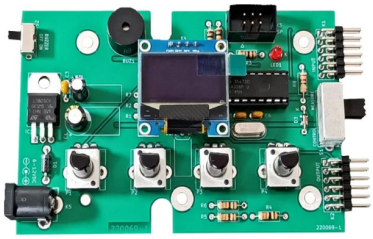
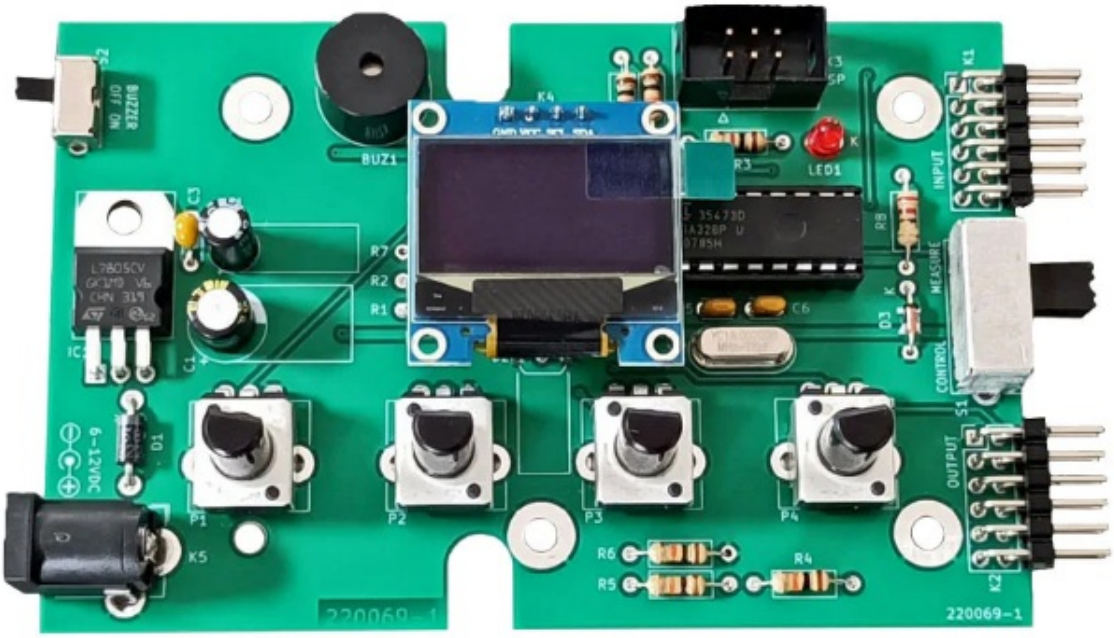


Elektor 20624 Super Servo Tester Kit User Guide

Elektor
Super Servo Tester Kit
User Guide

Contents

20624 Super Servo Tester Kit

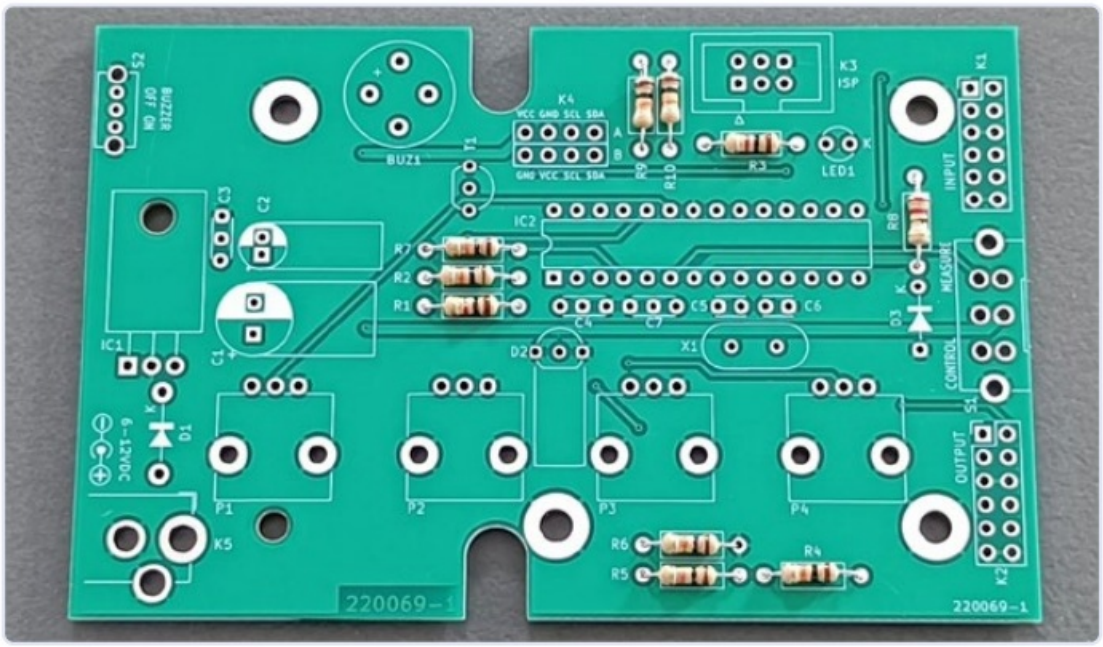


Project nr. 220069, version 30/11/2023

The Elektor Super Servo Tester can control servos and measure servo signals.
It can test four servo channels at the same time.
The Super Servo Tester comes as a kit. All the parts required to assemble the Super Servo Tester are included in the kit.

