

**Department of Education  
SPTVE**

**Exploratory 7**

**Electronic Products Assembly and Servicing  
Prepare Hand Tools  
Quarter 2: Week 5 Module**



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## Expectation

At the end of the module, you should be able to:

1. identify the hand tools used in electronics;
2. classify the tools and materials according to its function as per job requirements; and
3. practice proper care and maintenance of tools and equipment.



## Pre-Test

**Directions.** Read the questions carefully and choose the correct answer. Write the word/s of your choice on your answer sheet.

1. This hand tool is specifically designed to insert and tighten, or to loosen and remove screws.  
A. Hacksaw  
B. Long nose pliers  
C. Screw driver  
D. Side cutter pliers
2. It is a device used in joining two pieces of metal parts.  
A. Hacksaw  
B. Long nose pliers  
C. Screw driver  
D. Soldering Iron
3. This tool is used for cutting metals.  
A. Hacksaw  
B. Long nose pliers  
C. Screw driver  
D. Soldering Iron
4. This tool is used for holding, bending, and stretching the lead of electronic component or connecting wires.  
A. Hacksaw  
B. Long nose pliers  
C. Screw driver  
D. Soldering Iron
5. A tool called as wire-cutting pliers and it is used to cut wires.  
A. Hacksaw  
B. Long nose pliers  
C. Screw driver  
D. Side cutter pliers
6. Which of these tools is classified as splicing tool?  
A. Hacksaw  
B. Soldering iron  
C. Wire stripper  
D. Portable electric drill
7. This tool is used to remove soldered wires.  
A. Desoldering tool  
B. Long nose pliers  
C. Screw driver  
D. Soldering iron
8. These tools are classified as boring tools EXCEPT one.  
A. Metal files  
B. Utility knife  
C. 12v mini drill  
D. Portable electric drill
9. The following are hand tools except\_\_\_\_\_.  
A. Desoldering tool  
B. Long nose pliers  
C. Oscilloscope  
D. Screw driver

10. It is a device which produces simple wave forms.

- A. Oscilloscope
- B. Signal generator

- C. Volt-Ohm-Milliammeter
- D. Voltmeter



## Brief Introduction

Working with electronic equipment can be accomplished thoroughly by following the procedure or its step-by-step process as it will save time, effort and resources. While most of the work cannot be done by bare hands, completing the task with the aid of electronic tools and equipment is necessary.

The content of this module will help you identify the most common tools, materials and equipment used to perform and accomplish common electronic jobs.



## Activities

### Basic Hand Tools

#### Driving of Tools

1. **Screwdrivers** are hand tools specifically designed to insert and tighten, or to loosen and remove screws. A screwdriver comprises a head or tip, which engages with a screw, a mechanism to apply force by rotating the tip, and some way to position and support the screwdriver, the tip of which is shaped in to fit a particular type of screw.

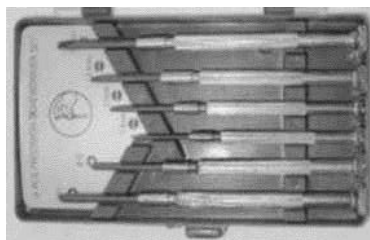
- a. **Slotted Screwdriver** is used to drive or fasten negative slotted screws.



- b. **Phillips Screwdriver** - used to drive or fasten positive slotted screws. It is a screwdriver that could take greater torque and could provide tighter fastenings.



- c. **Jeweler's Screwdriver Set** - is a set of small screw drivers composed of slotted and Phillips screwdrivers.



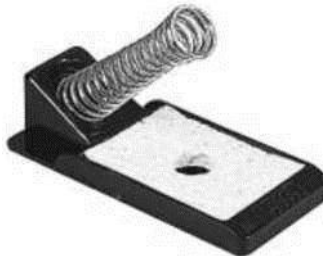
## Soldering Tools

**1. Soldering Iron** - is a device for applying heat to melt solder in attaching two metal parts. A soldering iron is composed of a heated metal tip and an insulated handle. For electrical work, wires are usually soldered to printed circuit boards, other wires, or small terminals. A low-power iron (20-30 Watts) is suitable for this work.

**2. Soldering Tool Stand** - is a place where the soldering iron is placed during usage.



This will keep the soldering iron away from flammable materials. The stand often



comes with a sponge used in cleaning the tip of the soldering iron.

**3. Desoldering tool** is used in removing soldered wires and components on printed circuit boards for troubleshooting and repair purposes.



