

**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 V4 Parts V1.0**

**12 09 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 AliExpress suppliers who ship to the UK suppliers and are a guide only.

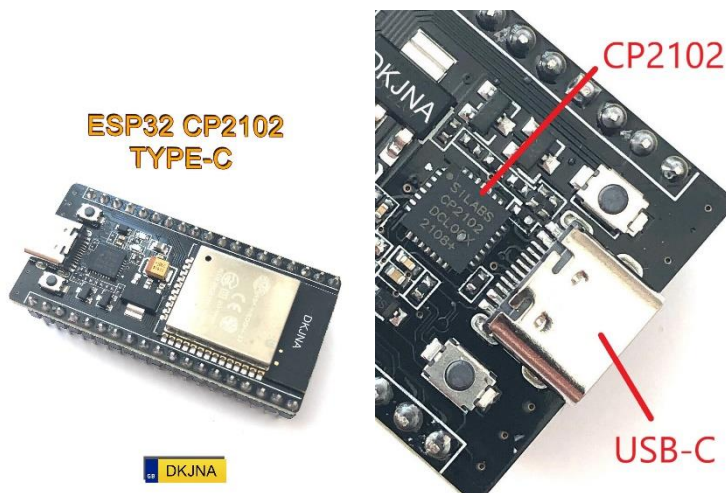
Use a supplier who ships to your country.

Note, often if buying from AliExpress, there is a 'Choice' 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](#)



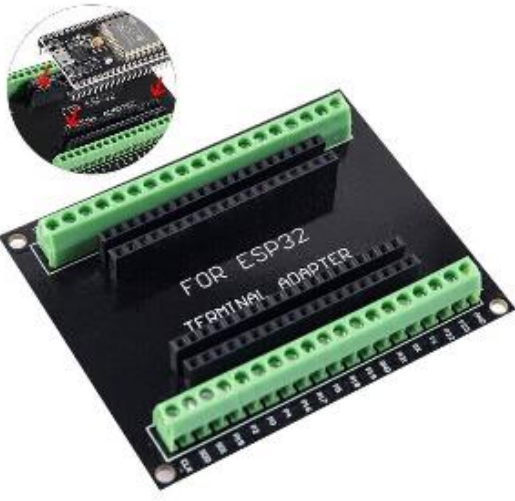
**IMPORTANT. There are multiple variants of this board. Get 38 pin USB-C and CP2102 chip.**

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



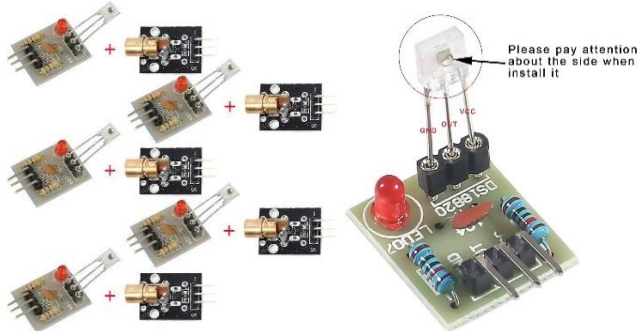
### Laser tx & rx module.

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](#)



### Buttons.

Below is a link to buttons which may be purchased as a 6-pack. Note they melt very easily with a soldering iron, so one must be proficient & quick when making the soldered joints. An alternate is to buy a 5 button module, which uses Dupont/JST header pins.

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



## JST XH 2.54MM wires 20cm.

These pre-made header cables make neat job of connecting the different modules to the screw-terminal board. They come in different pin lengths, so order the 20cm ones.

**Note** some of the pins will need to be removed and swapped to different places, to make the colours match (Red & Black, for example) This is done by carefully pressing down on the metal barb and sliding the terminal out.

The metal barb then must be bent back upwards, before reinserting into the plastic connector.

It takes a few goes to get the hang of it & a few terminals may get damaged when first trying. They are very cheap & come in packs of five, so plenty of spares.

8-way TFT screen

5-way Encoder, LED matrix

4-way LCD

3-way Sensors & Lasers (Six required) or solder the wires directly.

[5Sets JST XH2.54 XH 2.54mm Wire Cable Connector 2/3/4/5/6/7/8 Pin Male and Female Plug Socket 10cm 20cm Wire Length 26AWG - AliExpress 13](#)



## Dupont wires. (Optional)

These are an alternative to the JST connectors detailed above. They are simpler to use as they do not require any pin swapping, but are not as neat to use.