Assemble the PCB

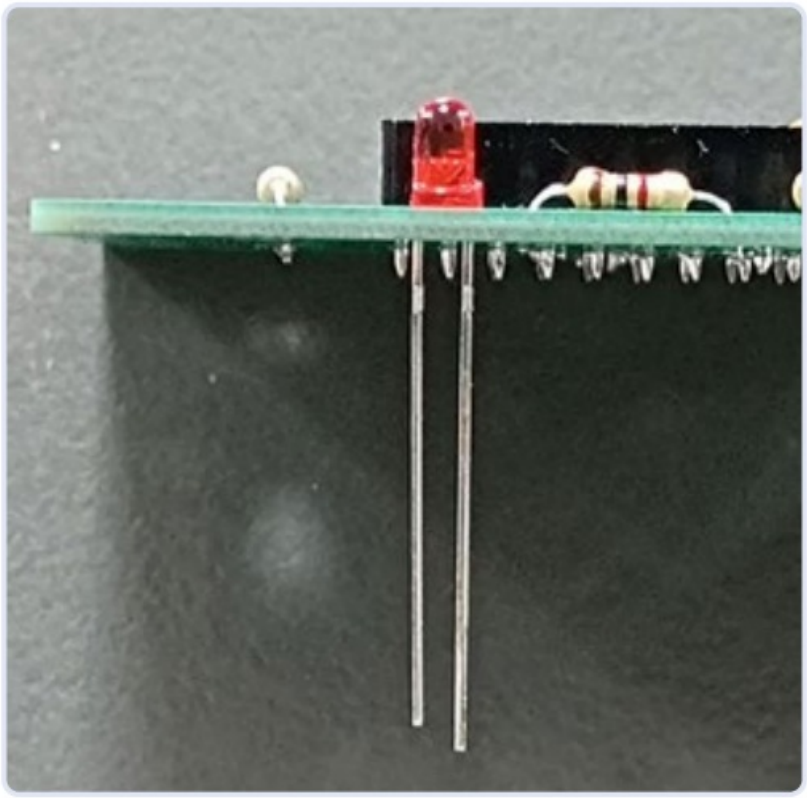
Assembling the circuit board is easy. The mounting order is based on component height.
Start with soldering the lowest parts: the resistors and the diodes D1 and D3.
Be careful with the polarity of the diodes.

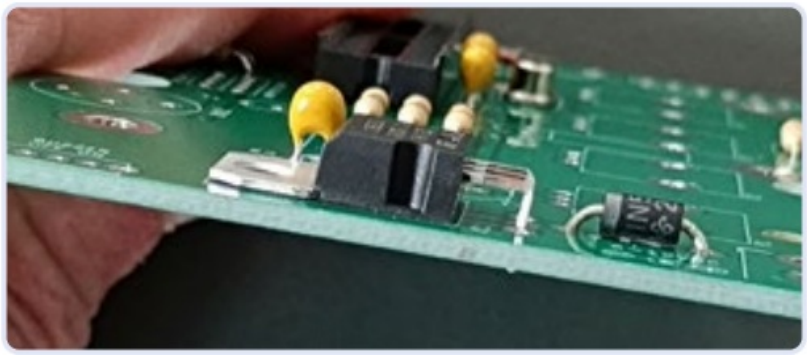


Mount the crystal and the 22 pF capacitors C5 and C6.

Insert the socket for IC2. Before soldering it, make sure it points in the right direction. Also mount the three 100 nF capacitors.

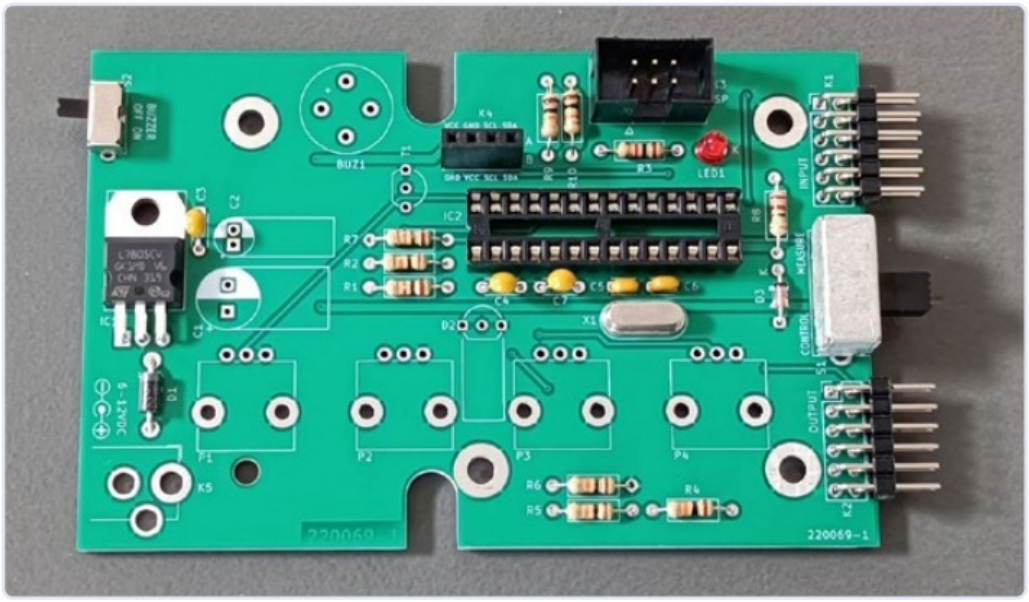
Next, insert the 3-mm LED. Make sure to put the LED in in the right way. The short pin goes in the hole labelled ‘K’.



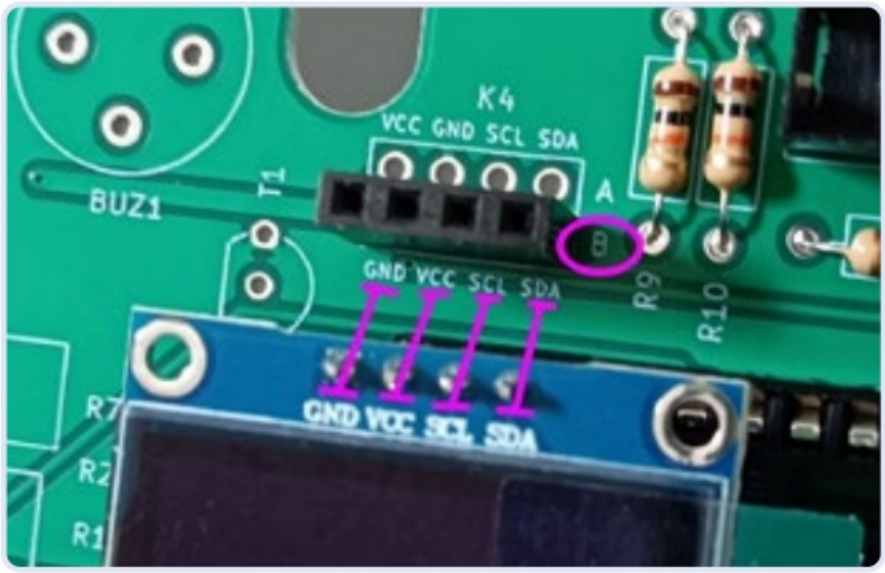


IC1 is intended to lie down on the board and now is a good time to solder it onto the board. Use pliers to bend its pins.

