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

Please refer to Photrio for further build help & to let us know you are building the timer.
[(1) Trigger Trap Splash Freeze Timer Cheap-Easy-It-Works | Photrio.com Photography Forums](#)

GitHub repository where all documentation & code can be found. [billbill100 (github.com)](#)

ESP32 Trigger Trap Splash Timer V1.1   27/03 2024

Below are links to the parts required to make the ESP32 Trigger Timer.

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

Links are a guide only. Use a supplier that ships 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.

1. ESP32 Development Board. NodeMcu32

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

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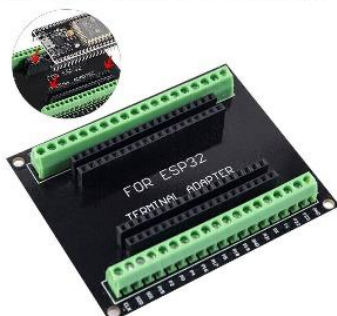

IMPORTANT. There are multiple variants of this board. Get 38 pin USB-C and CP2102 chip.
Note:- The guides have been written for this specific board type. Boards which differ with their USB chip and/or connector will still work, but the guides will not detail different driver installs or pin layout differences.

2. 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](#)

3. 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 & is great for development, but the coloured buttons below will be better for the final build.

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

4. Buttons.

If mounting in a project box, these buttons are easy to fit and make a nice-looking project. The display will state which colour button to push, Green for the Start Button, Black for Options etc.

Below is a link to buttons which maybe purchases as a 6-pack, including a white button, or individually. They have the advantage of including a white button. (The encoder knob is Blue, so the Blue button is not used).
[6piece Mini 12mm Waterproof Momentary On/off Push Button Round Switch Pbs-33b Kit White Black Red Yellow Blue Green - AliExpress](#)

The set is pre-wired, so no soldering is required, but does not contain a white button. The blue button can be substituted for the white button, but the on-screen prompts 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](#)
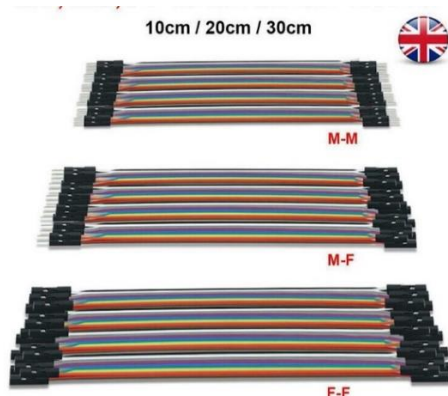
5. Dupont wires.

Two packs of 10cm male to female. (For connection to, tft, encoder).
One pack of 20cm male to female wires. (For connections to output modules).
One pack 10cm female to female (For the light sensor).

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

6. Camera Release Cable.

Note. Buy the correct remote release for your camera. Here is a link to cords terminating in 3.5mm jack plug.
It can be much cheaper to buy a complete remote & just cut (or unsolder) the cable from the hand-unit.

2.5-3.5mm Remote Shutter Release Cable Connecting Cord N1 N3 C1 C3 S2 For Nikon Pentax Canon Sony - AliExpress

