

I would really be grateful if you start to build the Shutter, that you go to the Photrio thread and say hi. Also please post photos of your completed tester.

[Build a shutter tester for Focal Plane shutters - Cheap, Easy & it Works | Page 18 | Photrio.com Photography Forums](#)

Please refer to Photrio for further build help

ESP32 Shutter Tester Parts V1.6

11 04 2024

Below are links to the parts required to make the ESP32 Shutter Tester.

Links are valid now, but of course could become dead in the future.

Links are (mainly) for UK suppliers and are a guide only. Use a supplier from your country.

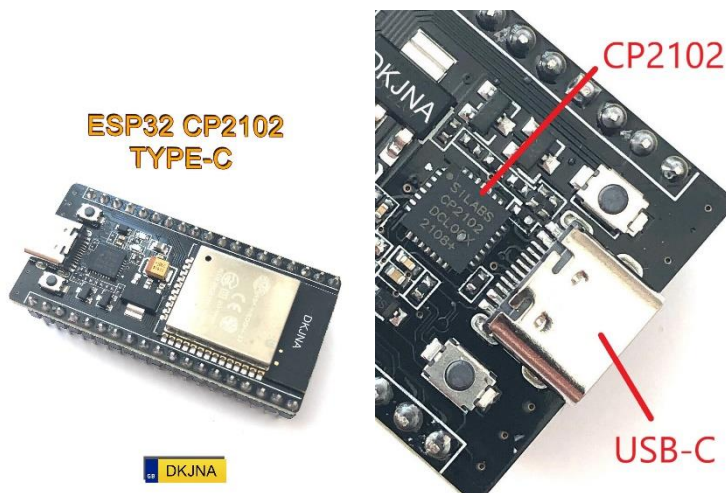
Ordering from China either from eBay sellers or AliExpress, the parts will be much cheaper.

Note, often if buying from AliExpress, there is a free express shipping option, if buying parts over a set value.

ESP32 NodeMcu board. 38 pin version. USB-C CP2102

[NodeMcu ESP32 WROOM-32 Type C Development Board Dual Core WLAN WiFi Bluetooth | eBay](#)

[ESP-WROOM-32 ESP32-S Nodemcu ESP32 Development Board ESP32 Bluetooth Wifi 32Mbit SPI Flash Bluetooth Module ESP32 30 Pin/38Pin - AliExpress](#)



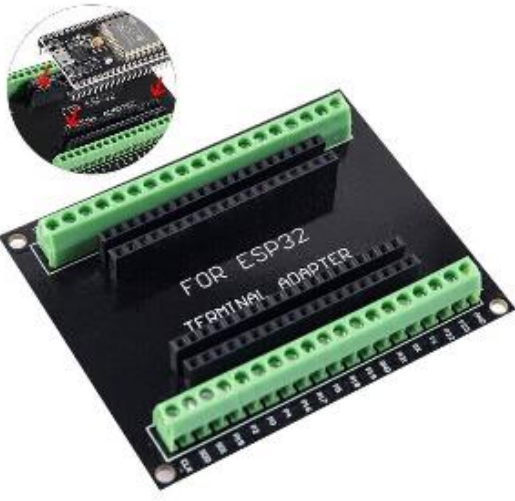
IMPORTANT. There are multiple variants of this board. Get 38 pin USB-C and CP2102 chip.

Note:- The guides have been written for this specific board type. Boards which differ with their USB chip and/or connector will still work, but the guides will not detail different driver installs or pin layout differences.