Get 20cm male to female ones if using the screw terminal prototype board.

Each pack has 20 wires, two of each colour, so one pack should be enough.

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



## TFT display.

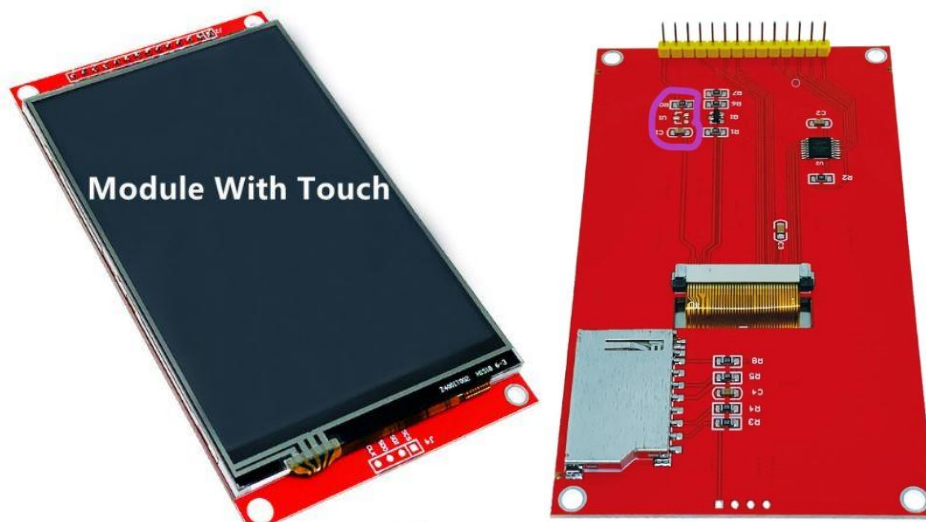
**4.0 inch SPI module 3.95 inch ILI9488 14 pin TFT LCD display screen Resistance touch panel PCB adapter base board 2.54 mm spacing (sic)**

**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](#)



## Rotary Encoder

Ensure you purchase the one mounted onto the blue pcb.

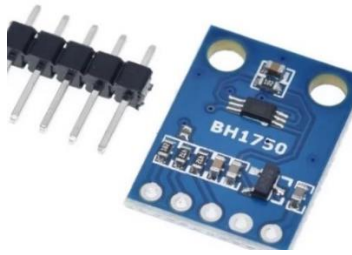
[Rotating Potentiometer Knob Cap Digital Control Module Rotary Encoder Controller Switch 5V Diy Kit EC11 For Arduino PCB Board - AliExpress](#)



## Light sensor (Optional)

GY-301 LIGHT SENSOR MODULE

[TZT GY-302 BH1750 BH1750FVI light intensity illumination module for arduino 3V-5V \(aliexpress.com\)](#)

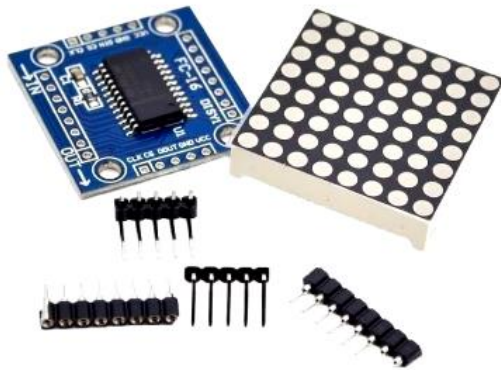


## LED Matrix Module (Optional). \*\* this item no longer stocked, New version (below)

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

New version – requires header pins soldering

[MAX7219 Dot Matrix Microcontroller Display Module Together For Arduino - AliExpress 502](#)

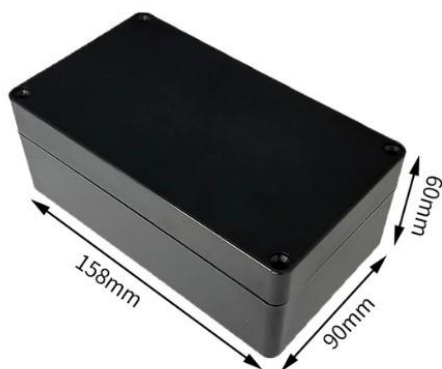


## Project Box.

There are all sorts of shapes & sizes of project boxes. The 158 x 90 x 60 is a good size. If using the tft.

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](#)



## PC sync cable (flash) (Optional)

For testing flash synchronising. A 3.5mm socket will also be required.