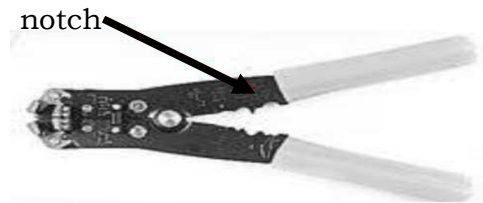
## Splicing Tools

**1. Long Nose Pliers** -is used for holding, bending, and stretching the lead of electronic component or connecting wires.



**2. Side Cutter Pliers** -is a wire-cutting pliers, though they are not used to grab or turn anything, but are used to cut wires.

**3. Wire Stripper** is a pair of opposing blades much like scissors or wire cutters. The addition of a center notch makes it easier to cut the insulation without cutting the wire.



### Boring Tools

**1. 12V Mini-Drill** - is used to bore or drill holes in the printed circuit board (PCB) with sizes from  $1/32''$  -  $1/16''$ .

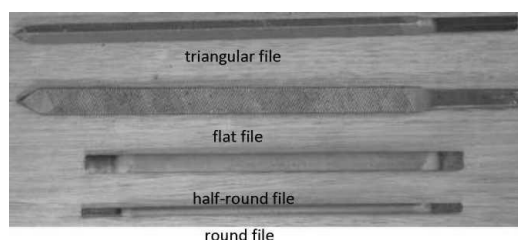


**2. Portable Electric Drill** is used for boring hole(s) in plastic or metal chassis with the used of drill bits having sizes from  $1/6''$  to approximately  $1/4''$ .



**3. Metal Files** These are hand tools having a series of sharp, parallel ridges or teeth. Most files have a narrow, pointed tang at one end to which a handle can be fitted.

- **Flat File** is parallel in width and tapered in thickness; they are used for flat surfaces and edges.
- **Half Round File** is tapered in width and thickness, coming to a point, and is narrower than a standard half round and used for filing inside of rings.
- **Round File** - is also called rat-tail file which is gradually tapered and used for many tasks that require a round tool, such as enlarging round holes or cutting a scalloped edge.



### Cutting Tools

**1. Utility Knife** is a common tool used in cutting various trades and crafts for a variety of purposes.



**2. Hacksaw** is used for cutting metals. Some have pistol grips which keep the hacksaw firm and easy to grip. The small hand-held hacksaws consist of a metal arch with a handle that fits around a narrow, rigid blade.



## Auxiliary Tools

**1. Magnifying Glass** is a convex lens which is used to produce a magnified image of an object. The lens is usually mounted on a frame with a handle. Roger Bacon is the original inventor of the magnifying glass. A magnifying glass works by creating a magnified virtual image of an object behind the lens. Some magnifying glasses are foldable with built-in light.



**2. Paint Brush** - made of bristles set in handle, used for cleaning dirty parts of a circuit or an object.



## Electronic equipment

Aside from hand tools, equipment are also needed for more accurate and quality output. In this connection, three of the most used equipment are presented here for you to be familiar with their uses and the proper way of maintaining them.

**a. Volt-Ohm-Milliammeter.** It is an equipment that combines three functions: as a voltmeter that measures both ac and dc voltages; an ohmmeter that measures resistance; and milliammeter that measures small amount of dc current. As safety precautions in the maintenance of this instrument, the following should be observed:

- Always rest the function switch at 250V AC if an OFF position is not available in the instrument.
- For current and voltage measurements, always set the function switch in the correct setting which is a little higher than the expected current or voltage present in the circuit.

- Place the instrument in a cool dry place, away from any magnetic devices, and free from vibrations.



Volt-Ohm-Milliammeter



Signal generator



Oscilloscope

**b. Oscilloscope.** An oscilloscope (commonly abbreviated CRO, for cathode-ray oscilloscope, or scope) is a piece of electronic test equipment that allows signal voltages to be viewed, usually as a two-dimensional graph of one or more electrical potential differences (vertical axis) plotted as a function of time or of some other voltage (horizontal axis).

**c. Signal generator.** A signal generator is a device which produces simple wave forms.

Such devices contain an electronic oscillator, a circuit that is capable of creating a repetitive waveform. These are typically used in simple electronics repair and design where they are used to stimulate a circuit under test.

Oscilloscope and signal generator should be given regular checkup for at least once a week by connecting them in the power line. This will help prevent their components from having moisture that might cause trouble in their circuits.

In any activity involving skills, it is a standard procedure that you must always use the right tool or equipment properly that would fit in a particular task. In spite of this reminder or caution, some students abuse the use of tools and still practice the following common faults that must NOT be done.

### Common Faults in Using Hand Tools

#### Pliers:

- Do not increase the handle length of pliers to gain more leverage. Use a larger pair of pliers or bolt cutters if necessary.
- Do not substitute pliers for a wrench when turning bolts and nuts. Pliers cannot grip these items properly and might cause a slip and create an accident.
- Never use pliers as a hammer on the handle. Such abuse is likely to result in cracks or breaks.
- Cut hardened wires only with pliers designed for that purpose.
- Always cut the wires in right angle. Never rock from side to side or bend wire back and forth against the cutting edges.