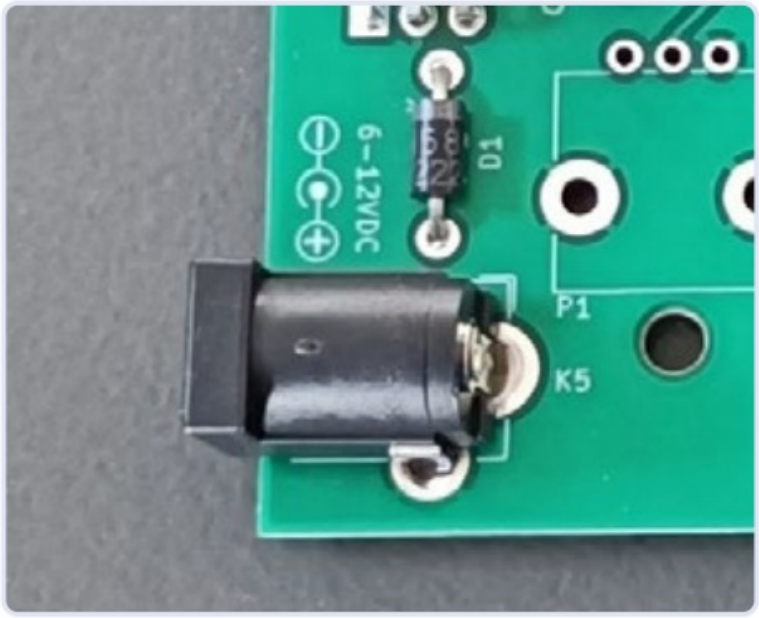
Now mount headers K1 and K2 and the small slide switch S2.
Mount the large slide switch S1, and header K3. The open side of K3 should look at IC2.

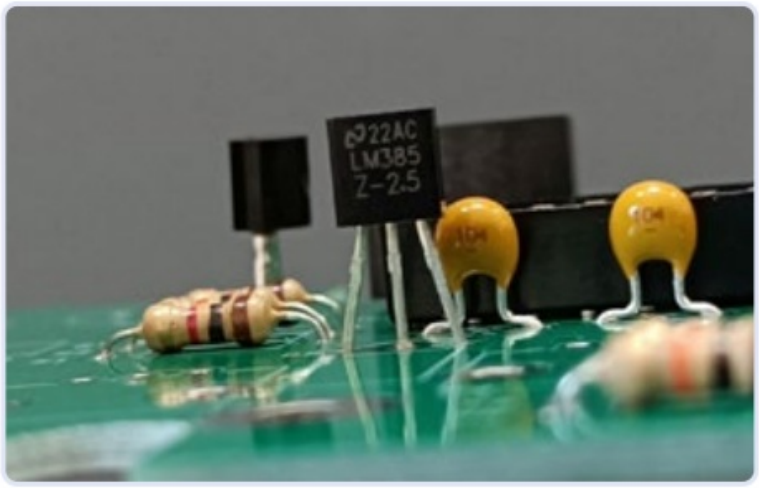


Mount socket K4. Choose row ‘A’ or ‘B’ depending on the pin labels on the OLED display. Make sure that the labels on the display are in the same order as the labels for K4.

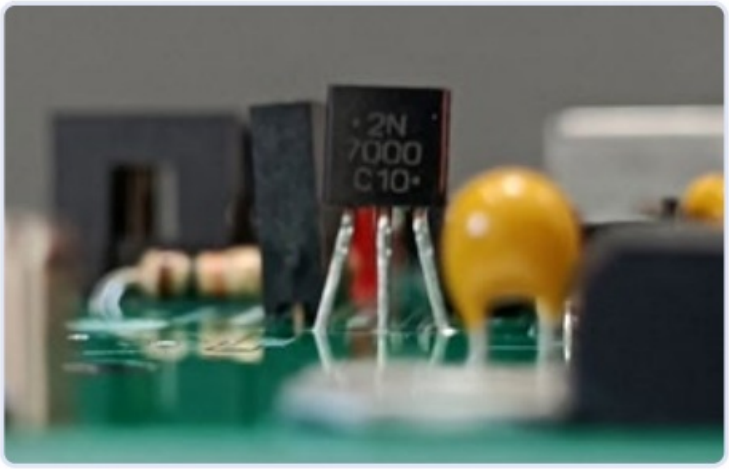


Next, insert the 100 µF electrolytic capacitor C1. Respect its polarity. It may be mounted horizontally.
Mount power connector K5.





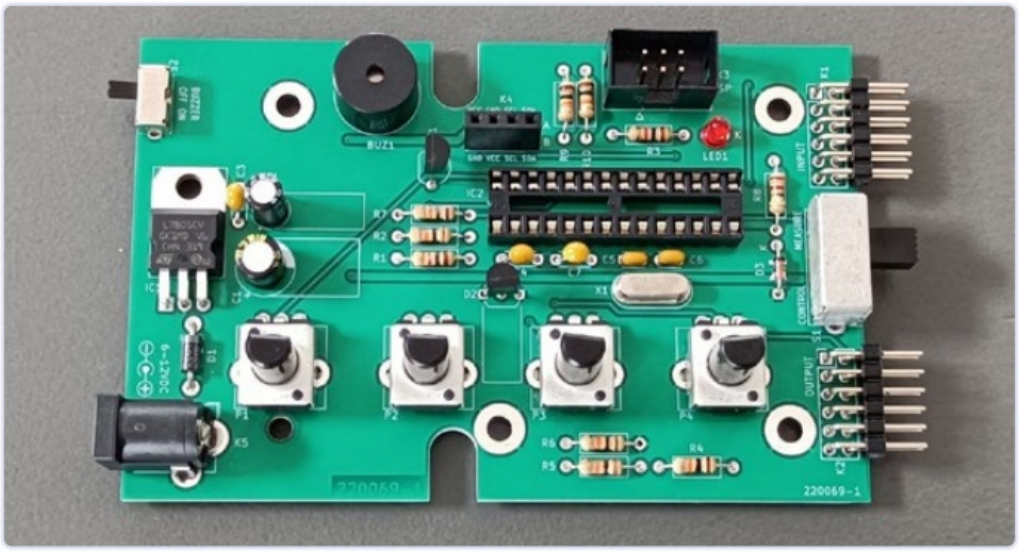
Insert the 3-pin diode D2, the LM385. Be careful as it looks the same as T1. Respect its orientation. It may be mounted horizontally.
Insert transistor T1, a 2N7000. Be careful as it looks the same as D2. Respect its orientation. It may be mounted horizontally.

