Soldering workbenches

SLQ Wiki Fabrication Lab 2026/04/16 09:47

Soldering workbenches

Current soldering workbench

Summary

Workbenches to allow for common electronics assembly, repair and diagnostics.

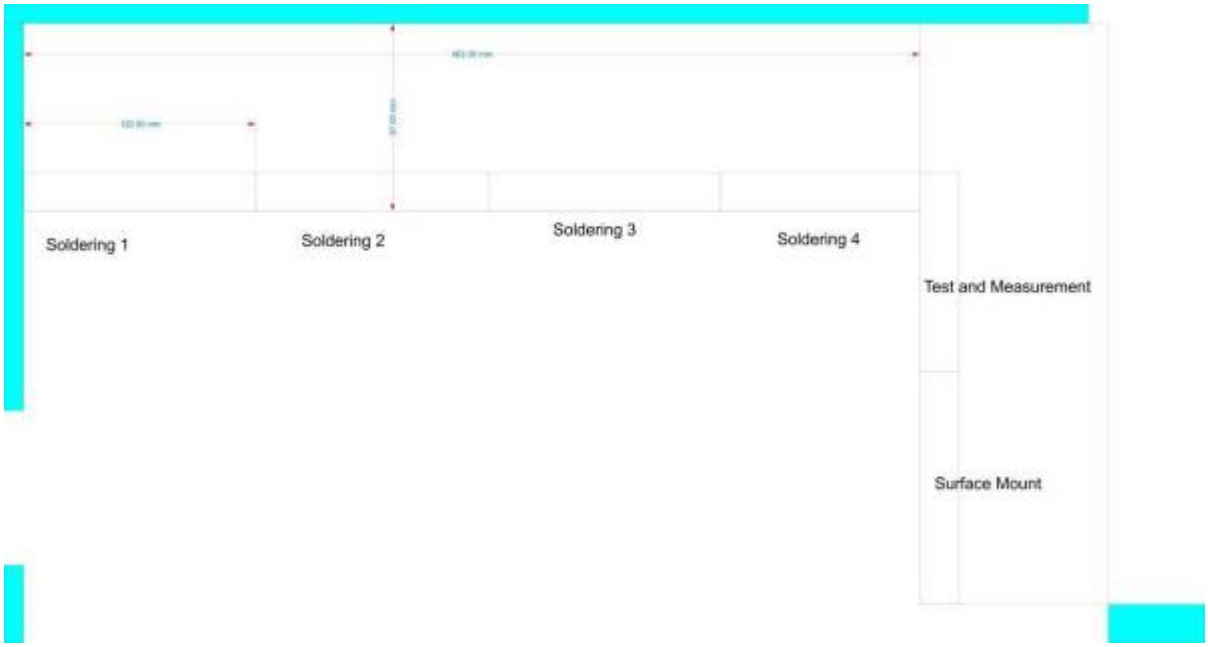
From basic through-hole and other traditional electronics technology to DIY level SMD(Surface Mount Device) repair up to small(hobby) scale manufacturing of a few dozen boards at most.

The layout should allow 4 people to use matching spaces at the same time and for up to 6 people doing different tasks.

Care has been taken to prevent mess and 'paused' projects of one space from spreading into the next 'bay' allowing both messy and clean users of the space plus longer term projects to coexist while at the same time allowing for the full bench lengths to be used if required for one-off events and projects.