ESP32 prototype/breakout board (38 pin screw-terminal version)

[ESP32 Expansion Board Compatible with ESP32 WiFi Bluetooth Development Board NodeMCU-32S Lua 38Pin GPIO Expansion Board - AliExpress](#)

38 Pin Breakout Board For ESP32



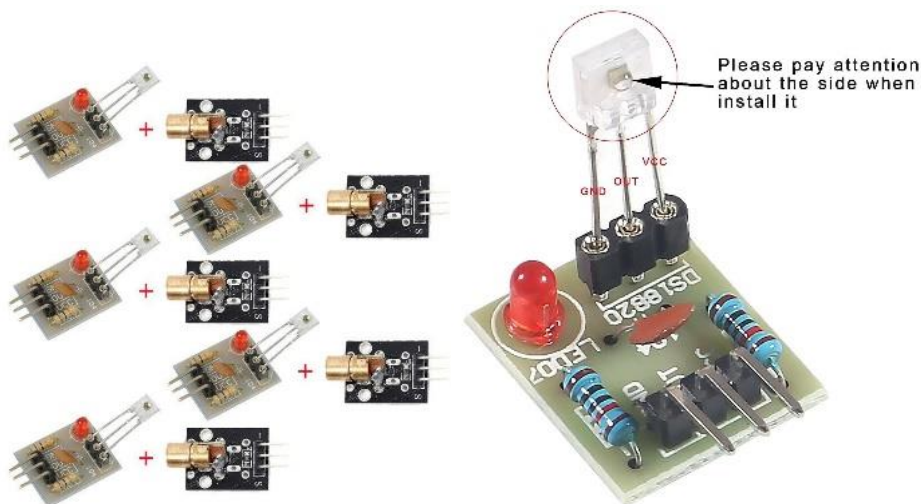
Laser tx & rx module.

Three Laser tx and rx module pairs are required.

The sensor is supplied loose. ENSURE YOU INSERT IT THE CORRECT WAY ROUND!!!. Little bubble lens points towards the header pins.

Note:- link is for a China supplied pack of 5 pairs. UK prices are far too high, I could not find a reasonably priced tx & rx pair in the UK when compiling this list.

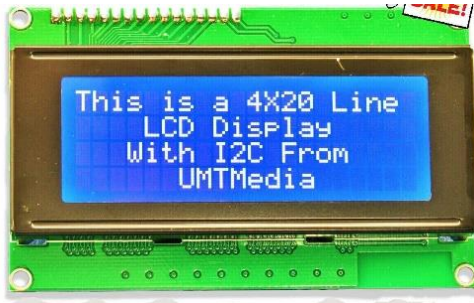
[Arduino Laser Sensor Receiver | Laser Transmitter Module Arduino - 10pcs/set Sensor - Aliexpress](#)



LCD Module 2004 with IIC (optional).

Ensure you get a module that includes the IIC or i2C module. The LCD screen is not required if using the tft screen, or no screen is wanted, as all output is also sent to the computer monitor. However, future firmware upgrades may incorporate touch-screen functionality, which will require use of the tft screen.

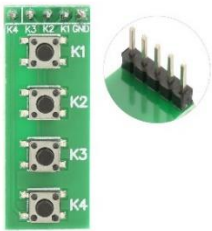
[LCD2004+I2C 2004 20x4 2004A Blue/Green screen HD44780 Character LCD /w IIC/I2C Serial Interface Adapter Module for arduino - AliExpress](#)



Button Module (optional).

There are all sorts of buttons available, feel free to choose different ones depending on your final design. This module has the advantage of header pins for use with Dupont jumper wires. It is good for prototyping, but for the final build, the buttons listed below are far better.

[DIY Kit 1x4 4 Independent Key Button Keypad Keyboard Module Mcu for Arduino Student Class Design Graduation Project Experiment - AliExpress](#)



Note:- This set does not have a White button, so only order this set if you cannot solder & require pre-wired buttons. The Blue or Red button can be used in lieu of White, but the on-screen prompts will still refer to 'White'

[DaierTek 5PCS 12mm Momentary Push Button Switch On Off Mini Round Switch Waterproof PBS-33B 3A 125V AC with Pre-soldered Wire - AliExpress](#)



Below is a link to buttons which may be purchased as a 6-pack, including a white button, or individually. They have the advantage of including a white button, but do require soldering. Note they melt very easily with a soldering iron, so one must be proficient & quick when making the soldered joints.

[6piece Mini 12mm Waterproof Momentary On/off Push Button Round Switch Pbs-33b Kit White Black Red Yellow Blue Green - AliExpress](#)



Dupont wires.

Get male to female ones if using the screw terminal prototype board.