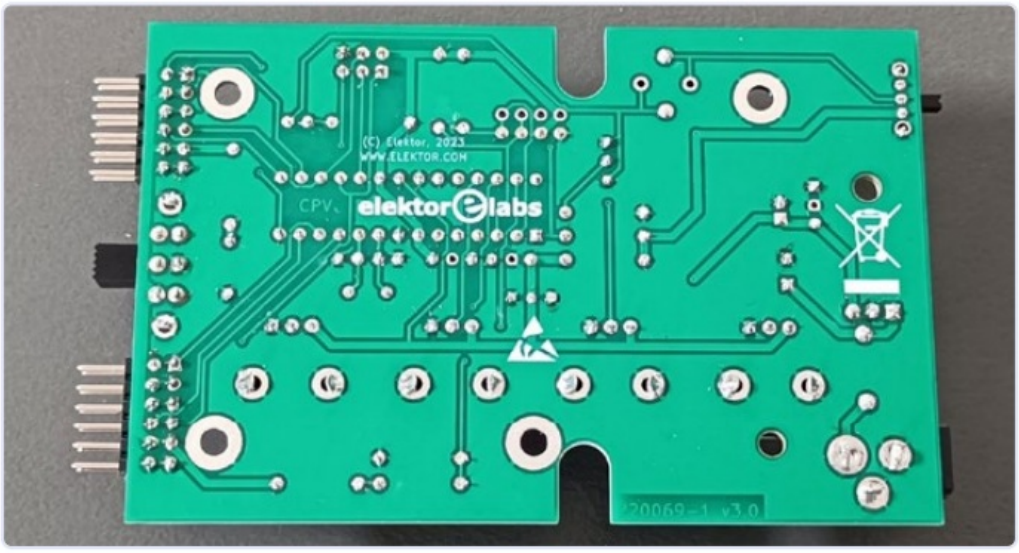


Solder the buzzer on to the board. Choose the two pins that fit best and respect its polarity. Peel off the seal when done.

Insert the 10 µF electrolytic capacitor C2. Respect its polarity. It may be mounted horizontally.

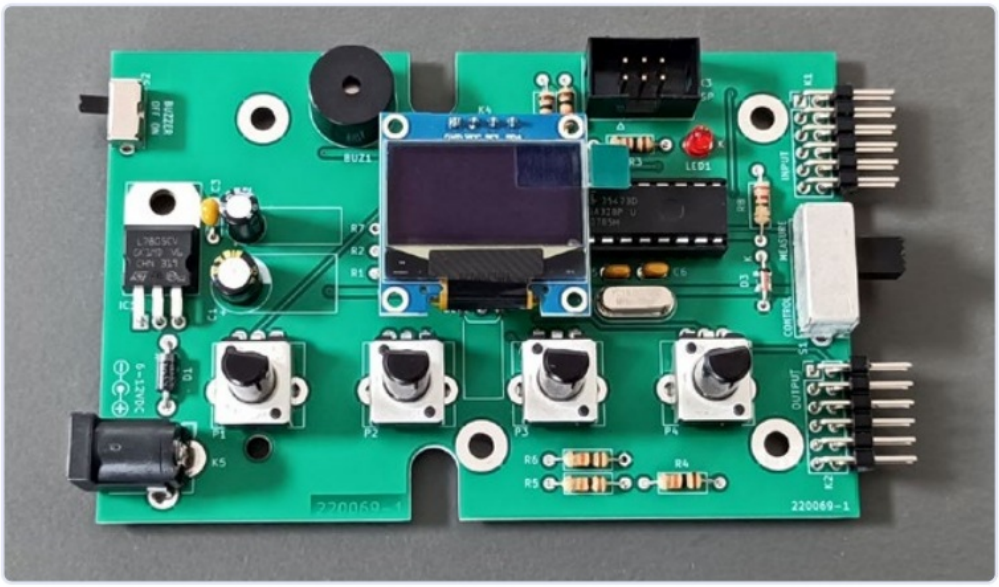
Finally, solder the four potentiometers P1 to P4 to the board. Make sure to also solder their mounting pins. Check once more the orientation of all the components and check your soldering.





