

# SO6502 - Version 1



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## Overview

The SO6502 is an SBC (Single Board Computer) based on the W65C02 8-bit microprocessor. Many home computers of the late '70s and '80s, like the original Apple and Apple ][, Commodore Pet, Commodore Vic 20 and Commodore 64, used the 6502 CPU, or a variant of it.

## Features

- W65C02 microprocessor running at 10MHz
- 32KB RAM
- 32KB ROM
- W65C22 VIA providing two bidirectional 8-bit I/O ports
- NXP SC28L92 DUART providing two full-duplex asynchronous receiver/transmitter channels
- 22V10 PLD providing address decoding, qualified read and write signals and wait states for slower devices
- MAX238 RS-232 line driver

## Assembly

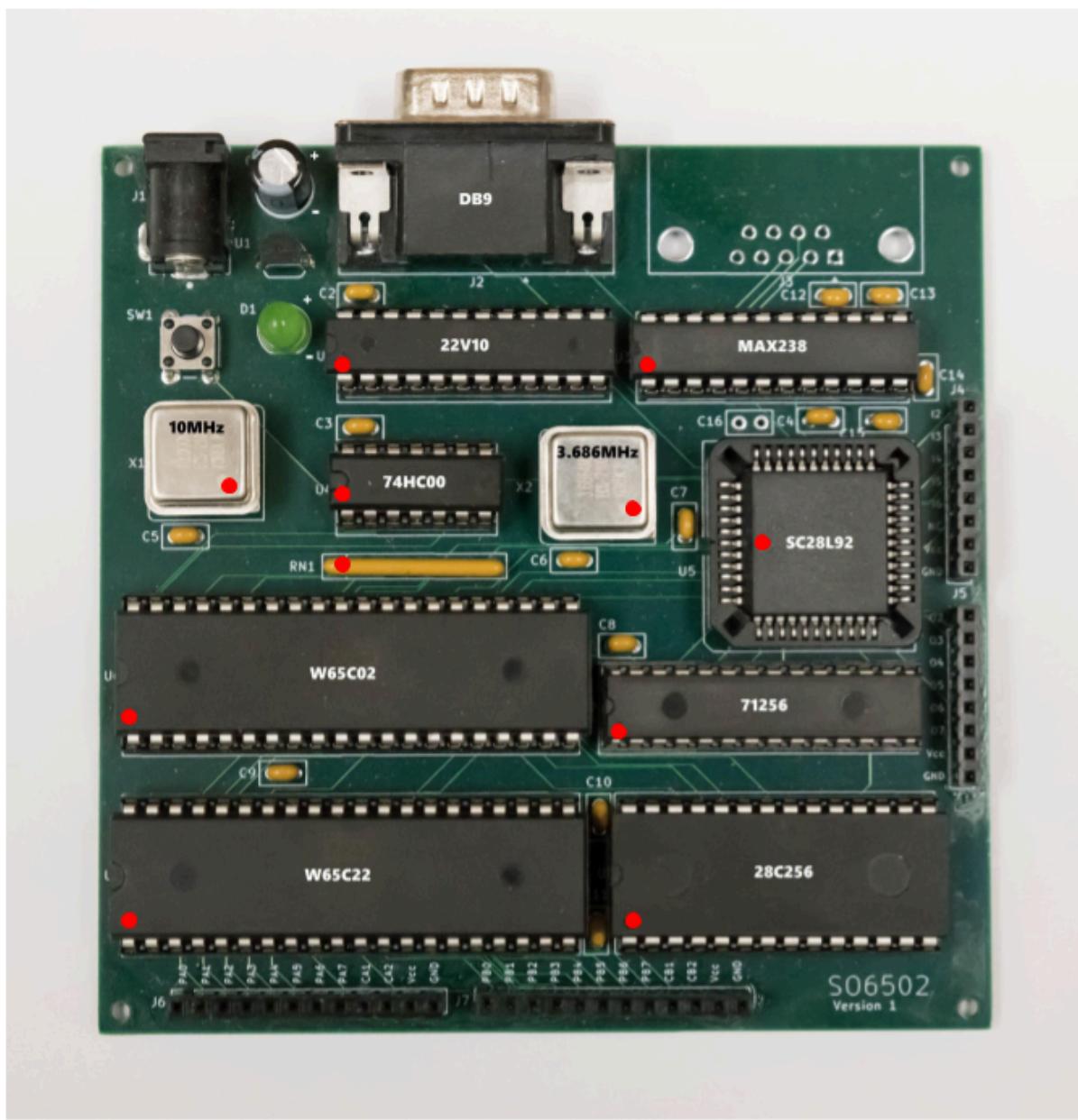
The various components must be installed onto the PCB and soldered in place. The components should be installed so that they are flush with the surface of the PCB. When soldering, use enough solder to ensure a good connection, but not so much as to create a solder bridge between adjacent pads. Use enough heat to quickly melt the solder, but work quickly to avoid overheating the PCB or components.