#### Screwdrivers:

- Never use screwdrivers as a pry bar, chisel, and punch stirrer or scraper.
- Never use screwdrivers with broken or worn-out handles. Screwdrivers of these kinds should have tags to indicate that it is defective.
- Never use pliers on a screwdriver for extra leverage. Only use wrench or screwdrivers specifically designed for purpose.

### Utility Knives/ Blades:

- Do not use dull blades because they require more force, thus are more likely to slip. Replace the blade when it starts to "tear" instead of cut.
- Never leave a knife unattended with the blade exposed.
- Don't bend or apply side loads to blades by using them to open cans or loosen tight cover of containers. Blades are brittle and can snap easily.



### Remember

- ✓ Electronic hand tools and equipment are needed to perform electronic works
- ✓ Hand tools are grouped into driving tools, soldering tools, splicing tools, boring tools, cutting tools and auxiliary tools.
- ✓ Electronic equipment are also needed for more accurate and quality output. They are volt-ohm-milliammeter, oscilloscope and signal generator.



### Checking Your Understanding

#### Activity 1. "TELL ME WHERE I BELONG"

**Directions:** On a separate piece of paper, classify the different kinds of hand tools according to their specification in Consumer Electronics Servicing like Soldering tool, Splicing Tool, Boring Tool, Auxiliary Tool and Driving Tool

Hand tools	Classification
1. Desoldering Tool	
2. Wire Splicer	
3. Utility knife	
4. Long Nose Pliers	
5. Mini Drill	
6. Magnifying glass	
7. Soldering stand	
8. Screwdriver	
9. Soldering iron	
10. Portable electric drill	





## Post-Test

**Direction:** Read the statement carefully and identify what is being described or defined. Write your answer in words on a separate sheet of paper.

1. This equipment combines voltmeter, ohmmeter and milliammeter as its function.  
A. Oscilloscope  
B. Signal generator  
C. Thermal scanner  
D. Volt-Ohm-Milliammeter
2. This is a tool invented by Roger Bacon using convex lens to easily see an image.  
A. Eye glass  
B. Magnifying glass  
C. Oscilloscope  
D. Signal generator
3. This tool is used for holding, bending, and stretching the lead of electronic component or connecting wires.  
A. Hacksaw  
B. Long nose  
C. Screw driver  
D. Soldering Iron
4. These tools are under boring tools except\_\_\_\_\_  
A. Metal files  
B. Utility knife  
C. 12v mini drill  
D. Portable electric drill
5. One of these is a piece of electronic test equipment that allows signal voltages to be viewed.  
A. Oscilloscope  
B. Signal generator  
C. Thermal scanner  
D. Volt-Ohm-Milliammeter
6. This hand tool is specifically designed to insert and tighten, or to loosen and remove screws  
A. Hacksaw  
B. Long nose pliers  
C. Screw driver  
D. Side cutter
7. It is a device which produces simple wave forms.  
A. Oscilloscope  
B. Signal generator  
C. Volt-Ohm-Milliammeter  
D. Voltmeter
8. It is a device used for joining two pieces of metal parts.  
A. Hacksaw  
B. Long nose pliers  
C. Screw driver  
D. Soldering Iron
9. Which of the following is under a splicing tool?  
A. Hacksaw  
B. Soldering iron  
C. Wire stripper  
D. Portable electric drill
10. This tool is used to remove soldered wires.  
A. Desoldering tool  
B. Long nose pliers  
C. Screw driver  
D. Soldering iron

## ANSWER KEYS

ANSWER KEY:	
Pre Test:	1. Screw driver 2. Soldering iron 3. Hack saw 4. Long nose 5. Side cutter 6. Wire stripper 7. Desoldering tool 8. Utility knife 9. Oscilloscope 10. Signal generator
Checking Your Understanding:	1. Soldering tools 2. Splicing tools 3. Cutting tools 4. Splicing tools 5. Boring tools 6. Auxiliary tools 7. Soldering tools 8. Driving tools 9. Soldering tools 10. Boring tools
Post Test:	1. Volt-ohm-milliammeter 2. Magnifying glass 3. Long nose 4. Utility knife 5. Oscilloscope 6. Screw driver 7. Signal generator 8. Soldering iron 9. Wire stripper 10. Desoldering tool

## References

1. Electrical materials and tools, Department of Education, **K to 12 Basic Education Curriculum Technology and Livelihood Education** Learning Module
2. Electronic tools and equipment, retrieved from <https://creativecommons.org>