It is suggested that one pack of 30cm wires are purchased (for the sensors, light-meter & flash).

Two packs of 10cm for connection to buttons, tft, LCD etc.

One pack each, 30cm Brown & Black wires

[Dupont Line 10cm 20cm Dupont Cables Male To Male Female To Female Male To Female Jumper Wire, for Arduino DIY Electronics KIT - AliExpress](#)



Note. If following the wiring diagram colour code (recommended) there are far more Brown and Black colour wires used, than come in a standard mixed-colour pack, so an additional pack of 30cm Brown & Black wires will be required.



[10pcs Breadboard Dupont Cable For Arduino Line 2.54mm Male Female Dupont Jumper Wire 26AWG Cable DIY Electronic 1P Connector - AliExpress](#)

Choc-block (Optional)

There are many 3V & 0V wires to be connected. The best way to accomplish this is to use a choc-bloc to group all of the wires together & then just one wire from here which then connects to the breakout board. Alternates are to solder them together, or use a joining block similar to the below,

[10-75pcs Orange Universal Type Quick Plug-in Terminals,Electrical Equipment Connectors,Wire Connector Terminals,250V/32A - AliExpress](#)

Single Strand Hard Wire (BV)
0.5-4.0²



TFT display. (optional)

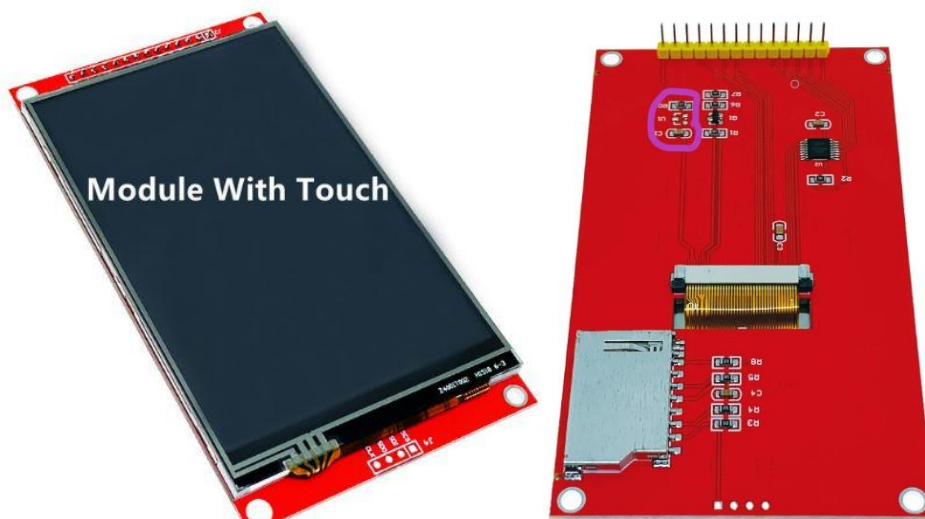
**4.0 inch SPI module 3.95 inch ILI9488 14 pin TFT LCD display scree Resistance touch panel
PCB adapter base board 2.54 mm spacing (sic)**

Board size is 108.04 X 61.74

Note:- there are many similar panels but they have different driver chips (ILI9488) , the Shutter Tester only works with this specific screen. Please ensure you correctly order the screen. The Aliexpress web sites often list similar but different boards & sometimes just the screen.

Note, whilst all output is also sent to the computer screen, making the tft screen optional, future firmware upgrades may incorporate touch-screen functionality, which will require use of the tft screen

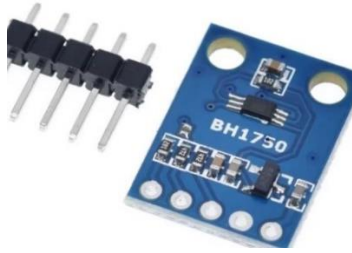
[4.0 inch SPI module 3.95 inch ILI9488 14 pin TFT LCD display scree Resistance touch panel
PCB adapter base board 2.54 mm spacing - AliExpress](#)



Light sensor (Optional)

GY-301 LIGHT SENSOR MODULE

[TZT GY-302 BH1750 BH1750FVI light intensity illumination module for arduino 3V-5V \(aliexpress.com\)](https://www.aliexpress.com/item/32938512811.html)



Rotary Encoder (optional).

