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64K MODIFICATION

The 32K Color Computer has always compared favorably to the Apple II, at least in terms of price, its 6809 microprocessor, and its use of Extended Color Basic. In the past, however, the Apple II had the edge in RAM size and software availability.

Now all that has changed. With the 64K modification described in this article and the availability of the FLEX operating system, which allows a plethora of software to run on the CoCo, the Color Computer has outdistanced the Apple II.

When you add the larger high-resolution display options now available for the CoCo, you have an even more impressive machine.

Identifying Your Board

To find out which board your computer has, look at the lower right side of the board, where there is a series of numbers followed by a letter. This letter indicates which board you have.

If you have a D board, the list of parts needed for the 64K modification is surprisingly short. (See Table 1.) If you have experience working with printed circuit (PC) boards, this modification will cost less than \$100—and even less if you already have the 1.1 ROM.

If you have an E board, all you need is some wire. If your board has no letter following the number, it is an F board. Computers that have F boards do not

You can bring your Color Computer up to its full potential by adding memory chips yourself.

have a black border surrounding the keyboard. All TDP-100s use the F board.

If you have an F board, your job is easy. If you have a 32K F, all you need is the software to get 64K. If you have 16K F, remove capacitors C58, C60, C62, C64, C66, C68, C70, and C72. Replace your 16K chips with 4164s and set the jumpers to the 64K position. You must add one jumper to the board, but the position requiring the jumper is clearly marked 64K.

Converting D Boards

The first step in this 64K modification is to upgrade all older D boards to E status. Unplug the machine, turn it upside down, and loosen the five screws holding the case together. The fifth screw is under the black warranty label. Place a piece of masking tape over each hole with the screw still in it so it will not fall out.

With the computer rightside up, remove the top cover. Unplug the keyboard and put it aside. After clipping the two plastic cable ties, remove the

metal shield covering the section of the board that contains the central processing unit (MC6809), synchronous address multiplexor (MC6883 SAM), two peripheral interface adapters (MC6821 PIAs), video display generator (MC6847 VDG), and memory.

Disconnect the power supply from the PC board. It has five plug-in leads. Remove the 10 #6 1/2-inch Phillips-head screws that hold the PC board. After you remove the screws, pop the 16 metal fasteners that protrude through the board.

At this point, with the board removed from the base, perform the following steps:

1. Remove the eight dynamic RAM chips. They are labeled U20-U27 on the board. The RAM chips are 4027s if you have a 4K machine or 4116s if you have a 16K machine. If you performed my piggyback modification (*80 Micro*, March 1982, p. 126), also remove the wire from pin 35 of the SAM chip.
2. Remove the 6883 SAM chip U10 with care. This chip is highly susceptible to static discharge.
3. Turn the PC board over so that you are looking at the foil side. Refer to Fig. 1 and cut the following lands:
 ● the -5 volt land at "A"
 ● the +5 volt land at "B"
 ● the +12 volt land at "C."
 Make these cuts cleanly and about 1/16-inch wide. Use a high-quality cutting tool, such as an Exacto knife with a #11 blade.
4. Remove a portion of the green film at point D to expose the lands for soldering.

● 1.1 Color Basic ROM (RS #AXX3052)—I paid \$36.30 at my local Radio Shack store. To find out if your computer already has this part, type EXEC 41175. If your computer displays Color Basic 1.1, you have it. If it displays Color Basic 1.0, you do not.

- eight 64K dynamic RAMs (I used NEC 4164s)
- one 33-ohm, 1/4-watt, 10-percent resistor
- a 12-inch length of 30-gauge wire-wrap wire
- a 6-inch length of insulated AWG 26- or 28-gauge wire
- a small piece of spaghetti insulation or electrical tape

Table 1. Parts List for the 64K Modification

System Requirements

**16K RAM
Color Basic**