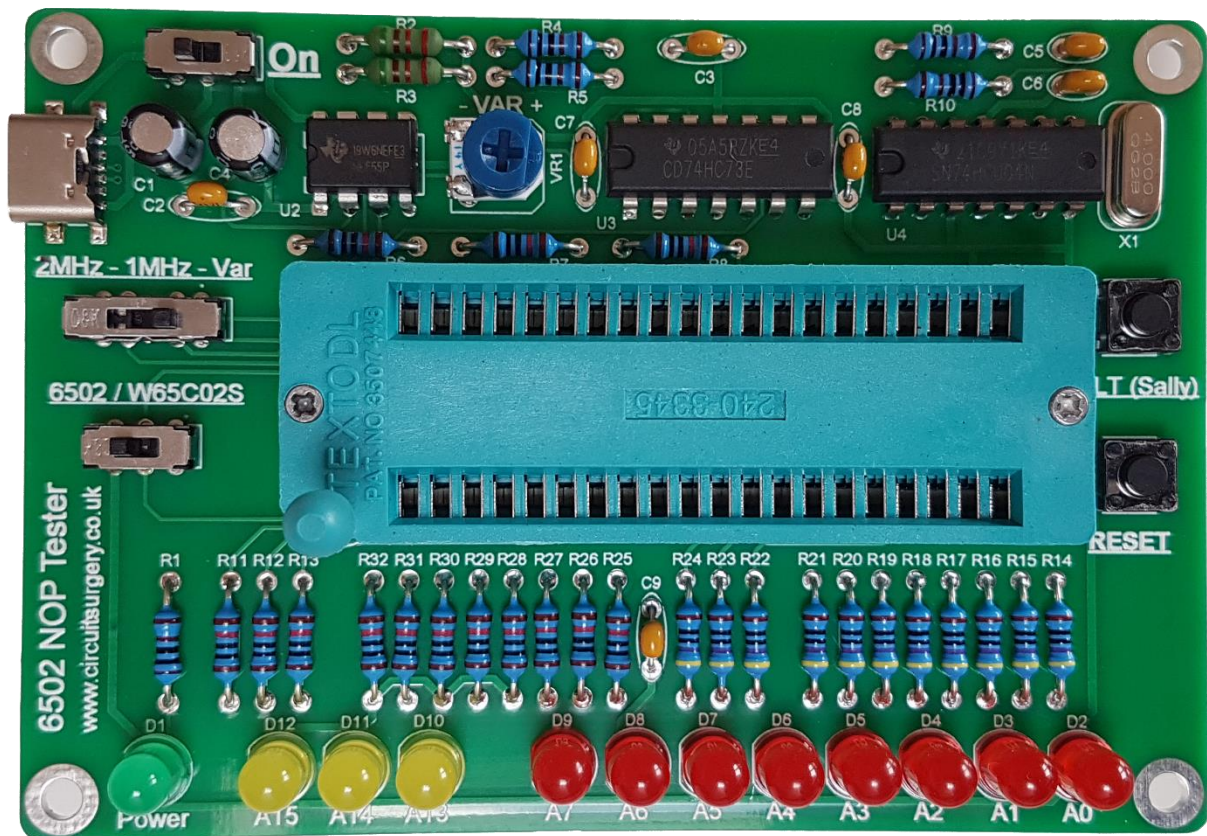


6502 / W65C02 NOP Tester

User Manual



www.circuitsurgery.co.uk



Introduction

The 6502 CPU is used in a number of vintage computers and games consoles including the Acorn BBC Micro, Apple I & II, Commodore 64, PET, Atari, Nintendo, and many more. Due to its popularity, there are numerous fake CPUs on the market, as well as, of course, genuinely faulty devices.

This tester allows you to perform a quick test of a 6502 CPU to determine if the chip is likely to be good or is faulty or fake.

It does this by presenting a permanent "NOP" (No Operation) instruction on the data pins of the device under test so that it will step through all the 64k addresses in sequence if it is not faulty or fake. The progress is displayed by the LED's.

Features:

- Drives the CPU under test at 1MHz, 2MHz, or a slower, more visible, speed, switch selectable.
- The slow speed can be varied by means of the on-board potentiometer.
- Switch selection of 6502 or W65C02 CPU variants.
- "Halt" button to test for "Sally" variant.
- "Reset" button to start the CPU without having to switch the tester off/on.
- LED's display the status of most of the address lines.
- ZIF (Zero Insertion Force) socket for the CPU to be tested.
- USB-C socket for connecting power to the tester from any USB power adapter.
- Power On/Off indicator LED.
- Fully through-hole technology (except the USB-C socket).
- Mounting holes enabling the tester to be fitted into a case or on feet

Note that whilst this tester can indicate a faulty or fake device, due to the complexity of such CPUs, it does not prove the device to be fully functional in all respects.

Use



Power

The tester is powered through the USB-C socket at the top left of the unit. Any standard USB power adapter or device capable of providing a small amount of power via a USB port may be used.

Insert device

Before inserting the device to be tested, ensure the tester is turned off.

If testing an original 6502, the device switch should be positioned to the left, or for a modern WDC W65C02, move it to the right.

Raise the lever and place the device into the zero-insertion force socket. Make sure pin 1 of the device is nearest the lever. Pin 1 is usually marked with a notch at one end of the device, so that end will be at the same end of the socket as the lever. The lever may now be lowered to lock the device in the socket, and the tester can now be switched on.

A functioning 6502 will normally start working straight away, but if the LEDs appear to be “stuck”, it may be necessary to briefly press the “Reset” button.

Speed selection

To begin with, set the speed selection switch to the “Var” position. This clocks the device at a slow speed which allows the red LEDs which are connected to the lower half of the address bus to be seen counting up in binary as the device steps through its address range. The speed can be varied by a small amount by adjusting the potentiometer at the top of the tester.

It should be noted that whilst most 6502's seem to be happy running at such a low speed, it is, nevertheless, well outside its operating specification and it is possible that the device being tested

may actually work fine at its designed speed whilst failing to run at the slow/variable speed, so in the event that your device appears to fail that test, it may be worth moving on to the next section.

Moving the switch to the 1MHz or 2MHz positions will apply the respective clock speeds to the device. At these speeds, the address bus is changing far too rapidly for the human eye to see the red LEDs counting, however it should be possible to see the yellow LEDs connected to the three most significant address bus bits counting. Operating the tester at these speeds makes it possible to observe the device pins running at the normal operating speed using an oscilloscope.

Sally

A “Sally” variant of the 6502 can be checked for by pressing the “Halt” button whilst the test is running. If the device is the “Sally” variant the counting will stop, otherwise this button will have no effect.

Reset

The reset button does what it says, i.e. it resets the device in the test socket. When a working 6502 is reset the LEDs will briefly appear to illuminate in a random fashion before turning off and starting to count.

