CONSTRUCTION PROJECT

Six Hi-Res Colors For Your Apple Easy And Safe Custom Circuit Wiring

For less than $7.00 worth of parts, you can add TWO MORE COLORS to your Hi-Res graphics! There are indeed, more colors locked up in your APPLE and an hour or so of time breaks them free.

The June 1979 issue of BYTE contains an article by Allen Watson III and a "Step-by-Step" set of instructions by Steve Wozniak for how to convert to SIX COLORS!

I have converted the WOZ schematic into a wiring diagram which, with the wiring approach I am going to suggest, makes the conversion both easy and safe.

If you're like I am . . . basically chicken when it comes to fiddling around inside my APPLE . . . here's a tip that may help your courage. After studying the instructions and after deciding to follow them carefully, buy 5 WIRE-WRAP SOCKETS when you go to get your chips (shown below). Then, when you sit down to disassemble your APPLE, *don't cut, solder, or do anything on your main board.* Do all your wiring "Off-Line" using your wire-wrap sockets. When you have the whole circuit wired, (using the wire-wrap sockets in place of the I.C.'s on the board), you can gently remove the APPLE I.C.'s from the Board, plug them into your *PRE-WIRED* sockets, and then plug the *whole circuit* into your APPLE.

I use this method for all custom wiring in the APPLE. The wire-wrap sockets give plenty of space for soldering, and they're easy to handle when it comes to plugging them into the board. In this manner, if I make a mistake somewhere, I can get "back to where I was" without having made irreparable alterations to the APPLE board.

The additional colors derive from the bit positioning on the screen, and the original APPLE II's don't make use of the High-Order bit of the color bytes. The little circuit activates the High-Order bit and adds BLUE and ORANGE to the basic repertoire of VIOLET, GREEN, WHITE, and BLACK.

Remember: Adding this circuit voids your warranty so don't do it until you've had your APPLE at least 90 days.

I've used "The Wire Wrap Method" to build and install a "Home-Made Numeric Keypad", "Double Joysticks", and a few other things. It works!

Instructions For Wiring Two More APPLE Hi-Res Colors!

The wiring diagram (on left) shows specifically how to build the "More Colors" circuit. The five I.C.'s at the top are already on your APPLE printed circuit board. The two NEW I.C.'s are 74LS74 and 74LS02. (Remember: Adding this circuit voids your 90-day warranty).

A TOP VIEW of the board shows the "APPLE I.C.'s by their location on the main printed circuit board. These locations are B8, B11, and A8-10. They are clearly marked on the APPLE board. Using the "Wire-Wrap Socket Method" of wiring, all you will have to do is remove the APPLE BASE from its cabinet. The steps for doing this are:

1. Remove the ten screws securing the plastic cabinet to the metal bottom plate. Six of these screws are around the perimeter and Four are along the Front lip of the computer.

2. Carefully lift the cabinet from its base. Be very careful to DISCONNECT THE RIBBON CABLE CONNECTING THE BASE TO THE KEYBOARD, while you remove the cabinet.

3. Disconnect the Power Supply from the printed circuit board.

Now wire the circuit using 5 Wire Wrap sockets for the APPLE I.C.'s. When you have finished wiring the circuit, making all of the solder connections to the pins of the sockets, you can simply remove (gently) the APPLE I.C.'s from the printed circuit board, plug them into their designated sockets, and then plug the sockets back into the printed circuit board.

The two NEW I.C.'s can be mounted on a small piece of Perf Board and bolted to the base in the empty space at the rear, right-hand area of the base.

VERY IMPORTANT: Note that six of the APPLE I.C. pins have small "Arrow" designations. These are pins which are to be lifted from their sockets and bent so that they are not returned to their sockets. This is to establish a NEW CONNECTION, and it is greatly simplified by simply bending the pins on the Wire-Wrap sockets before inserting them in the printed circuit board. These pins are as follows: I.C. A8: PINS 1, 6, and 13/I.C. A9: PINS 1, 2, and 9.

With this method, the degree of disassembly of your APPLE is minimal. You never touch the board with your soldering iron or a knife. And the only handling of the APPLE I.C.'s is to gently remove them and replace them in the "already-wired sockets" of your circuit.