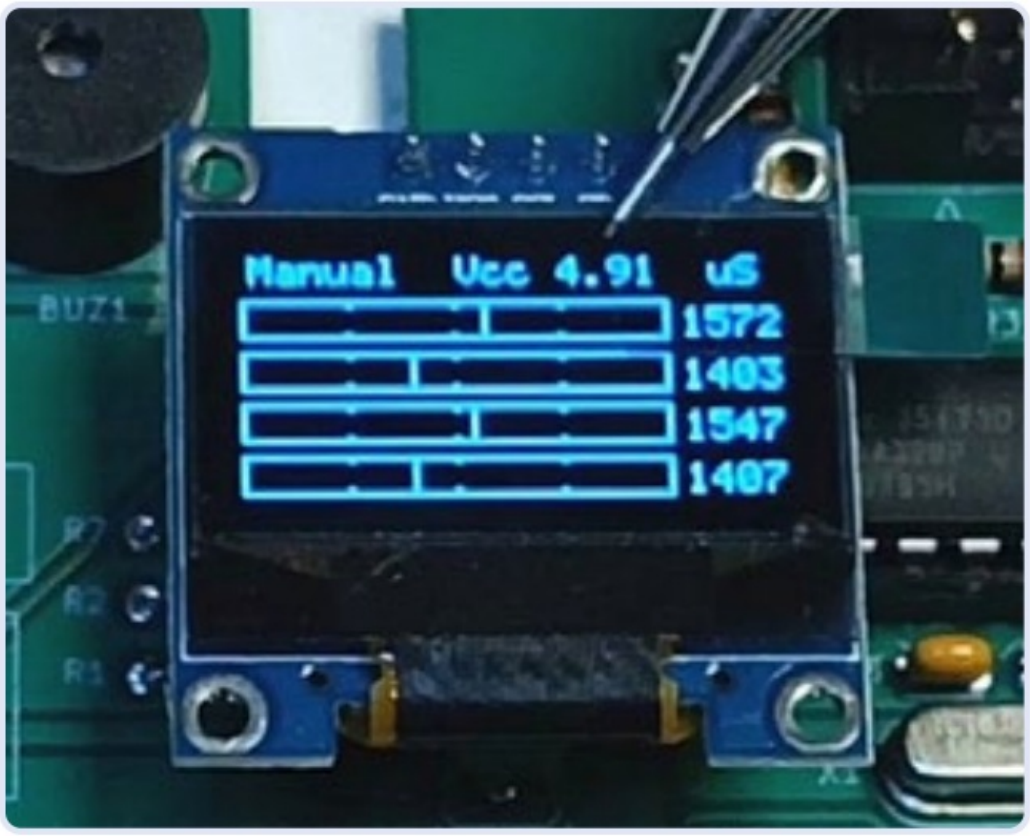
Insert IC2 in its socket.

Plug the OLED display on its socket K4. Make sure that the labels on the display are in the same order as the labels for K4.

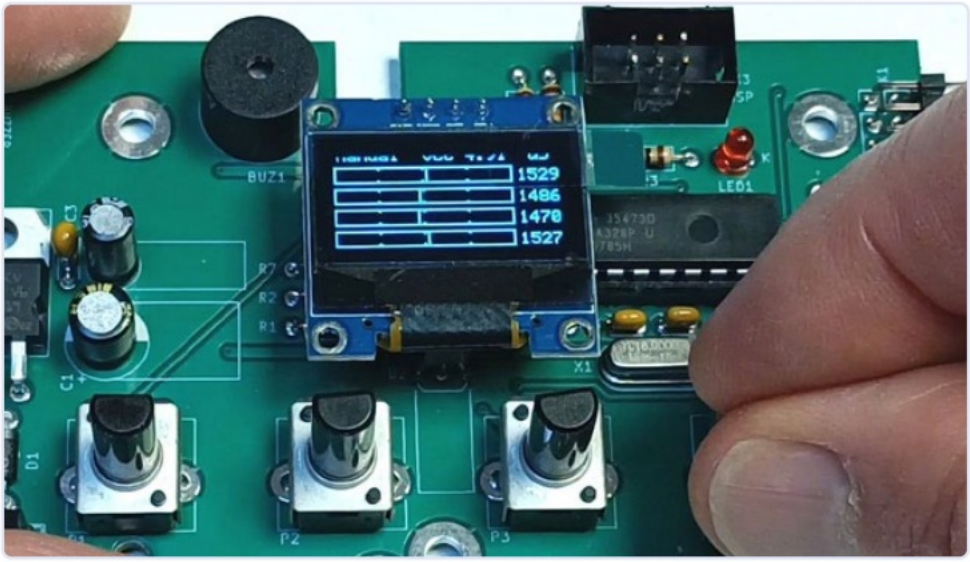


First Power-On

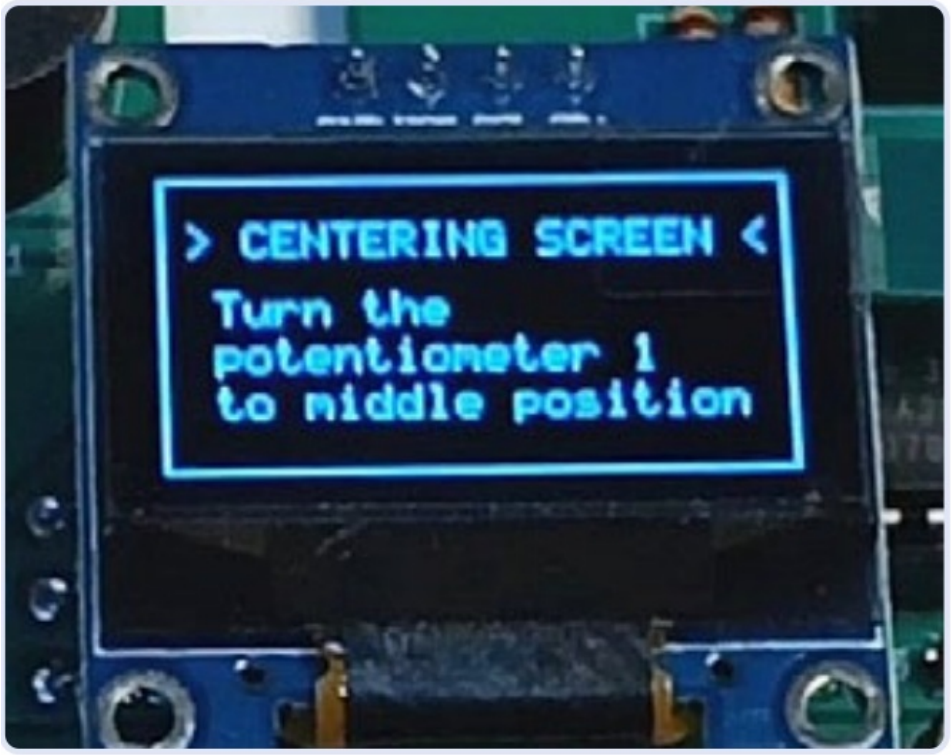
Slide S1 to the Control position, this means downwards, towards the potentiometers.
Turn the potentiometers to their middle position except for P4. Turn P4 all the way to the left, which is zero.
Connect a 7V to 12V DC power supply to K5. The center pin is plus. Switch the power supply on.
The display will show a welcome screen for a few seconds and then a stack of four rectangles appears. This is Display Mode 1, Stack Display. Turn the potentiometers to move the vertical lines inside the rectangles. The numbers to the right of the rectangles should change too.



