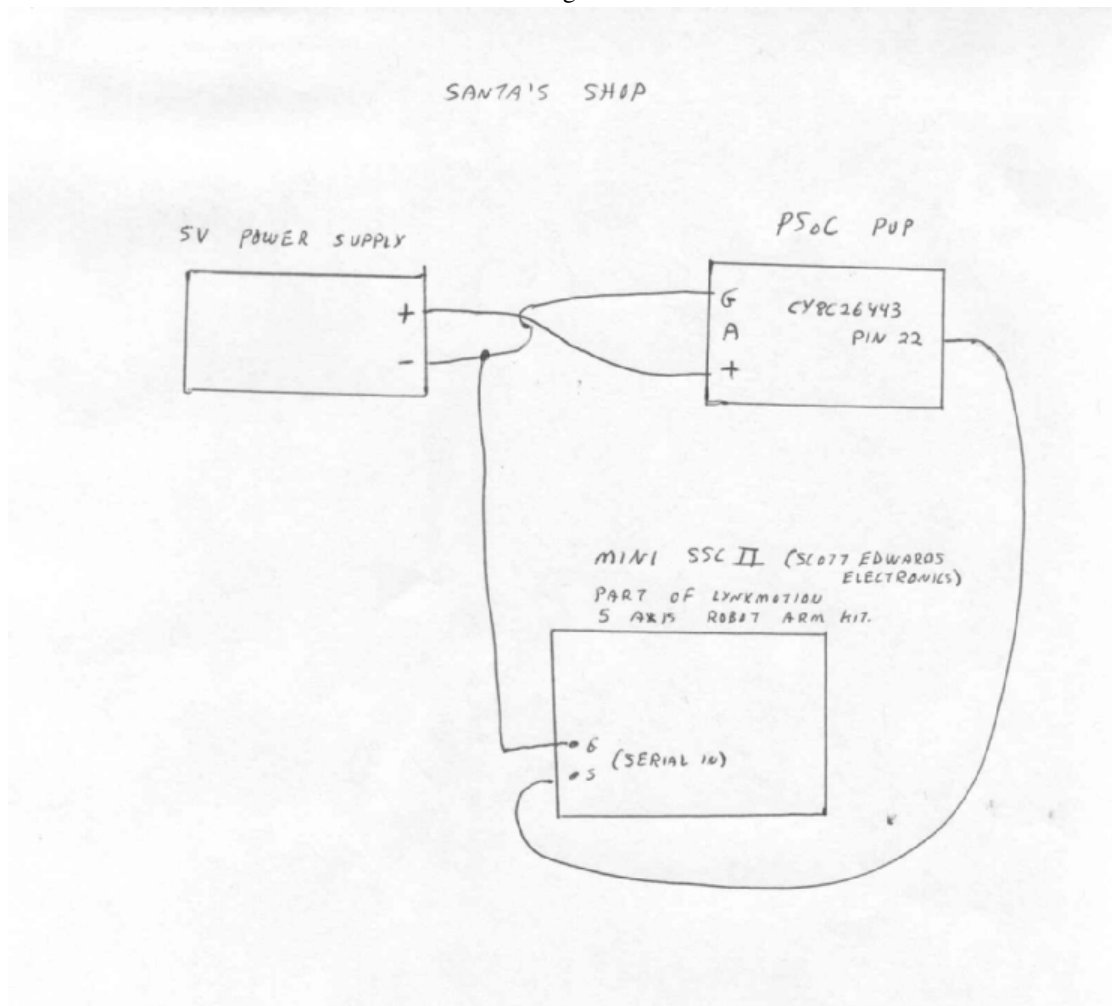
Santa's Shop is an interactive display where Santa's mechanical arm assembles a Christmas tree on command.



Santa's mechanical arm, a Lynxmotion 5 axis arm kit, is composed of six servomotors, controlled by a "mini SSC II serial servo controller" by Scott Edwards Electronics. Serial commands to the servo controller determine the position and path of the arm. The Cypress Microsystems microcontroller (cy8c26443) is configured to provide serial commands to the arm.

By using the PSoC Pup board (wire wrapping a connection off LED #6—pin 22 of the processor), a serial line can be generated to control the arm. I used the "Example\_TX9600\_28pin" software, changing the byte count to 156 and creating an endless loop when the bytes have been sent.

## Block Diagram



Turning the power supply on will initiate program execution, which causes the arm to pick up the tree base and place it on a peg. This is followed by the tree trunk and then the star. The arm then rests. Currently, --that's it. The tree must be manually disassembled and the power turned off and back on to repeat the cycle.

### Santa's Shop—General Information

This project will be displayed in the local public library during the Christmas season. By that time, there will be three light sensors which will trigger three actions. Pointing a finger at the base will cause it to be placed on the "assembly peg". Pointing a finger at the tree will cause it to be placed, and pointing a finger at the star will result in its placement. After the tree is assembled for a few seconds, the parts will be returned to their homes. If a finger is pointed to a piece out of sequence, Santa will shake his head "no" and refuse to lift the wrong part. Santa's head (an old Teddy Ruxpin head with blinking eyes) has a servo motor at the neck to accomplish the "no" shake. This servo will be controlled from a spare output of the "mini SSC II". The PSoC will perform the logic operations and send the serial commands. Acrylic sheeting will keep little hands away from Santa and the arm.

The PSoC Pup board and example program were used in this project because of the very short learning curve required to get up and running.

