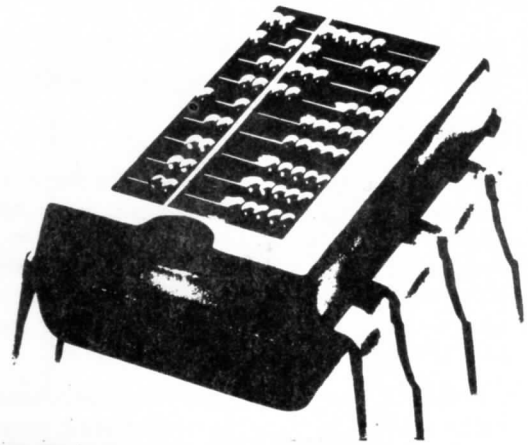


# AN ABACUS HARDWARE APPLICATION=■

by  
Larry Freeman

Copyright © 1981

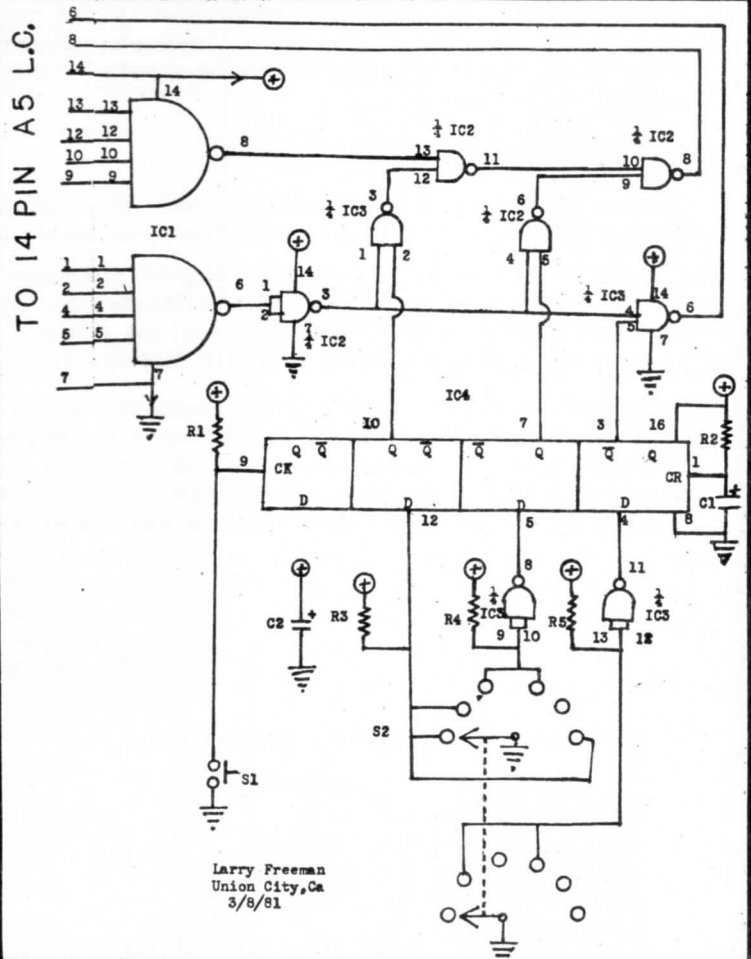


## ★ ★ ★ ★ ★ WHICH MONITOR WOULD YOU LIKE?

A few days ago I was trying to beat the bugs out of my 5K machine language program. I was looking for a bug and I could not find it. I needed the step function in my old monitor ROM (I have the language system and it has the auto-start ROM). After about an hour, I finally gave up trying to find the problem without the step function. I powered down the computer then pulled out the auto-monitor and installed the old ROM. I reloaded my program and was able to find the elusive bug in a couple of minutes. (The bug was caused by addressing Indexed Instead of Indirect indexed.)

Everything was fine until I received a call from my wife the next day. She called to tell me that the computer wasn't working. I explained to her that the old ROM was in the computer and she needed to boot-up the old way. She had forgotten how, so I told her how to do it. She did not appreciate the value in the old monitor and wanted me to restore the computer after I messed it up. I did not like the idea of having to power down my computer to change ROMs everytime I had a bug that gave me a problem. I had a mission. I wanted to be able to change the ROM that I was using at the flip of a switch, also my wife did not want to have to mess with any of the switching of the monitor.

I first started by tracing the wiring on my language card and made a schematic (this will be an article in the future). I found out that when the computer is using the RAM language it also uses the RAM monitor (it is loaded with the language). I would also like to set



the computer to use the monitor in RAM when I wanted to. In this manner, I would be able to have my own monitor in the computer.

I built a modification and these are its features;

- 1) On power up it is normal.
- 2) It will not switch when you pass over a position you don't want.
- 3) You can switch it back to normal.
- 4) No key bounce problems.
- 5) Select the ROM on the motherboard

Instead of the one on the Language Card.

6) Force the monitor to be from:

- a) ROM on the Language Card,
- b) ROM on the motherboard,
- c) F800-FFFF RAM.

It allows me to select which monitor I want or even write my own and select it. It is a very simple and easy modification. It requires only 3 small additional chips. It is easy to remove and add to the computer. It connects by a plug-in cord. The parts are easy to obtain. All parts can be obtained from Radio Shack. It is inexpensive. All parts costs less than \$35.

To construct:

First determine whether you want the unit in the box or mounted inside the computer. If you choose the box, determine the position of the two switches, then determine the maximum size of perfboard that can fit and mark it on the perfboard. Place the sockets on the board. You will need four 14 pin sockets (one for the cable) and one 16 pin socket (for IC4). Wire the sockets together according to the schematic. Wire in the resistors, capacitors, and

leads to the switch (wires to these should be soldered). Mount the boards and switches and connect them. Plug the jumper cable into the socket. If the jumper cable is a 16 pin, have the last two pins sticking out behind (the opposite end of pin 1). Check the continuity of your connections. Plug in IC2, IC3, and IC4.

To install:

First be sure power is off!!! Remove the chip (74LS20) at the top back socket (position A5) and put it in on your card for IC1. Place the jumper cable into the socket that the chip was removed from. If you are using a 16 wire cable, be sure that the extra pins are on the back side of the sockets. Make sure that there is no possibility that the board or wire can be shorted to the battery or ground. Turn on the power,

if a funny noise comes from the computer turn off the computer immediately, you have shorted the power supply. Find the problem before trying again. Put your finger on the ICs, and if they get hot in a few minutes, turn off the power (you probably have the IC or cable in backwards).

To use:

Select one of the following functions you want and turn the switch to that number then press select button. If you want normal, do nothing, it will come up in the normal mode.

- 0 = Normal
- 1 = Motherboard ROM
- 2 = Force to Language Card ROM
- 3 = Force to Motherboard ROM
- 4 = Force to RAM (F800-FFFF)
- 5 = Normal

Parts List

IC1 74LS20 (removed from the computer)	
IC2, IC3 74LS00	276-1900
IC4 74LS175	276-1934
R1-5 3.3k 1/4W	271-1324
C1, C2 10uF Tantalum	272-1411
S1 momentary push button sw.	275-1549
S2 2-pole 4-pos. switch	275-1384
18" Ribbon Jumper Cable	276-1976
4 14 pin wire wrap sockets	276-1999
1 16 pin wire wrap skts	276-1994
1 comm. knob (no. 0-10)	274-392
1 perfboard	276-1395
1 experimenters box (optional)	270-238
Misc: wire wrap wire, wire wrapper, mounting hardware for perfboard.	