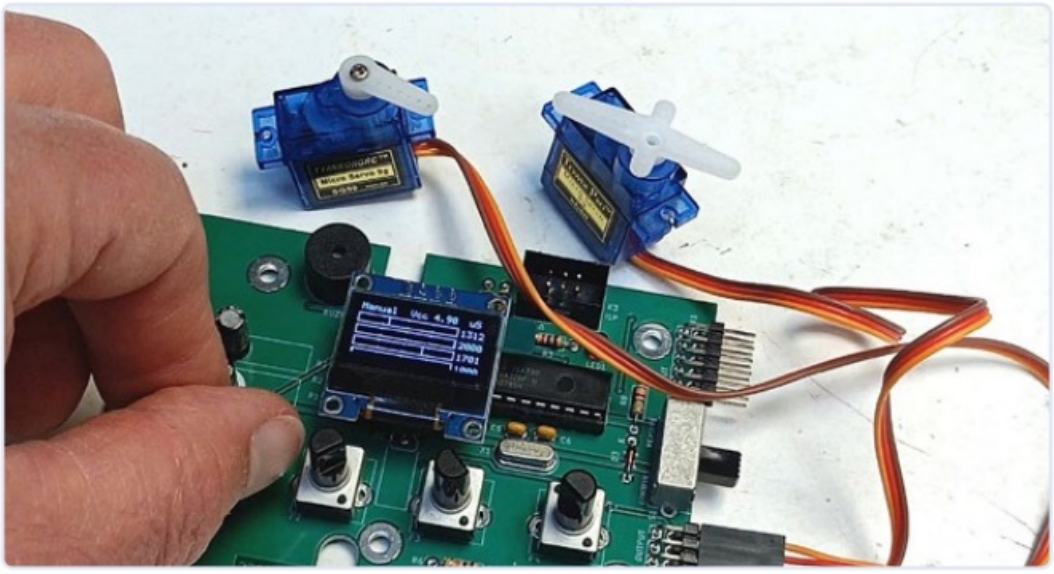
VCC should be close to 5 V.
Switch off the Super Servo Tester.
Turn P4 all the way to the right, which is maximum.
Switch on the Super Servo Tester.
After the welcome screen disappears, a 2 × 2 grid of four rectangles is shown.
This is Display Mode 2, Grid Display. Turn the potentiometers to move the vertical lines inside the rectangles. The numbers below the rectangles should change too.



Switch off the Super Servo Tester. Turn P1 all the way to the left, which is zero. Switch on the Super Servo Tester. The display will now show a rectangle and the text “Centering Screen”.



This screen is to help you cut out and grind a suitable rectangle in an enclosure for viewing the display. Turn P1 to the right to enter normal operation mode.
The Super Servo Tester is now ready for use.

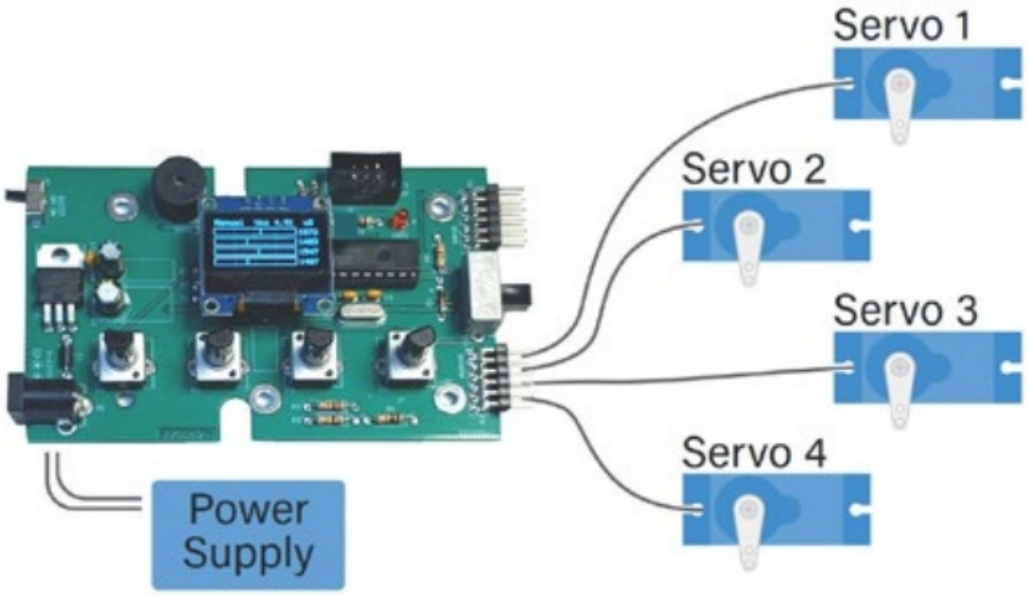


Use It

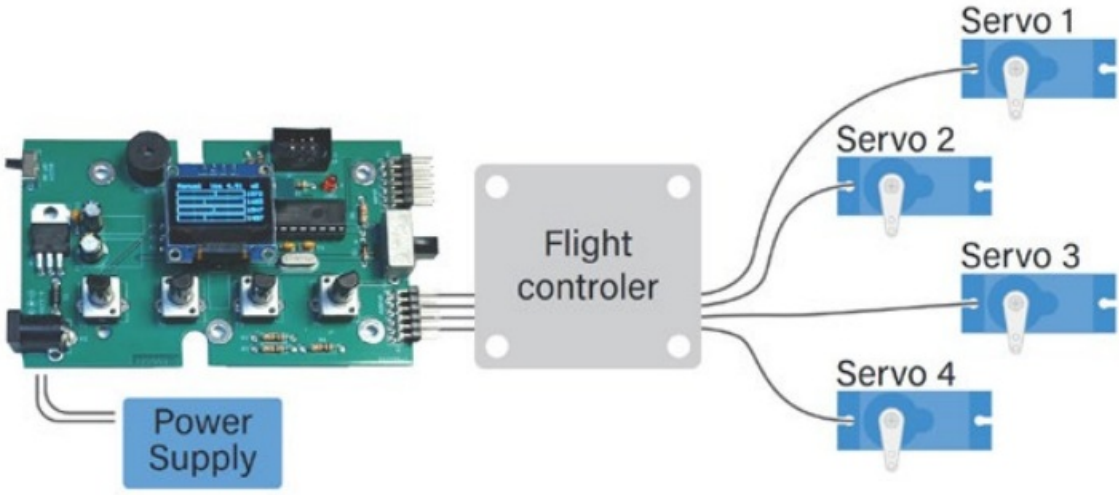
The Super Servo Tester features two operating modes: Measure/Input and Control/Manual. The mode is selected by the large slide switch S1.