This part is not currently used, but maybe added in the future. Ensure you purchase the one with blue pcb.

[Rotating Potentiometer Knob Cap Digital Control Module Rotary Encoder Controller Switch 5V Diy Kit EC11 For Arduino PCB Board - AliExpress](https://www.aliexpress.com/item/32938512811.html)



LED Matrix Module (Optional).

Gives a visual indication of shutter speed, works like the old idea of photographing a scanning CRT.

[8x8 8*8 MAX7219 Dot Led Matrix Module MCU LED Display Control Module For Arduino 5V Interface Module Output Input Common Cathode - AliExpress](https://www.aliexpress.com/item/32938512811.html)

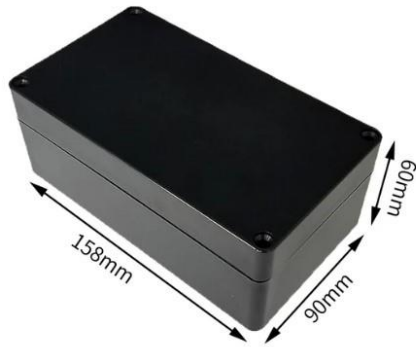


Project Box.

There are all sorts of shapes & sizes of project boxes. The 158 x 90 x 60 is a good size. If using either the tft or LCD. If using both, a larger box will be required.

The screen must be positioned as high as possible, to leave enough space below, for two rows of buttons. A suggested layout & template can be found in the 'Build a Box' document

[Black Box Outdoor Waterproof Case Plastic Box Electronic Project Case Instrument Waterproof Junction Box Housing - AliExpress](#)



Acrylic Shell for LCD (Optional).

The LCD can be mounted into a project box, or fitted into an acrylic shell and mounted on top, thus angling the screen towards the user.

[Transparent Acrylic Shell for LCD2004 LCD Screen with Screw/Nut LCD2004 Shell Case holder \(no with 2004 LCD\) - AliExpress](#)



USB C chassis connector (Optional).

If using the large project box, and mounting the breakout board vertically, this can be used, with a short USB-C to USB-C cable, to make the USB socket on the ESP32 board accessible. Alternate is to have a trailing USB lead from the ESP-32 board, exiting the project box via a suitable drilled hole.

[D-Shape USB Type-C Female Socket Chassis Panel Mount Connector Round Type Black Silver Zinc alloy Industry Waterproof Extension \(aliexpress.com\)](#)



RJ45 Chassis connector (Optional)

This can be used to enable the sensor cable to be unplugged from the project box. Any suitable connector could be used (5 pin DIN or 9-way D type, for example). Or the sensor hardwired.

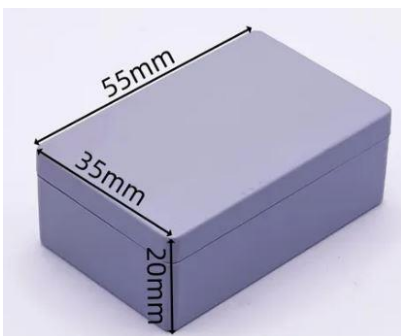
[RJ45 Network Cable Connector CAT5E Panel Installation Module Shielded Solder-free Network Cable Extender Category 5 Panel Socket - AliExpress](#)



Project box for Film-Gate Sensor 55 X 35 X 20 (Optional)

If making the Film-Gate Sensor or using the Light-Meter module, this box is the ideal size.

[1pc Waterproof Black/white Housing Instrument Case ABS Plastic Project Box Storage Case Enclosure Boxes Electronic Supplies - AliExpress](#)



Shrink Tube (Optional).

If making the film-gate sensor, insulation is required for the sensor legs.

[127pcs/lot 2:1 Thermoresistant tube Shrink wrapping Black heat shrink Sleeving set Wire Cable Polyolefin Wrap Tubing - AliExpress](#)



LED Light Box (Optional).

