

Computer Casing

Objectives:

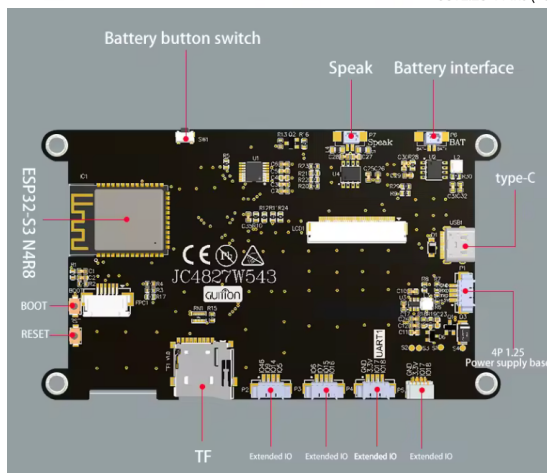
- **Securely holds** (minimal rattling)

[Link to screen](#) (ordered)



Hardware Feature of JC4827W543C/R_I

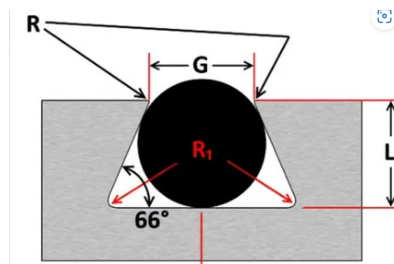
4.3" LCD-TFT HMI Capacitive touch or Resistance touch display module
 Supports WiFi and Bluetooth
 Support lithium battery power supply
 Capacitive touch or Resistance touch
 480 x 272 screen resolution
 RGB 65K true-to-life colours
 Onboard 240MHz LX6 MCU
 520K Byte RAM
 8 MB PSRAM
 4 MB Flash memory
 JST1.25 4 Pins (+5V, TX, RX, GND) TTL serial interface



■ Width unknown

- End knobs will also be contained in the casing
 - Will also hold battery (are the dimensions known?)
- **Waterproof**
 - Screen = use glue as sealant
 - Casing = use gasket (long cylindrical tube wedged into groove)

■ Groove:



- Increase number of screw holes to increase pressure between contact surfaces of casing.
 - Using M2 screws will decrease shredding on ABS filament material

- Rigidware

SCREWS	PRICES MAY VARY	
4900216.4	M2 5MM SOCKET CAP SCREW	0.10
4900225.4	M2 10MM SOCKET CAP SCREW	0.10
4900234.4	M2 16MM SOCKET CAP SCREW	0.08
4900243.4	M2 20MM SOCKET CAP SCREW	0.08
4900252.4	M2 25MM SOCKET CAP SCREW	0.08

- Mounting (??)
 - On bike handles

Material Choice: 3D printing ABS

ABS is the preferred choice for a weatherproof electronics enclosure due to its superior impact resistance, machinability, weather resistance, and thermal stability. While PVC has excellent chemical resistance, it is less durable in outdoor conditions, making it less ideal for bike computer casings. [1]

PVC → not good with oil, therefore if exposed and there are screwed the threads dissolve [1]

Design Research :

1. Effective Display Area (Screen Only)

- Width: 95.04 mm
- Height: 53.86 mm

2. Overall Module Size (Including PCB and Frame)

- Width: 120 mm
- Height: 70.2 mm

3. Thickness:

- The datasheet does not provide the exact thickness, but typical ESP32 display modules range between 5 mm to 10 mm depending on the components.

- I added 12mm on each side of the length (120 → 144) to guess for the protruding parts

Acrylic width:

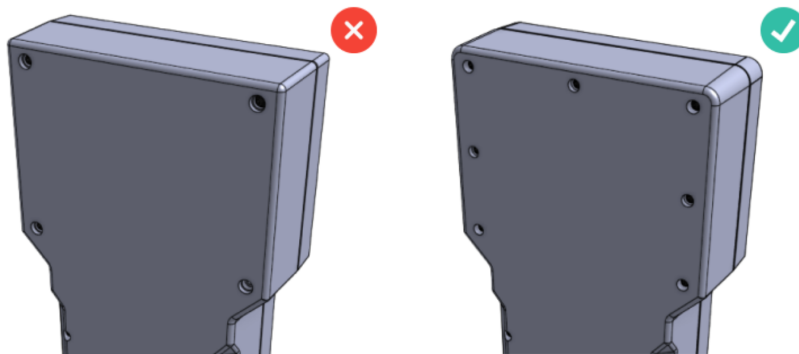
Decimal Inches	Fractional Inches	Metric
0.125"	1/8"	3.18 mm

- 1mm tolerances on the fitting of the monitor and the acrylic
- Assumed a 1mm rubber o-ring diameter
-

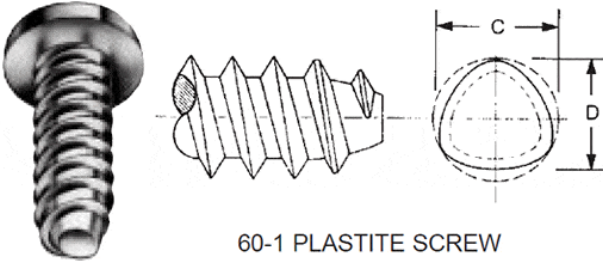
Feature	Before Rounded Corners	After 10mm Rounded Corners
Internal Width	120 mm	100 mm
Internal Height	70 mm	50 mm
External Width	~125 mm	~140 mm (if keeping 120mm internal)
External Height	~75 mm	~90 mm (if keeping 70mm internal)
Depth	20-30 mm	20-30 mm (unchanged)