7. Connector 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
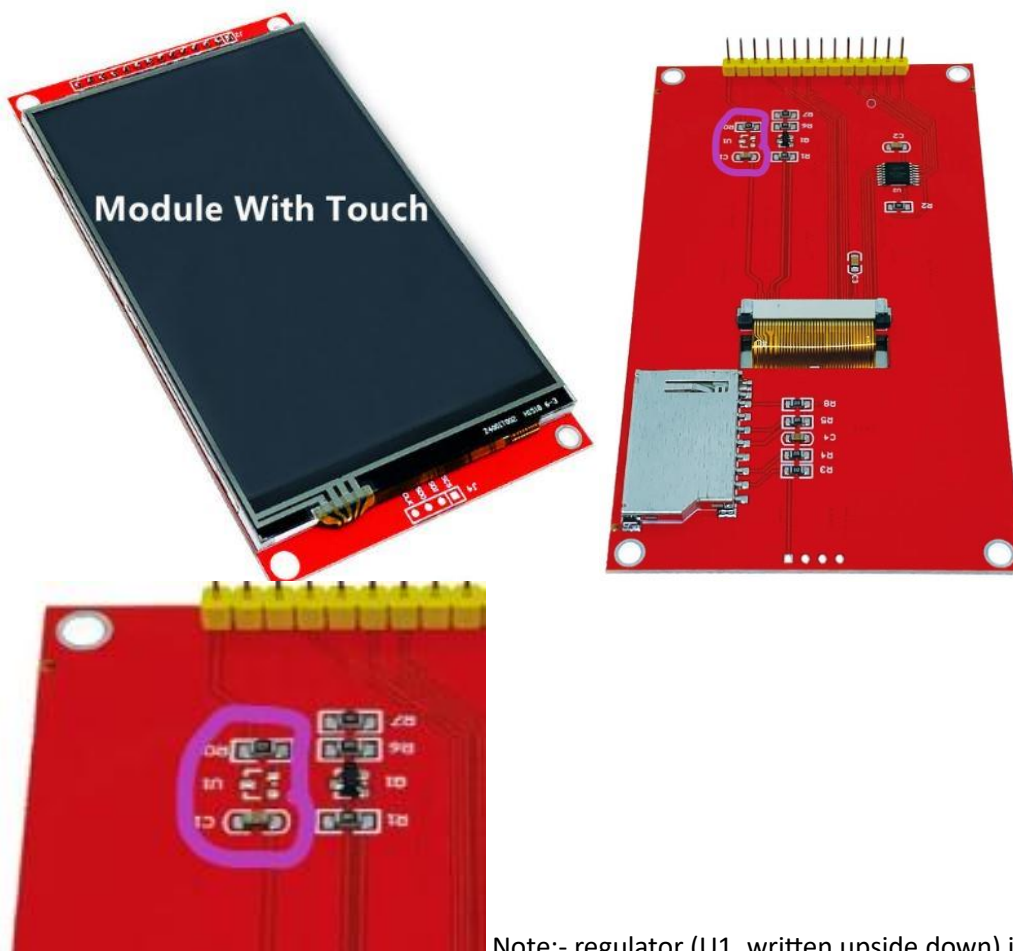
8. TFT display.

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

(The above, including mis-spelling, is taken from AliExpress listing, to help ensure the correct tft screen is purchased

Note:- There are many similar modules but they have different driver chips (ILI9488), the Develop Timer only works with this specific module. Please ensure you correctly order the module. The Aliexpress web sites often list similar but different modules & sometimes just the bare screen. The 4.0" specified for this project module does not have the 5V regulator populated on the board. (circled).

[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](#)

Note:- regulator (U1, written upside down) is not populated on this board.

9. Rotary Encoder.

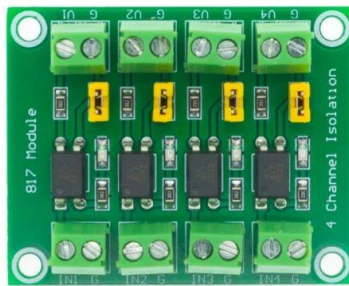Ensure you purchase the one with blue pcb as shown below.

[With Switch Rotary Encoder Module for Arduino Brick Sensor Development Round Audio Rotating Potentiometer Knob Cap EC11 - AliExpress](#)

10. Optocoupler Isolation Board.

The four channel board. Two outputs for the camera. An additional way can be optionally used for low voltage flash units.

[PC817 2 4 Channel Optocoupler Isolation Board Voltage Converter Adapter 3.3V to 5V Module 3.6-30V Driver Photoelectric Isolated - AliExpress](#)

11. Mosfet Isolation Board. LR7842

Three are required for the solenoid output. They can be damaged by incorrect wiring, so wise to by a couple of spares. Ensure the LR7843 model is selected.

[1PCS FR120N LR7843 AOD4184 D4184 Isolated MOSFET MOS Tube FET Module Replacement Relay 100V 9.4A 30V 161A 40V 50A Board Module - AliExpress](#)

12. Mosfet Board.

Low voltage flash units can be connected to the opto-isolator board. An alternative is the Mosfet board, which will allow higher voltage and current. However, old flashguns that have an orange neon that starts to glow when charged, should not be connected as they have very high voltage

[TZT 15A 400W MOS FET Trigger Switch Drive Module PWM Regulator Control Panel for arduino - AliExpress](#)

13. Connector. (Optional)

The above Mosfet board does not have input screw terminals. You can solder directly to the input, or solder these screw terminals to the board. Ensure to order the Green two pin option.