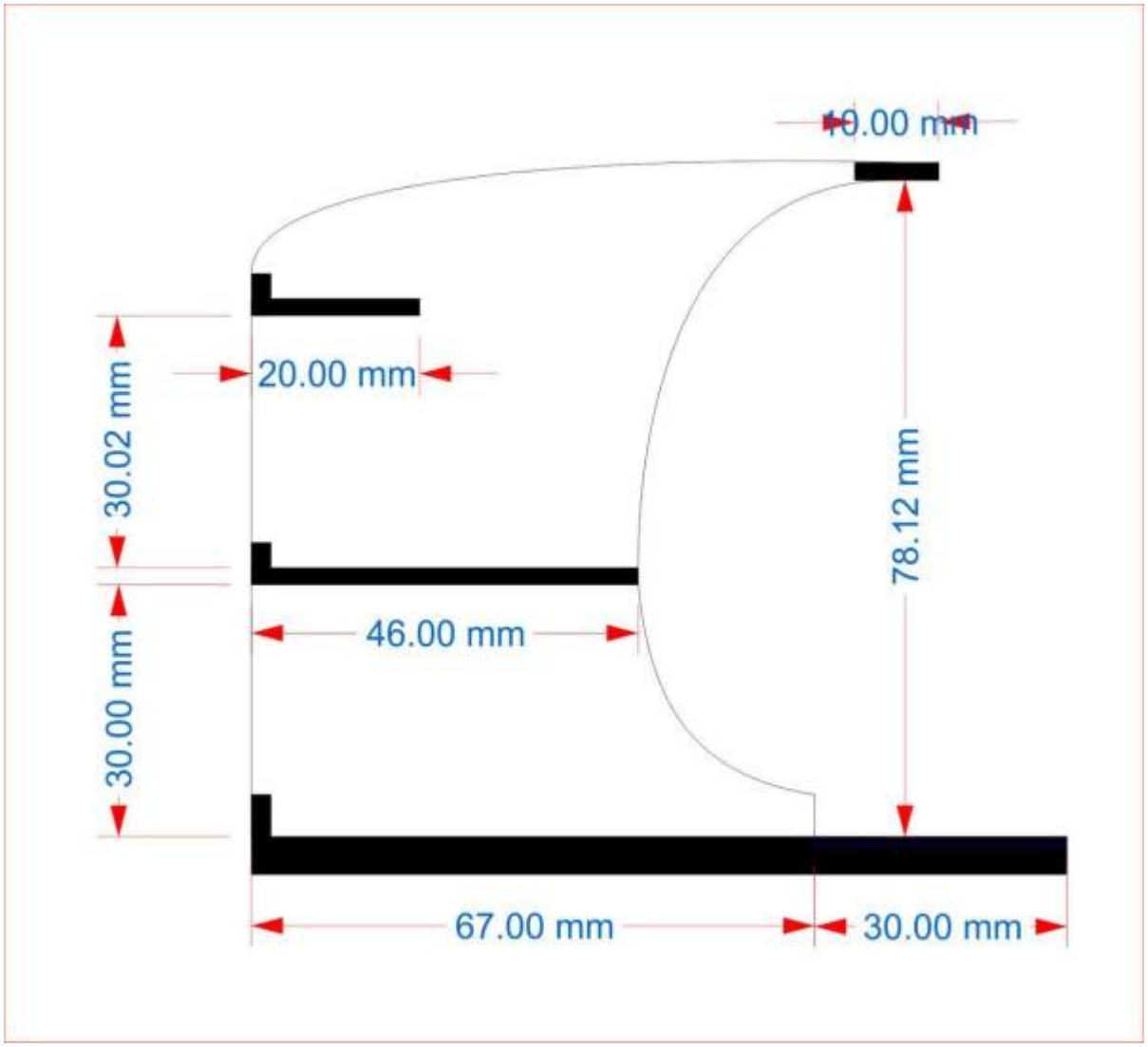
Layout

Plan view:

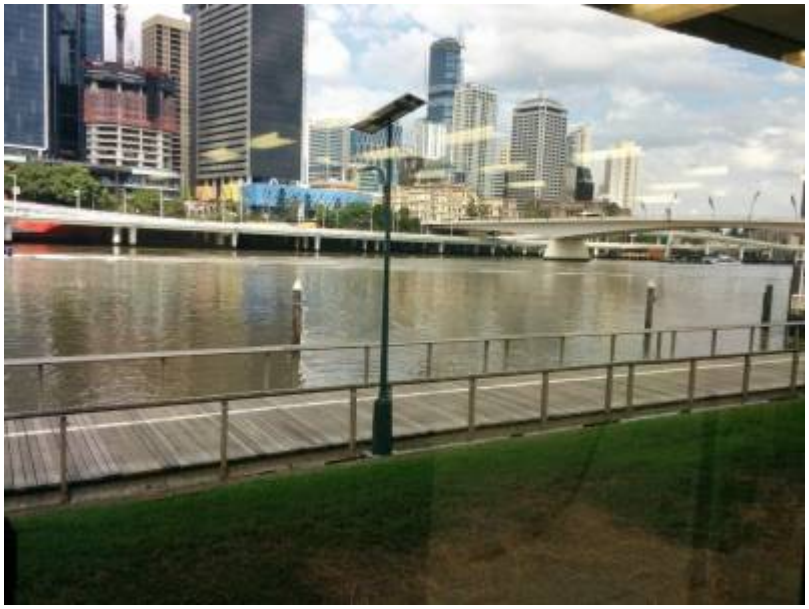


Bench design

End view: (1/10th scale)



Note: The 'odd' design of this bench takes into account that behind this bench is this window/view and thus
aims to maintain an open and, as far as practical, unobstructed view through to this 'million dollar view':



Work stations

Three stations are envisaged:

General soldering

- Weller soldering iron
  - Solder (0.5 and 0.7mm)
  - Tip cleaners
- Hot air gun
- Adjustable power supply
- Portable multi-meter
- Basic hand tools
  - Angle cutter
  - Pliers
  - Wire stripper
  - Screwdriver sets (Small and large)

Test/measurement

- Oscilloscope
- Bench-top multi-meters
- Basic hand tools
  - Station 4 would be able to be a 'hybrid' station along with Test and Measurement by setting them up next to
    each other in the right away, allowing either two independent stations or one 'advanced' station for doing
    electronics repair and test using the full toolset.