- Rounded corners will make it endure better, stiffer = load distributed better [1]



- Screws for casing should be stainless steel or brass → may want to reinforce screw bosses with ribs or thicker walls to prevent cracking over time. [1]
 - o M2 Plastite trilobular thread-forming screws with TORX heads (create a strong hold without damaging the material, washer heads can distribute the load, preventing the screws from digging into the case, which is essential for maintaining a good seal)



60-1 PLASTITE SCREW

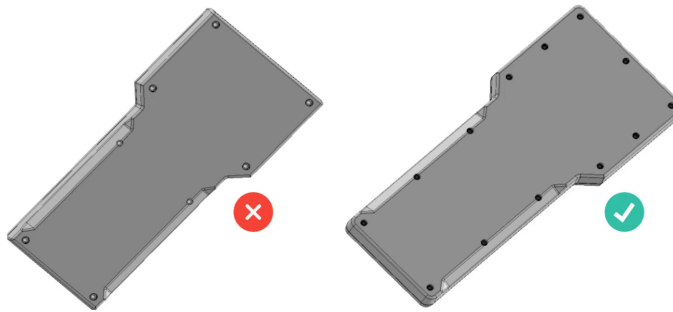
The first screw (longer, partially threaded) is better when:

- Alignment of parts is needed before fastening.
- You want to reduce wear or stress on a specific material.
- Shear strength is more important than holding force.

The second screw (shorter, fully threaded) is better when:

- A strong clamping force is required along the full length.
- The material is relatively thin.
- The application involves metal-on-metal fastening where grip is needed.

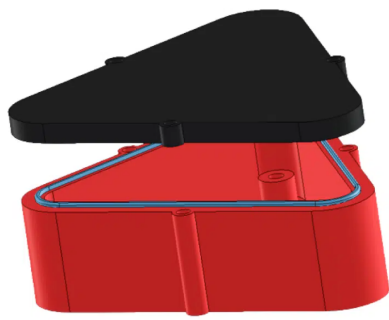
- Make fixings close together [1]



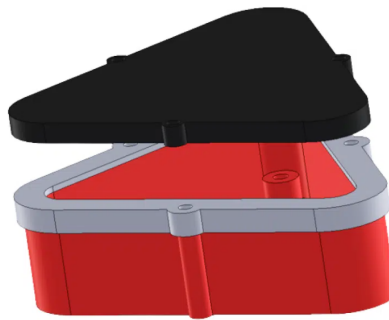
Fixings far apart

Fixings no more than 35mm apart

- Use a rubber gasket? (is this even a possibility or should it all be done with STL print design?) → use silicone or EPDM rubber



O-rings



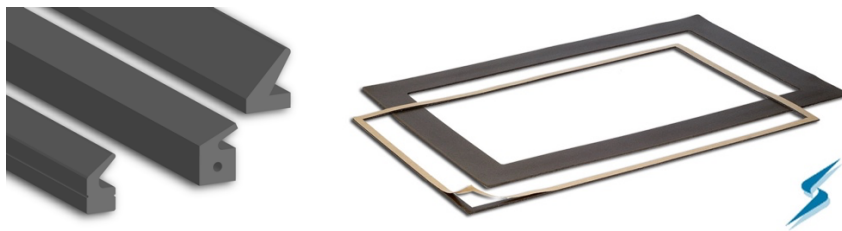
Custom Rubber Gasket

Feature	Rubber Gasket	O-Ring
Best for	Enclosures, flanges, large surface areas	Pipe fittings, dynamic seals, high-pressure applications
Compression Needed	Moderate	High (deforms in groove)
Pressure Handling	Low to medium	High (creates a tighter seal under pressure)
Waterproofing Efficiency	Good for flat interfaces	Excellent in cylindrical and high-pressure sealing

- Use a **rubber gasket** for **flat** sealing surfaces (like a waterproof electronics case).
- Use an **O-ring** when sealing **round or grooved** joints (such as waterproof connectors or pipes).

Additional considerations:

- Sealing the touchscreen:
 - A raised lip around the screen opening can prevent water pooling near the edges.
 - Optical bonding or a thin adhesive seal around the display can prevent water ingress while keeping touch sensitivity.



For your **weatherproof bike computer**, a **gasket-style seal with a raised lip** would be a good choice if:

- Your **screen sits flush** against the enclosure.
 - You want to **evenly distribute compression** around the edges.
 - You need **easy disassembly** for maintenance.
- Battery compartment:
 - If you need access to the battery, consider a separate waterproof hatch with a smaller gasket for easy replacement.

Mounting/ Connection:

- Where is it going to be mounted on the bike (handles right?)

[1] Jon, "Designing a Waterproof Enclosure: A Simple Guide," *Jiga*, Nov. 15, 2023. Available: https://jiga.io/injection-molding/designing-waterproof-enclosure-a-guide/?utm_source=chatgpt.com. [Accessed: Feb. 04, 2025]

Current Design