## Component Locations and Orientation

It is crucial to orient the components correctly when they are installed. Each of the rectangular ICs has a small half-circle or notch on one end of the chip. The IC sockets have a similar notch. There is a small half-circle printed on the PCB that corresponds to the notches on the IC sockets and ICs. Aligning the notches when installing the IC sockets and ICs will ensure the ICs are oriented correctly.

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The following image shows the location and orientation of the various components.



All of the rectangular ICs are oriented in the same direction, with the notch to the left. Take special care with the SC28L92 IC. The socket has 3 rounded corners and one corner with a 45 degree angle. This corner must be aligned with the 45 degree angle printed on the PCB. The SC28L92 IC package has a small dimple next to pin 1. The IC should be oriented with this dimple to the left.

The components are installed in order from the shortest/smallest to tallest/largest. This will help ensure that there is ample room to install each component. Trying to install the small capacitors after the IC sockets have been installed could prove difficult.

Use the following checklist to install each of the components in the proper location:

- Install the 0.1uF capacitors in locations C2, C3, C4, C5, C6, C7, C8, C9, C10 and C11
- Install the 1.0uF capacitors in locations C12, C13, C14 and C15
  - (i) Location C16 is left empty.
- Install crystal oscillator sockets X1 and X2
  - (i) The oscillator sockets are square, and can be installed in any orientation. However, you may want to orient them the same as the IC sockets for consistency.
- Install IC sockets U2, U3, U4, U6, U7, U8 and U9
  - ! Remember to align the notches in the sockets with the half-circle printed on the PCB.
- Install PLCC 44 socket U5
  - ! Align the corner of the socket with the 45 degree angle with the 45 degree angle printed on the PCB.
- Install resistor network RN1
  - ! One end of the resistor network has a small dot printed on it. Orient the resistor network with the dot closest to the RN1 label printed on the PCB.
- Install headers J4, J5, J6 and J7
- Install DB-9 connector J2
  - (i) DB-9 connector J3 is available for future expansion.
- Install the power socket barrel jack in location J1
- Install the reset push-button switch in location SW1
- Install the 100uF capacitor in location C1
  - ! The 100uF capacitor is polarized. Ensure that it is oriented correctly.
- Install the DS1813 reset IC in location U1
  - ! Ensure that the DS1813 reset IC is oriented correctly.
- Install power LED D1
  - ! Ensure that the LED is oriented correctly.

After installing the capacitors, sockets and connectors, but before inserting the ICs into the sockets:

- Trim any long leads protruding from the bottom of the PCB
- Clean any solder flux residue from the PCB
- Inspect the PCB and verify the solder joints are good and there are no solder bridges between adjacent pins/pads
- Using a multimeter, verify there is not a short circuit from +5V to GND

Before inserting the ICs into the sockets:

- Connect the power adaptor to the barrel jack, turn on the power and verify the power LED illuminates

Disconnect the power and insert the ICs into the sockets, remembering to orient them correctly:

- Insert the 22V10 IC in the U2 socket
- Insert the MAX238 IC in the U3 socket
- Insert the 74HC00 IC in the U4 socket
- Insert the SC28L92 IC in the U5 socket
- Insert the WD65C02 IC in the U6 socket
- Insert the 71256 IC in the U7 socket
- Insert the WD65C22 IC in the U8 socket
- Insert the AT28C256 IC in the U9 socket
- Insert the 10MHz crystal oscillator in socket X1

 Ensure that the dot printed on the oscillator is lined up with the square corner printed on the PCB

- Insert the 3.686MHz crystal oscillator in socket X2

 Ensure that the dot printed on the oscillator is lined up with the square corner printed on the PCB

## Powering Up

After double-checking that all of the ICs are inserted correctly, connect a serial cable between the DB-9 connector on the SO6502 and your computer. Launch a serial terminal program, such as PuTTY or Tera Term, configured for 57,600 baud, 8 data bits, no parity, 1 stop bit and RTS/CTS flow control.

Connect a power adaptor to the SO6502 and turn it on. Quickly turn the power off if any heat or smoke is observed. If everything is working correctly the SO6502 will print a message on the serial terminal.

-  When not driving any outputs the SO6502 should draw less than 100mA.

## Memory Map

0000..7FFF	RAM
8000..800F	SC28L92
8010..801F	W65C22
8020..802F	Spare
8030..FFFF	ROM