For use with Film-gate Sensor.

About the cheapest rechargeable LED light box available. It has to be used at full brightness; else the Shutter Tester picks up the flickering LEDs. At maximum brightness, it gives EV 13 onto a bare light sensor module.

A non-dimmable mains powered panel may be better for shutter testing alone.

[LED Clip Video Light Portable Photography On-Camera 3000K-6000K Bi-Color Lighting Cold Shoe For DSLR Camera Camcorder Gopro Vlog - AliExpress](#)



10K resistors (Optional).

Required if making the Film-Gate Sensor

[100PCS Metal Film Resistor 1/4W 1% 100R 220R 1K 1.5K 2.2K 4.7K 10K 22K 47K 100K 100 220 1K5 2K2 4K7 Ohm Resistance 1R~22M - AliExpress](#)

0.1uF Capacitors (Optional). (104 100NF)

Required if making the Film-Gate Sensor

[100PCS/ Porcelain Chip Capacitors 104 0.1uF 100NF 50V 30PF 103 0.01UF 22P 102 20PF 473 683 104 224 47NF 68NF 220NF 4.7NF 6.8NF - AliExpress](#)

Additional useful parts

Note:- also see other document listing parts for the optional film-gate sensor.

Drill bits for making encoder and button holes. 6mm for encoder, 13mm for the buttons.

[3-12mm Three-point Woodworking Drill Hole Opener Twist Drill Bit Practical Wood Milling Cutter Multifunctional Drilling Tools - AliExpress](#)

13mm bit.

[10-35mm Woodworking Twist Drill Bit Set Long Four-Slot 6.35mm Shank Carbide Drill Bit Hole Saw For Door Lock Wood Slotting Tools \(aliexpress.com\)](#)

M3 Bolts, Nuts, Washers.

Depending on the final design, M3 bolts can be used to hold the tft screen & breakout-board.

https://www.aliexpress.com/item/1005005544927756.html?spm=a2g0o.order_list.order_list_main.96.18381802at3zUL

3.5mm socket.

If using the Flash Sensor, rather than it being hard-wired, a socket on the box can be used. PJ-391 for the sockets.

[10PCS 2.5 3.5MM Headphone Jack Audio Video Female Dual Channel Stereo Jack Jack Socket Stereo Solder Panel Mount PJ-210B PJ-392 - AliExpress](#)

3.5mm plug

[5Pcs/lot 3.5mm Black Plastic Housing Audio Jack Plug Headphone Connector Discount - AliExpress](#)

Glue Gun.

Cheap glue gun, but surprisingly it works ok.

[20W Hot Melt Glue Gun DIY Mini Household Industrial Guns Heat Temperature Thermo EU Electric Repair Tool Use 7mm Glue Sticks - AliExpress](#)

Don't forget the glue :o)

[T TOVIA 60pcs/120pcs Hot Melt Glue Sticks 7mm Hot Glue Sticks Rod for Craft Album Repair Tools Hot Glue Gun Sticks - AliExpress](#)

Hook-up Wire.

If using sockets on the project box, flexible silicone wire is ideal to make the connections. Also useful for soldering the buttons. It can be purchased in different lengths and gauges and as boxed sets. Unfortunately, there is no box set that matched the Dupont colours. I opted to buy a box and add the missing colours as single lengths (Grey, Brown, Purple) 22AWG.

[60m/box 196ft Hook-up Stranded Wire 22 AWG UL3132 Flexible Silicone Electrical Wire Rubber Insulated Tinned Copper 300V 6 Colors \(aliexpress.com\)](#)

[10metre 30AWG 28AWG 26AWG 24AWG 22AWG 20AWG 18AWG 16AWG Silicone Wire Ultra Flexiable Cable High Temperature Test Line Wire - AliExpress](#)

Soldering Iron Kit.

Cheap soldering iron kits are available on Aliexpress. I found the tips are very loose & the internet mod is to wrap a strip of aluminium cooking foil around the ceramic heater, to reduce the gap. However, it is far better to buy a genuine branded product, Weller or Antex (not a cheap knock off)