

ELECTRONICS DIY TOOLS

For Hobbyists And Professionals



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Use of proper tools is important for making any project properly. Here are some tools that are in common use by amateurs as well as professionals.

Soldering tools

Soldering tools are needed for performing efficient soldering work. Soldering is an art by which electronic components are connected with each other, so that these can communicate in a circuit and perform a specific task. Electronic components are held together on a board called a printed

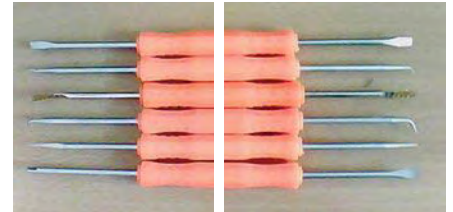


Fig. 1: Tools shown in the two images are actually pairs and form six types of different tools: Knife pair is useful for cutting tracks of PCB, chip hold pair for holding surface mount devices while soldering, cleaning brush pair for removing solder from PCB, hook pair for removing components after de-soldering, reamer pair for transforming holes on PCB to larger-desired size and fork pair for aligning component leads to desired direction

TABLE I
SOLDERING TOOLS

Name of tool	Function
Variable soldering station	Soldering stations have a soldering pen/iron and a base unit with a knob to vary temperature of the soldering iron tip as per needs. Most soldering jobs are performed at 250°C/15W knob setting. For bigger joints, you can use 350°C/25W knob setting, too.
35-watt soldering iron	This soldering iron is part of Max Gold 535 station and you need to use Bevel 4C bit with it for almost all kinds of soldering jobs. Tip of the bit is the area that melts the solder, so it should be properly tinned frequently for best results. Always leave a blob of solder on the tip after you finish soldering.
Tripod PCB holder	It is needed for holding the PCB while performing soldering work. The PCB can be rotated at any angle as per needs.
De-soldering pump	This tool is needed to correct any mistakes that you may have committed while soldering. It helps extract the excess or wrongly-formed solder from the solder joint.
Connections	The light-green area is the copper track that connects two component leads with the help of a molten solder (white, conical objects). The dark-green area is the solder side of the PCB.
Fine 26SWG solder wire	You should use very fine solder wires (of size 26SWG) to avoid excess feeding of solder to the joint. It is better to use 60 per cent tin and 40 per cent lead based solder wire, as lead-free ones need higher melting temperatures and are difficult to inspect for correct joint formation. Use a solder wire with at least five cores of flux within.
Thick 22SWG solder wire	For bigger joints, use a thicker solder wire (of size 22SWG). Composition should be 60/40 (same as fine solder wire).
De-solder braid	De-solder braid, or de-solder wick, is extremely useful to wick away (extract away) excess solder from an incorrect solder joint. Place it between the joint and the tip of the soldering iron and it will magically absorb all the solder from the joint. It has flux built-in that turns to smoke when heated.
Flux paste	Flux is applied to the area where solder joints need to be formed. Action of flux is simple; it is corrosive in nature at soldering temperatures and non-corrosive at normal temperatures. Due to its corrosive nature it removes oxides and other impurities from soldering surfaces while soldering.
PCB cleaner	The PCB cleaner is used to clean the PCB after soldering work to remove left-over flux.
Cleaning sponge	It is first made wet and then squeezed to the level so that water does not drip from it but instead moistens. It is used to clean and tin the tip of the soldering iron. This is a cellulose-type sponge.

