Thank You, for attending the . . .

4th Annual Last Chicago *CoCoFEST!* '95

You now have the E-clock Fix board from the GlenSide Color Computer Club. We thought it would be good for you to know how to install it into your CoCo 3. So here are the instructions to do so.

Please! Read this entire document before installing the E-clock fix Board!

WARNING !!!

This installation involves opening your computer that will void any and all Warranties!

NOTICE !!!

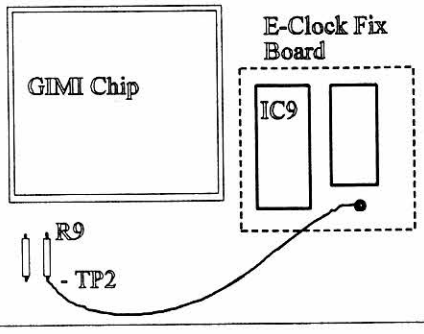
The installation of this board will not guarantee to fix any or all problems that you may or may not have with your computer before installation. The GlenSide Color Computer Club, it's members, or the original author(s), will not be responsible, nor liable for any damage, loss of data, time or money, if this item is installed into your computer.

NOTES . . .

I have to the best of my knowledge and ability, created a board that meets the standards from an article circulated both on Delphi, and in GlenSide's newsletter. *I*, have personally built and successfully used this E-clock fix board with no problems at all. All should go well if the installation instructions are properly followed.
Please use common sense and good electronic building practices for best results. If in question . . . **GET HELP!**

INSTALLATION

1. Remove the computer cover and carefully disconnect the keyboard from the motherboard.
2. Remove the motherboard from the case and remove the groundplane from the back of the motherboard.
3. Locate IC9 (74LS138, see diagram below), and carefully remove IC9 from the PC Board. Use your preferred method of removal. Do not worry about destroying the chip. There is a replacement supplied with this kit.
4. Inspect the motherboard and make sure the holes are clear and the traces are in good shape.
5. Insert and solder the 16 pin low profile socket provided. Make sure of good connections through the board.
6. Insert the daughter board into the socket (insure correct orientation). Yes. Pin 4 **IS** supposed to be cut off. If the daughter board is too high, you may evenly trim the leads to size. Cut off no more then 1/4 of an inch.
7. Then solder the wire from the daughter board to R9 (see diagram below). Inspect for correct connections.
8. Hook up the power supply, keyboard and monitor. Then turn on the computer and make sure you get the 'OK' prompt. If you do, turn off the computer and insert the disk drive controller. Turn on the computer to see if you get the 'Disk Basic' prompt. If you do, try to access your drives. If they work, then your system is ready to be reassembled.



The article written by Charles C. Bundy IV, will be included for your reference. **Note on the article.** With this E-Clock fix board you do **NOT HAVE TO CUT ANY TRACES**, as was stated in that article. This was done for ease of installation and removal if necessary.

The GlenSide Color Computer Club.

Docs and Boards prepared by Brian Schubring.

Editor's note:

This is off the Internet via Marty Goodman, Art Flexser, Hugh P. Kelly and whoever was the kind person who downloaded it to Cup of CoCo. My thanks to them, Mr. Bundy, and any other intermediaries!

E-Clock Modification

by Charles C. Bundy IV

DATE: March 27, 1991

COMMENT: This document is PD, and the author assumes no liability for damage done to computing equipment. The subject of the article has been built and tested and has been working since 1987. I have made every attempt to double check my instructions and schematics for errors, but cannot gurantee they do not exist. This fix requires direct motherboard modifications and as such is highly susceptible to damage of said motherboard. Proceed with caution, and good luck!

The CoCo III has a slight timing problem with SCS/CTS/ROM selects. This is due to IC9 (74LS138) being selected (i.e. transiting) during an entire E-clock cycle instead of being gated to the READ portion. The tech manual quotes "Due to the nature of the ROMs and in order to prevent data bus contention, the ROMs are enabled only during the E portion of a read cycle." pp 36. This is blatantly false when you look at IC9 it has both *G2A and *G2B and G1 mux selects tied wide open! The fix came from the Motorola 8-bit Microprocessor Handbook Data sheets on the MC6883 SAM (GIME's father :-)).

Take a 74LS02 NOR gate and tie one input to pin 3 of IC9. Cut the connection between *G2A and ground. Tie the NOR gate output to *G2A of IC9 (pin 4). Tie the other NOR gate input to the E-clock output at the intersection of R9 (47ohm resistor) and C10 (39pF capacitor). R9 is coming from pin 6 of the GIME chip. Make sure you tie pin 14 of the 74LS02 to pin 16 of IC9 (+5v) and pin 7 of 74LS02 to pin 8 of IC9 (Gnd). This is not something for the weak of heart to try! At the very least you will have to remove the motherboard from the case (unless you clip IC9's little leg!) and cut a trace on the bottom of the motherboard. I cut/desoldered IC9, replaced it with a socket and built a little daughterboard which held a new IC9 plus 74LS02.

This fix resulted in the following improvements on my system -

(1) Sparklies disappeared on graphics screens under OS9. (GIME chip circa 1986)

(2) Before the fix, I had blob problems (expr. yielded ~1 in 4). I no longer have the BLOB.

(3) My Performance Perp. No Halt controller wouldn't run reliably in No Halt mode with the Burke & Burke RTC Hard Disk interface. They coexist peacefully with the fix.

*** Note: an article in "The Rainbow" said that Disto products "depended"? upon the timing not corresponding to the E clock. My personal opinion is: bull twinkies. As far as I know all Disto products should work with CoCo's 1 and 2 which do have the proper E-clock gating. Remember, that is just my opinion and all Disto users should be prepared for this fix not working. (If you put a socket in and build the daughterboard you can have it either way...)