### 3.5mm socket.

If using the Flash Sensor, a 3.5MM socket is required. 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](#)

### M3 Bolts, Nuts, Washers. 25mm Length

M3 bolts can be used to mount the tft screen into the project box. Additionally, slightly elongating two of the mounting holes on the breakout board, allows it to also be easily mounted onto the same bolts. 25mm length is ideal.

[10/50pcs M1.6 M2 M2.5 M3 M4 M5 M6 M8 304 A2-70 Stainless Steel ISO7380 Hexagon Hex Socket Head Button Allen Bolt Screw L=2-100mm - AliExpress 13](#)

### Multicore Wire.

Used to connect the sensors to the breakout board.

5 cores are required, but buying the six cores, gives the additional yellow wire, which can be used to connect the yellow button & flash socket.

[5/10Meter 22 AWG 2Pin 3Pin 4Pin 5Pin 6Pin Electronic Cable Extension Wire Color Line for 5050 3528 RGBW RGB CCT LED Strip Lights - AliExpress 13](#)

 ebsenf

**6-Pin Electronic Cable**  
22AWG



More expensive but has outer insulation.

[5-50m LED Strip Extension Cable Flexible Multi 2 3 4 5 6 7 8 9 10 Core Insulate Audio Electrical Wire For Speaker LED Lights Bar - AliExpress 13](#)



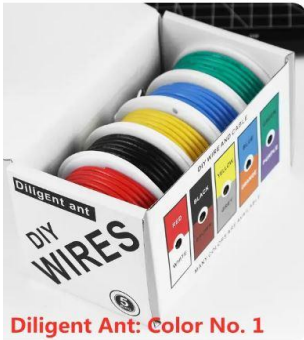
## Hook-up Wire.

The above multicore cable can be used to connect the buttons & sockets within the project box.

An alternate is to buy silicon hookup wire, which is very flexible.

If using sockets on the project box, flexible silicone wire is ideal to make the connections. Unfortunately, there is no one box set that matches the JST or Dupont colours.

Here is a link to wire in a dispenser box. Buying both box 1 and box 2 will match the Dupont wire colours. Get 22AWG [High quality super soft silicone wire and cable household DIY 5 colors mixed box wire tinned pure copper \(aliexpress.com\)](#)



Single colours

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

## Choc-block (Optional) 2 pole.

There are many 3V & 0V wires to be connected. The quickest way is to use a lever-locking connector as shown below. As the wires are thin, many can be put into each terminal, so a 2-terminal type is fine. Use one with more terminals if you like

Alternates are to solder them together, or use a joining block.

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

Single Strand Hard Wire (BV)  
0.5-4.0<sup>2</sup>



## Shrink Tube (Optional).

It is useful cut into small lengths of 5mm, and place along the cables, to hold them into a bunch, for neater wiring.

If wires are joined together (using the JST connectors onto the sensors & lasers, for example, & then soldered to the multicore cable returning to the project box, they are ideal for covering the soldered joint.

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](#)



## Plug & Sockets 8 pin.

The cable to the sensors/Lasers & Light-meter can be hardwired or plugs & sockets used.

Using 8 pin plugs & sockets allows for separate pins to be used for each. 5 for sensors/Lasers and 4 for the light-sensor, using a common 0V.

In this way, should the wrong plug be put into the socket, not pins (other than 0V would be connected & no harm will be done.

An alternate would be using a different connector for each. This of course adds a little cost.

[Solder Connector DIN 3 4 5 6 7 8 Pin DIN Male Female Plug with Plastic Handle + Female Socket Hulled Panel Mount Chassis a1 - AliExpress 13](#)

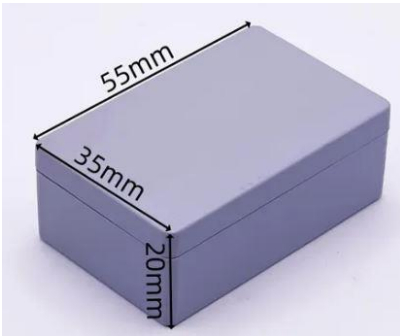




## Project box for Light-Meter & Film-Gate Sensor 55 X 35 X 20 (Optional)

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](#)



## LED Light Box (Optional – Not Recommended).

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.

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

Note the use of Lasers are far superior to using this light box, it is only listed here for people wishing to experiment with the film-gate sensor box.

[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**

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 \(aliexpress.com\)](#)

### **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](#)

### **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)