[10/20/50Pcs/lot KF301-5.0-2P KF301-3P KF301-4P Pitch 5.0mm Straight Pin 2P 3P 4P Screw PCB Terminal Block Connector Blue Green - AliExpress](#)

14. 3.5mm Jack Socket.

These are used for camera out, flash out, trigger in (X2)

[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](#)

15. 3.5,, Jack Plugs.

Used for camera & flash in, trigger in etc.

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

16. Jumper wire.

To make all the soldered connections to buttons, sockets etc, jumper wire is required. You could just by a reel of one colour, or use wire from an ethernet cable. Or buy a box of multi-colour cable.
Note:- the Dupont wires are not suitable for soldering.

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

Note the above boxed wire selection does not have brown colour (nor can I find any of the same wire in brown). You can of course use a different colour, but I like to keep all 3V wires Brown, 5V Red and 0V Black. Here is a link to brown pvc wire. Get 20AWG

RV Copper Wire PVC Electrical Extension Cable Single-Core Multi-Stranded Flexible Hookup Building Wire For Car Audio Wires Motor (aliexpress.com)

17. DC-DC Converter.

This will allow the ESP32 board to power from the 12V supply, negating the need for separate USB power. Select the 5V version.

High Efficiency Output 3.3V 5V 9V 12V 5A mini560 Step Down DC-DC Converter Voltage Regulator Buck Stabilized Power Supply Module - AliExpress

18. Diodes. 1N5404

One must be placed on the DC-DC converter 5V output.

Solenoids should each have one mounted as close as possible to them, reversed biased (Anode connected +V) to stop back EMF (large power spikes) when the solenoid is turned off.

High quality Rectifier Diode 1N4007 10A10 1N5408 1N5819 1N4001 5822 1N4001 1N4004 1N4005 1N5404 1N5408 6A10 FR107 UF4007 SR5100 - AliExpress

19. 2.1mm sockets.

For the solenoid connections & power in.

5/10Pcs 5A 30V For DC Power Supply Jack Socket Female Panel Mount Connector 5.5mm 2.1mm Plug Adapter 2 Terminal Types 5.5x2.1 - AliExpress

20. 2.1mm Plugs.

For solenoid connections.

[5pcs 10pcs DC female male Power Plug 5.5mm x 2.1mm Male Female Jack Socket Adapter Connectors Set For DIY Projects Connector (aliexpress.com)](aliexpress.com)

21. Relay. (optional)

Automatically turn on & off a light (or anything else) when operating the Timer.
Note:- If using this to control mains voltage, please ensure you do it safely.

[Diymore 5V One Channel Relay Module Relay Switch with OPTO Isolation High Low Level Trigger 1/3/5/10PCS - AliExpress](AliExpress)

22. Light Sensor.

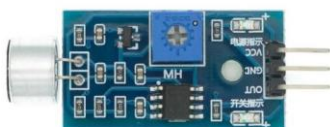Automatically opens the shutter when the lights are turned off. Neat! :o)

[TZT Photosensitive brightness resistance sensor module Light intensity detect New For Arduino (aliexpress.com)](aliexpress.com)

22. Sound Sensor.

Note:- This will probably be the most useful sensor, but many of the other Arduino sensor modules could be used, Laser, IR, Light, vibration etc. depending on how you will use the Trigger_Timer

[Sound Sensor Module Sound Control Sensor MAX4466 MAX9814 Switch Detection Whistle Switch Microphone Amplifier For Arduino - AliExpress](AliExpress)

23. Solenoid Valve 12V.

Three required. 12V ¼"

[DC 12V 24V 110V 220V Solenoid Valve 1/4" 1/8" 2 Way Normally Closed Direct-acting Pneumatic Valves For Water Air Gas Hot (aliexpress.com)](aliexpress.com)

24. Solenoid Water Connectors.

¼" thread required. Diameter is up to you. Input side, larger bore is desirable, 6 or 8mm.

Output, for the drips, quite small is required. Either buy 1/8" or experiment making your own size by putting smaller tubes into a connector, a pen or drinking straw, for example. Or plant watering drippers.