Control/Manual Mode

When S1 is set to Control mode or Down, Manual mode is selected. The Super Servo Tester generates control signals for four servos or for the flight controller or ESC. The signals are controlled by the four potentiometers. In this mode, it is the Super Servo Tester that provides power to the servos or ESC or flight controller and the model's power supply must not be connected to any of them. The supply voltage of the Super Servo Tester must be between 7.5 VDC and 12 VDC.



Configuration 1, simple test of four servos (Manual Mode, S1 down), allows testing four servos at the same time. The servos are powered by the tester and controlled by the **potentiometers.**



Configuration 2, flight controller test (Manual Mode, S1 down), allows for testing a (drone's) flight controller without transmitter nor receiver. The servos and the flight controller are powered by the tester and controlled by the potentiometers.

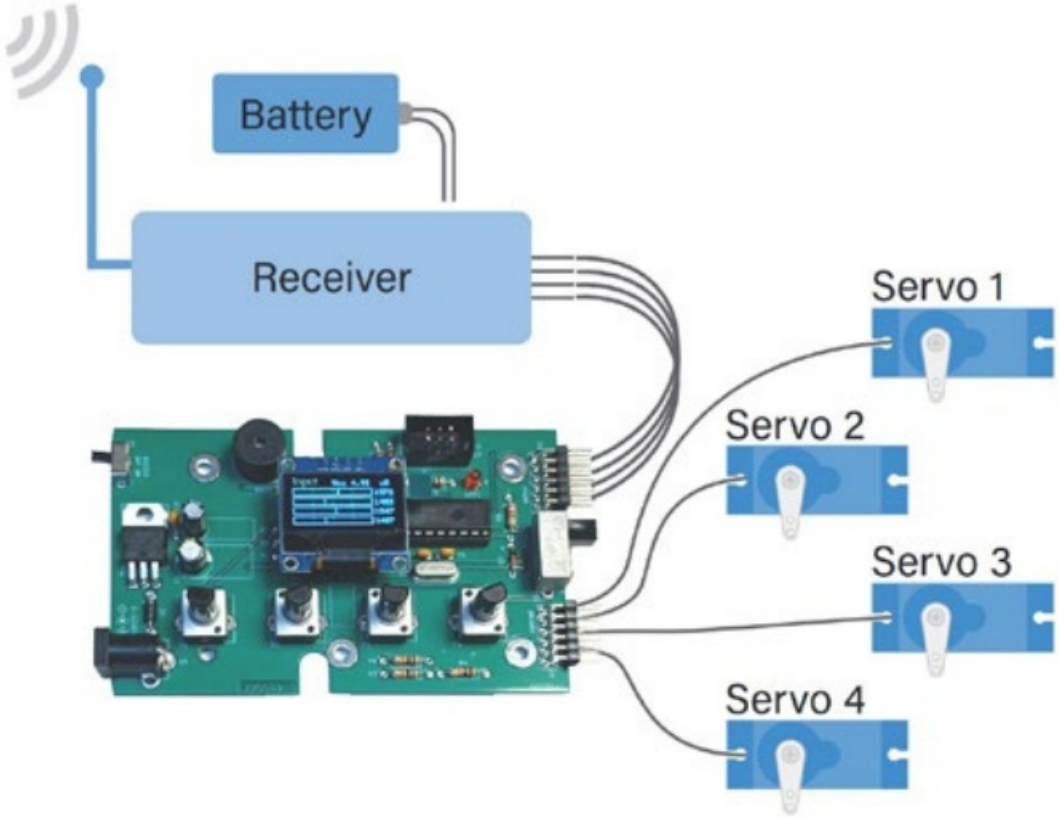
Measure/Inputs Mode

When S1 is set to Measure or Up, Inputs mode is selected. The Super Servo Tester measures the servo signals connected to K1. These signals may come from for instance an ESC, a flight controller, or the receiver or another device.

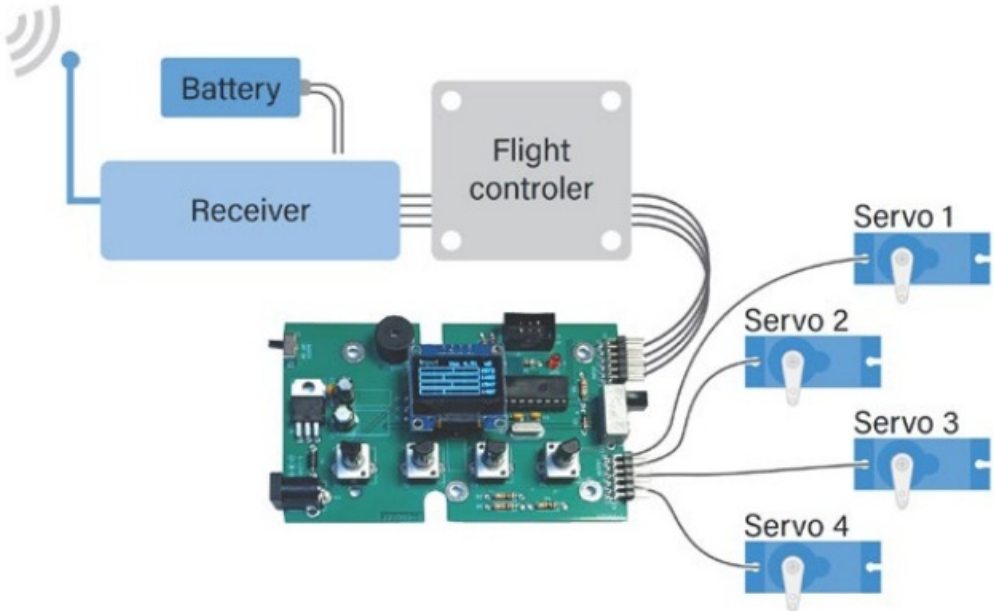
The signals are also routed to the outputs on K2 to control the servos or the flight controller or ESC. The results are shown on the display.