**TABLE II
HAND TOOLS**





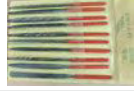


















Name of tool	Function	Name of tool	Function
 <p>Hand drill</p>	It is needed for drilling holes of 1.5mm to 6.5mm diameter in cabinets/enclosures of electronics projects. The bit is attached to the drill by rotating the top (shiny portion in picture) anti-clockwise, placing the bit and then rotating it clockwise. You can also choose a motorised drill if cost is not a factor.	 <p>IC chip extractor</p>	An IC chip puller is used to pull chips off the PCBs without bending the pins of the IC.
 <p>Drill bit sets</p>	These bits are needed for drilling holes of 0.8mm to 6.5mm diameter in cabinets/enclosures of electronics projects. The bit can be attached to a hand drill or motorised drill. These come in sets. Fine 0.8mm and 1mm drill bits are required for drilling holes in PCBs.	 <p>Illuminated magnifier</p>	A magnifier like the one shown in the image that can magnify as well as illuminate the object under inspection is a must-have for inspecting solder joints for proper soldering, reading component markings and while dealing with surface mount device components.
 <p>Needle files</p>	Needle files of various types like square, semi-circle, triangular, round and flat are extremely useful for giving desired shapes or for imparting the perfect finish to the crudely-cut areas of electronic enclosures.	 <p>15.2cm (6-inch) hand file set</p>	This usually comes in sets that include various types like square, round, flat, triangular, semicircular, etc. It is useful in giving finishes to the otherwise crudely-cut electronic enclosures.
 <p>Ten-piece trimming tool set</p>	These form the essentials when it comes to the setting of trimmers, presets and the like, where the use of normal screwdrivers can cause hand capacitance effect.	 <p>Lineman's plier</p>	It has a large number of applications like cutting, bending and stripping wires. It is also useful in holding the bolt while tightening the nut.
 <p>Fine screwdriver</p>	This type of fine screwdrivers can be used for applying flux paste to PCBs.	 <p>Needle-nose plier</p>	It is useful in bending component leads prior to soldering these on PCBs. It can also be used to hold precision-fine bolts while tightening the nut.
 <p>Solder-assist tool set</p>	It is needed for cutting tracks of the PCB, holding SMD components while soldering, removing solder from the PCB, removing components after de-soldering, transforming holes to a larger desired size and aligning component leads.	 <p>Nipper</p>	Nippers are useful in cutting component leads in hard-to-reach areas where flush-side cutters cannot fit. Look for a nipper with one side of the cutting blade completely flat so that it cuts the leftover component lead with extreme precision.
 <p>Hexagonal head L key set</p>	These come in sets as well as loose and are very useful for opening grub screws.	 <p>Open-end spanner set</p>	Open-end spanners are useful for opening bolts from cabinets of large electronic appliances.
 <p>Automatic wire stripper</p>	These are useful for stripping off the insulation from single- or multi-stranded copper wires of 0.5mm to 6mm thickness.	 <p>Large heavy-duty cutter</p>	A large heavy-duty cutter can be used to cut PCBs, plastic cabinets and more.
 <p>Baby vice</p>	It is useful for holding PCBs or electronic enclosures while performing shaping, cutting, filing or drilling work on these.	 <p>Helping third hand with magnifier</p>	A helping third hand is used to hold the wires while tinning or joining these. It can also be used to hold small PCBs. It basically has two alligator clips that hold stuff together. It can be felt as an extension to our two hands, hence the name.
 <p>Flush-side cutter</p>	It is used to cut the leads of components after soldering work is done.	 <p>Archimedes push drill</p>	It is used to drill precision-fine holes of 0.8mm, 1mm or 1.2mm sizes on PCBs.
 <p>Hacksaw</p>	This tool is used to cut enclosures, PCBs and so on.	 <p>15.2cm (6-inch) adjustable spanner</p>	An adjustable spanner comes in handy to remove larger bolts from large cabinets of electronic appliances.
 <p>Hammer with flat and point chisels</p>	Hammer and flat chisels can be used to cut metal enclosures in a straight manner, while point chisels can be used to make a pre-mark before drilling.	 <p>5mm flat screwdriver</p>	It is useful in bending component leads after inserting components into the PCBs.
 <p>Hot glue gun</p>	A hot glue gun is used in fixing cabinet-mounted parts to enclosures like switches, LEDs and so on.		

TABLE III
MEASUREMENT AND POWER SUPPLY TOOLS








Name of tool	Function
Auto-ranging digital multimeter 	An auto-ranging digital multimeter is a must-have tool for beginners as well as advanced users. Look for features that suit your purpose well. A good digital multimeter should have a micro-ampere range and large backlit display. It should have separate input sockets for current measurements and voltage/resistance/other measurements, so that you do not accidentally short the test leads while in current range.
Analogue multimeter 	Due to provision of measurement over a dial, an analogue multimeter can be used to test such electronic components that we cannot with a digital meter. Although new digital multimeters come with a bar graph display but they still cannot beat analogue multimeters when it comes to cost. Analogue multimeters are not auto-ranging and you would have to select the range manually.
Logic probe 	It is used to check logic levels (high or low) of the digital circuit under test. It has two alligator/crocodile clips that are connected to the supply voltages of the equipment that is being tested.
Lab power supply 	A lab power supply is used to power electronic circuits/projects. If you work on op-amps a lot, you should consider buying a dual-tracking power supply. It has two knobs: one for limiting the current and the other for adjusting the voltage. Voltage output is provided at binding posts, which is where banana plugs fit in. For most jobs 0V-18V, 3A output is more than adequate.

TABLE IV
PROTOTYPING TOOLS

Name of tool	Function
Large breadboard 	It is good to build your own breadboard by sticking three 840-tiepoint breadboards on a wooden board. Using a drill attach two binding posts (red and black) on the wooden board that will receive power from the lab supply.
Connecting jumper wires 	You can either buy pre-made jumper wires or make your own using a single-strand 22SWG hook-up wire. Such wires can be used to add a connection between electronic components on a breadboard or perfboard.
Perfboard 	Called perfboard, veroboard or general-purpose PCBs, these serve as a base upon which electronic components are interconnected with each other, so that these can communicate and form a circuit. When buying one, look for the tinned version.

circuit board (PCB). Leads of electronic components are joined to the PCB by melting the solder wire and waiting for it to cool and solidify. PCBs either have external copper wires (in general PCBs/perboards) or printed copper tracks (advanced FR4-grade PCBs) that help in establishing the required connections. Various soldering tools are described in Table I.

Hand tools

Hand tools are required for stripping wires, cutting component leads, drilling holes in PCBs and cabinets, shaping electronic enclosures, setting trimmers and presets, opening enclosures, cutting cabinets, providing assistance in soldering, extracting integrated circuits (ICs), holding things while soldering or other work, magnifying work area and so on. Check out Table II for some basic hand tools.

Measurement and power supply tools

Measurement tools are required in taking measurements of physical quantities in electronics like voltage, current and resistance, while power supply is used to power up the electronic circuits. Table III shows some handy measurement and power supply tools.

Prototyping tools

Prototyping tools are required for assembling a single unit of electronic project/circuit, which then can be mass produced, if successful. Some common prototyping tools are shown in Table IV.

Screwdriver tools

These are your best friends when it comes to opening/hacking electronic gadgets. These come in various tip types like slotted, Philips, Torx and so on. Avoid the extremely-cheap, low-quality screwdriver sets whose tips bend while opening a screw. Select sets that have tweezers included, as these are extremely useful in holding fine wires while soldering. Fig. 2 shows some widely-used screwdriver tools. **EFY**



Fig. 2: Some common screwdriver tools