[Pagoda connector 6 8 10 12 14mm hose barb connector, hose tail thread 1/8 1/4 3/8 1/2 inch thread brass water pipe fittings - AliExpress](AliExpress)
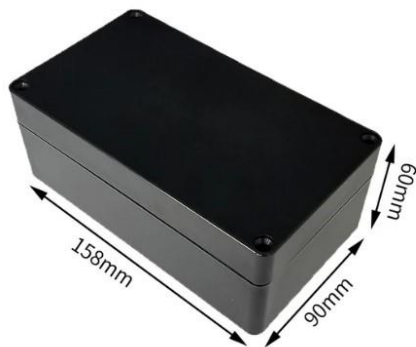

25. Project Box.

There are all sorts of shapes & sizes of project boxes. The 158 x 90 x 60 is a good size. The screen must be positioned as high as possible, which leaves just enough space below, for two rows of buttons.

You may also want to get small boxes to mount the sensors into & wire to a 3.5mm socket.

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

26. 12 Volt Power Supply.

A 12V 2A power supply is required to run the solenoids.

[AC DC 12v 1A 2A 3A 2000ma 3000MA adapter power supply EU UK AU US PLUG 5.5*2.5mm wall charger for DC male female led strip light (aliexpress.com)](#)

Additional useful parts

Drill bits for making encoder and button holes. Wood Brad-Point bits work well in plastic, as they do not wander like a metal or flat bit.
3mm to mount tft & breakout boards, 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](#)

[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)](#)

6mm tees
[Plastic Barb Hose Fitting Tee 4mm 6mm 8mm 10mm 12mm 16mm 3 Way Hose Tube T-Shape Barb Plastic Fittings - AliExpress](#)

6mm pipe
[1 Meter Hose Pipe Pneumatic Tubing PU Plastic Air Tube Gas 4mm 6mm 8mm 10mm 12mm 14mm 16mm - AliExpress](#)

6mm Elbows & Cross
[Barbed Pipe Fitting Coupler Connector Adapter for Fuel Gas Water 4mm 5mm 6mm 8mm 10mm 12mm 16mm 19mm Hose Barb Elbow Brass - AliExpress](#)

¼" to 1/8" adaptors
[Plastic Threaded Bushing Connector 3/8" 1/4" 1/8"1/2" 3/4" 1''Straight Male/Female Change Joint Pipe Fittings Irrigation Adapter (aliexpress.com)](#)

1/8" 2.8mm dripper, 3.9mm & 4.6mm
[Plastic Pipe Fitting Pagoda Barb to 1/8 1/4 3/8 BSP Male Thread Coupling Straight Fish Tank PP Hose Connector (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](https://www.aliexpress.com/item/1005005544927756.html?spm=a2g0o.order_list.order_list_main.96.18381802at3zUL)

3.5mm Cables.
Flash, Camera, sensors will all need to be positioned. A selection of extension cables are required to achieve this.

[1.5/3/5/10M 3.5mm Stereo Male to Female Audio Extension Cable Cord for Headphone TV Computer Laptop MP3/MP4 Earphone - AliExpress](#)

Flash Gun Adaptor.
Some flashguns have an output jack for remote wired trigger. You will need to buy the correct connector & make up a lead. A hot-shoe adapter can also be used where the flash does not have a dedicated socket

[Hot Shoe Converter Nikon | Hot Shoe Adapter Nikon | Hot Shoe Adapter Sync - C-n2 Hot - Aliexpress](#)

[3.5-PC 3.5mm to Male Flash PC Sync Cable Cord for Studio Photography Strobe Flash - 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](#)

Soldering Iron Kit.
Cheap soldering iron kit that has everything to get started. Works fine.
[Adjustable Temperature 80W Soldering Iron Internal Heating Type Household Electronic Welding Repair Tool and Tin Wire Bracket - AliExpress](#)

Other items A Mariotte bottle to supply constant water pressure, made from what ever you have to hand (I used a refillable drinking bottle, plastic piping & Tee pieces to connect the solenoid valves to the Mariotte bottle. Google it for details. Plenty of web pages describing how to make one. [Green Drip Irrigator - Instructables](#)

Frame to hold the solenoids & Mariotte bottle. I made a simple stand from MDF, rather like a film Enlarger, So I could raise & lower the solenoids, giving great or lower height for the drips to fall.

Change Log
V 1.1 Updated parts & added relay.