In this mode, the Super Servo Tester and servos are powered by the power supply connected to K1. The power

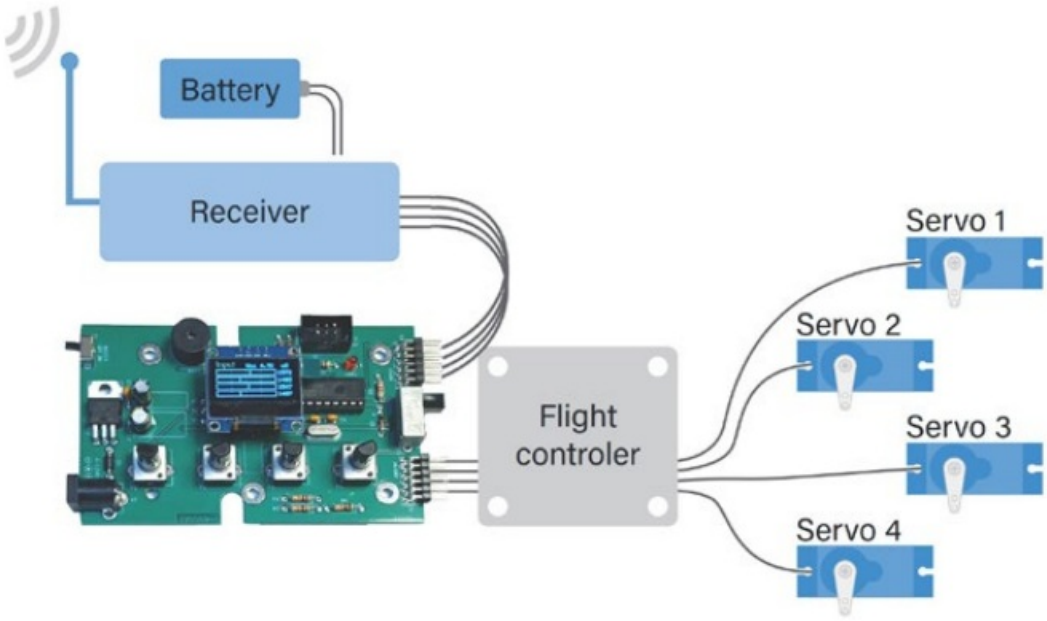
supply may not exceed 7.5 VDC and the Super Servo Tester should not be connected to its own power supply. Also, all four input channels must be connected, otherwise the Super Servo Tester's LED and buzzer will signal a fault. The buzzer can be switched **off.**



Configuration 3, test of the transmitter and receiver (Inputs Mode, S1 up) to verify the transmitter and receiver. The tester and servos are powered by the receiver's **battery.**



Configuration 4, transmitter, receiver, and flight controller test (Inputs Mode, S1 up), is for checking the correct operation of the transmitter and receiver with the flight controller (in case of a drone). The tester, servos and flight controller are powered by the receiver's **battery.**



Configuration 5, transmitter and receiver test (Inputs Mode, S1 up), allows testing the flight controller with the transmitter and receiver. The tester, servos and flight controller are powered by the receiver's battery.

Display & Buzzer

The display shows the duration of the servo pulses graphically on four bars with a cursor together with their numerical value in microseconds. The bar graphs are limited to the range 1000 µs to 2000 µs. When a value is out of bounds, a box is drawn around its numerical value. In this case, the LED will light up too, and the buzzer, if switched on, will beep.
The display also shows the value of the supply voltage of the servos. The value is boxed when it is below 4.5 V. The LED will light up too, and the buzzer will beep.

Specifications

› Operating modes	Control/Manual & Measure/Inputs
› Channels	4
› Servo signal inputs	4
› Servo signal outputs	4
› Alarm	Buzzer & LED
› Display	OLED, 0.96″, 128 x 32 pixels
› Input voltage on K5	7-12 VDC
› Input voltage on K1	5-7.5 VDC
› Input current	30 mA (9 VDC on K5, nothing connected to K1 and K2)
› Weight	60 g
› Dimensions	113 mm × 66 mm × 25 mm

Kit Contents

Resistors (0.25 W)
R1, R3 = 1 kΩ, 5%

R2, R4, R5, R6, R7, R9, R10 = 10 kΩ, 5%
R8 = 22 Ω, 5%
P1, P2, P3, P4 = 10 kΩ, lin/B, vertical potentiometer

Capacitors

C1 = 100 µF 16 V
C2 = 10 µF 25 V
C3, C4, C7 = 100 nF
C5, C6 = 22 pF

Semiconductors

D1 = 1N5817
D2 = LM385Z-2.5
D3 = BZX79-C5V1
IC1 = 7805
IC2 = ATmega328P-PU, programmed
LED1 = LED, 3 mm, red
T1 = 2N7000

Miscellaneous

BUZ1 = Piezo buzzer with oscillator
K1, K2 = 2-row, 12-way pinheader, 90°
K5 = Barrel jack
K4 = 1-row, 4-way pin socket
K3 = 2-row, 6-way boxed pinheader
S1 = Slide switch DPDT
S2 = Slide switch SPDT
X1 = Crystal, 16 MHz
28-way DIP socket for IC2
Elektor PCB 220069-1
OLED display, 0.96″, 128 x 32 pixels, 4-pin I²C interface

More Information

Elektor Shop: www.elektor.com/20624	
Elektor Magazine: www.elektormagazine.com/220069-01	
Elektor Labs: www.elektormagazine.com/labs/super-servo-tester	

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Documents / Resources

	Elektor 20624 Super Servo Tester Kit [pdf] User Guide 20624 Super Servo Tester Kit, 20624, Super Servo Tester Kit, Servo Tester Kit, Tester Kit, Kit

References

- Elektor Super Servo Tester Kit | Elektor
- Super Servo Tester | Elektor Magazine
- Super servo tester | Elektor Magazine

- **User Manual**