When you have finished, re-attach the keyboard ribbon cable and the power cable and bolt the cabinet back to its base and you're finished. You have now increased your High Resolution Color capability by 50% and now you have VIOLET, GREEN, WHITE, BLUE, ORANGE, and BLACK! The Parts list for this circuit follows. All part numbers are from Radio Shack.
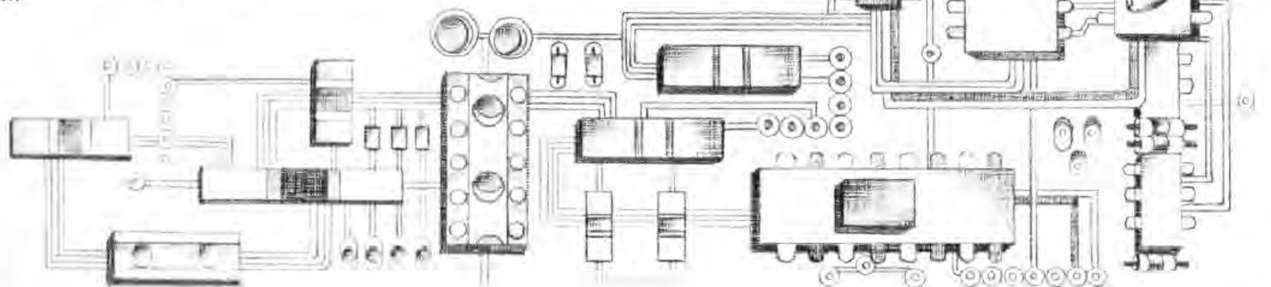
3 Packages	
16-pin Wire Wrap Sockets part # 276-1944	
1 package	
14-pin Regular Sockets	part # 276-1999
1 I.C.	
74LS74	part #276-1919
1 I.C.	
74LS02	part # 276-1902

The total parts list should cost less than $7.00.

**6 High-Resolution Colors
for the Apple**
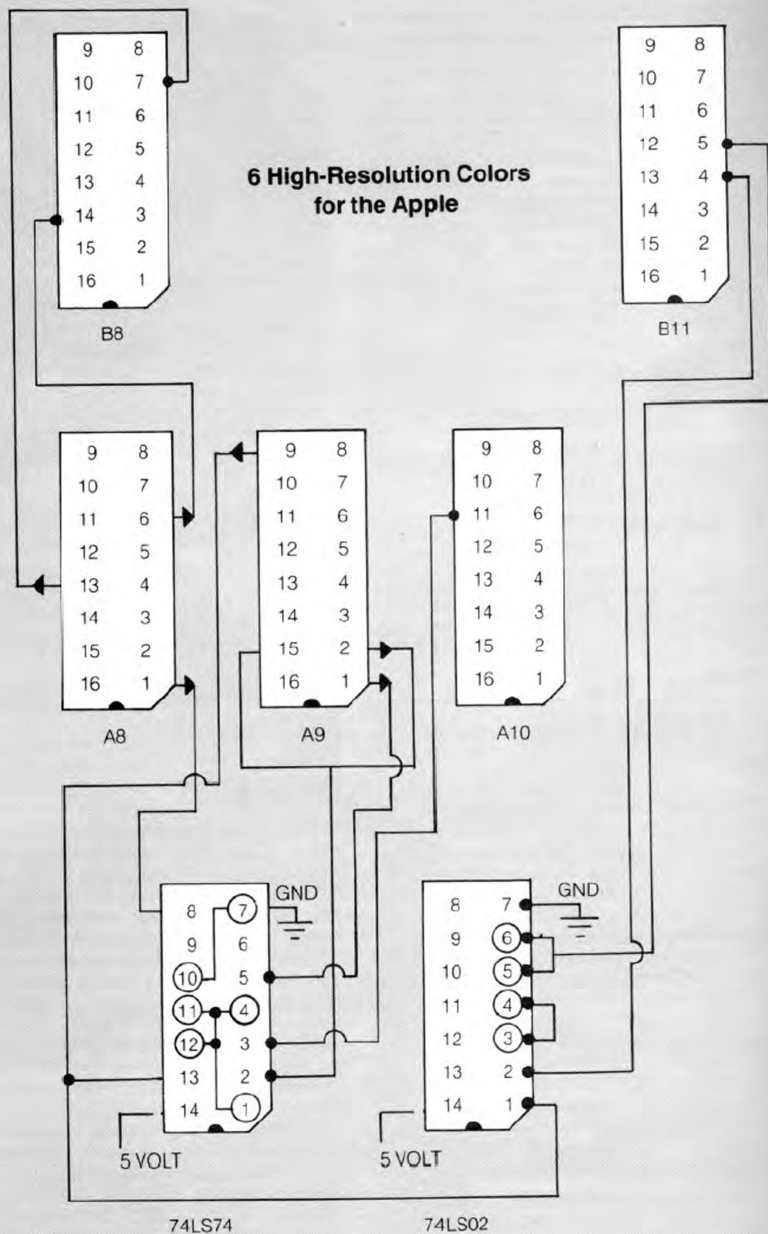
TOP VIEW

▽

(TOWARD KEYBOARD)

NOTE: → INDICATES A PIN THAT IS LIFTED FROM
ITS SOCKET AND BENT SO THAT IT IS
← NOT RETURNED TO ITS SOCKET

⑥
⑤ INDICATES PINS CONNECTED TOGETHER
ON THE SAME I.C.