Surface Mount Device (SMD)

- Fine tipped, temperature controlled soldering station
- Vacuum pick and place tool
- Fine tweezers, picks, etc
- Higher end hot air station
- Inspection/work microscope/camera
- Reflow oven

Tools

Vacuum pick and place

https://img.diytrade.com/cdimg/989265/10170268/0/1250749604/SMD-VAC_VACUUM_HANDLING_SYSTEMS.jpg

Microscope

Something like this connected up to a large monitor:

https://www.aliexpress.com/item/Autofocus-SONY-IMX290-HDMI-TF-Video-Auto-Focus-Industry-Microscope-Camera-180X-C-Mount-Lens-Stand/32854389430.html

https://www.aliexpress.com/item/Autofocus-1080P-60FPS-SONY-IMX290-HDMI-TF-Video-Auto-Focus-Industry-Video-Microscope-Camera-180X-C/32867628649.html

https://www.aliexpress.com/item/Big-Size-Adjustable-table-Stand-Holder-Multi-axis-Adjustable-Metal-Arm-for-Lab-Industry-Microscope-Camera/32704723593.html

https://www.aliexpress.com/item/Free-shipping-10X-180X-Adjustable-Magnification-25mm-Zoom-C-mount-Lens-0-7X-4-5X/32703396905.html

Ventilation

Overview

Soldering stations and reflow will require forced air ventilation. Measurement maybe not.

Details

Soldering benches share a common 125mm fan, controlled from any station's power switch.

This connects back to the 150mm main exhaust line common-ed with the 3d printers and resin casting area. Backflow gates allow independent use of the systems.

A rigid 125mm pipe across the back of the workbenches connect via 50mm flexible tubing to a bench mounted fume hood/extractor set up at the back edge of the soldering area of each station to draw fumes away from user.

Numbers

Main fan is rated at 280 m3/hr (77.77 l/s) and devided by 6, becomes 12.96l/s.

Extraction systems were tested to work flawlessly at 43.06 l/s, so further testing is required.

Hoods

Hardware

- https://www.pureventilation.com.au/product/manufacturers/tt-mixflow-line-fan-125mm-w-lead-plug/
- https://www.pureventilation.com.au/product/fanco/back-draft-shutter-plastic-125mm/
- https://www.pureventilation.com.au/product/accessories/flexible-duct-100mm-6m/
- https://www.bunnings.com.au/holman-150mm-x-6m-stormwater-pipe_p4770357
- https://www.aliexpress.com/item/Inner-Diameter-50mm-75mm-80mm-100mm-150mmAluminum-Foil-Hose-Ducting-Flexible-6-Meter-Pipe-Ventilation-For/32907036947.html?

Standards

= AS 1668.2 =

- https://www.scribd.com/doc/114252126/AS1668-2
- https://www.google.com/search?q=AS+1668.2+0.5+m%2Fs

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5.3.2.2 Type A effluent removal
In addition to the requirements of Clause 5.3.2.1, the velocity of air as it
enters the hood,
special surrounding or exhaust air intake used in the removal of Type A
effluent shall be
not less than 0.5 m/sec averaged across the opening.
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Note from asking elsewhere:

With particular respect to AS 1668.2, I can't the particular scenario but the 0.5 m/s in a hood and 5 l/s per m^2 floor (not counting occupancy based ventilation) seem to stick out.

Found a council website that basically paraphrased a decent chunk of the AS 1668.2 document so people in its area can access it for compliance reasons **“The effluents shall be collected as they are being produced, as close as practical to the source of generation, using special surroundings, hoods, surface mounted exhaust air intakes or other approved means. The airflow rates shall be such as will ensure positive capture and removal of all effluents.”** pretty much says it (for miscellaneous applications, it's more words than numbers).

So yeah, as long as the system *feels* like it's safely in operating limits, then the 0.5 m/s airflow at the site of soldering is a good rule of thumb but not god I guess

Light

LOTS AND LOTS OF LIGHT!

Each bench should have a good amount of overhead light from at least two angles. Likely two or three strips of mixed warm and cool white LEDs.

Current lighting plans:

- Each bench/bay will have a 45W LED overhead light
- strip of LEDs in the dust collector
- Desklight/light on an arm of some kind.

Development notes

(This is where you can put ideas that you tried, but which did not work (and why))

Feedback

(Here you can put any suggestions from users that you have not yet implemented, and mention any unforeseen difficulties encountered in operation or construction)

References

This were you put external links like LED generator, if they have not appeared in the Instructions.

Files

This is where you put files for laser cutting, Excel sheets of suppliers etc..