

Electronics

Merit Badge Workbook



Merit badges are earned by doing: reading the pamphlet, practicing the skills, and showing your counselor what you have learned.
This workbook gives you a place to organize your notes and track your progress along the way.
Merit badge counselors may not require the use of this or any similar workbook.
You still must satisfy your counselor that you can demonstrate each skill and have learned the information.
Use the space under each requirement to note what you have done and what you want to talk about, not to write out full answers.
When a requirement says discuss, show, tell, explain, or demonstrate, that is what you must do.
No one may add to or subtract from the official requirements found on scouting.org (Guide to Advancement 7.0.4.8).

Scouting America last updated this badge's requirements page on September 19, 2025.
Requirements change from time to time. Double-check scouting.org before you start.

Scout's name: _____ Unit: _____ Date started: _____

Counselor's name: _____ Phone no.: _____ Email: _____

Links marked "Scouting America resources" are the ones Scouting America shares on its official badge page.
This workbook is unofficial and not endorsed by Scouting America.

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1. Describe the safety precautions you must exercise when using, building, altering, or repairing electronic devices.

Scouting America resources: Computer Safety Procedures (video)

Safety precautions

When I am...	Precautions I must take
using	
building	
altering	
repairing	

Requirement 1 completed on _____ counselor initials _____

2. Do the following:

(a) Draw a simple schematic diagram. It must show resistors, capacitors, and transistors or integrated circuits. Use the correct symbols. Label all parts.

Scouting America resources: Schematics (video) · How to Read a Schematic (video)

- ☐ Resistors
- ☐ Capacitors
- ☐ Transistors or integrated circuits
- ☐ Correct symbols
- ☐ All parts labeled

My schematic diagram (draw here or attach)

(b) Tell the purpose of each part.

Scouting America resources: Electronic Components Guide (video) · 10 Common Electronic Components (video)

The purpose of each part

Part (as labeled)	Its purpose

Requirement 2 completed on _____ counselor initials _____

3. Do the following:

(a) Show the right way to solder and desolder.

Scouting America resources: Using Solder | Soldering Basics | Soldering for Beginners (video) · How to Desolder (video)

What I showed

Skill	Date	Shown to	Notes
solder			
desolder			

(b) Show how to avoid heat damage to electronic components.

Scouting America resources: Applying Heat to your Parts (video)

Date _____ Shown to _____

How I kept the parts from heat damage

(c) Tell about the function of a printed circuit board. Tell what precautions should be observed when soldering printed circuit boards.

Scouting America resources: What Are Printed Circuit Boards (PCBs)? (video)

The function of a printed circuit board

Precautions when soldering printed circuit boards

Requirement 3 completed on _____ counselor initials _____

4. Do the following:

(a) Discuss each of the following with your counselor:

(1) How to use electronics for a control purpose.

Scouting America resources: Inputs, Outputs and Controllers (video)

My notes on using electronics for control

(2) Explain the basic principles of digital logic.

Scouting America resources: Understanding Logic Gates (video)

My notes on the basic principles of digital logic

(3) How to use electronics for three different analog applications.

Three analog applications

Application	How electronics is used

(b) Show how to change three decimal numbers into binary numbers and three binary numbers into decimal numbers.

Scouting America resources: How to Convert Binary to Decimal (video) · Convert Decimal to Binary (video)

Decimal to binary

Decimal number	My working	Binary number

Binary to decimal

Binary number	My working	Decimal number

(c) Choose ONE of the following THREE projects. For your project, find or create a schematic diagram. To the best of your ability, explain to your counselor how the circuit you built operates.

Scouting America resources: How to Read an Electronic Schematic (video)

- ☐ **(1)** A control device
- ☐ **(2)** A digital circuit
- ☐ **(3)** An analog circuit

My circuit's schematic, found or created (draw here or attach)

What I built _____ Date _____

How my circuit operates

Requirement 4 completed on _____ counselor initials _____

5. Do the following:

(a) Show how to solve a simple problem involving current, voltage, and resistance using Ohm's law.

Scouting America resources: Ohm's Law Formula (video) · What is OHM'S Law? (video)

My Ohm's law problem and how I solved it

(b) Tell about the need for and the use of test equipment in electronics. Name three types of test equipment. Tell how they operate.

Scouting America resources: Circuits & Electronics - Electronics Lab Introduction (video)

The need for and use of test equipment

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Three types of test equipment

Type	How it operates

(c) Demonstrate to your counselor how to read the colored bands of a resistor to determine its resistance value.

Scouting America resources: How to Read a Resistor (video)

Date _____ Shown to _____

Resistors I read (band colors and value)

(d) Explain the differences between Through Hole and Surface Mount assembly technologies and give three advantages of each.

Scouting America resources: Through Hole vs Surface Mount Method? (video)

The differences between Through Hole and Surface Mount

Three advantages of each

	Through Hole	Surface Mount
1		
2		
3		

Requirement 5 completed on _____ counselor initials _____

6. Identify three career opportunities that would use skills and knowledge in electronics. Pick one and research the training, education, certification requirements, experience, and expenses associated with entering the field. Research the prospects for employment, starting salary, advancement opportunities and career goals associated with this career. Discuss what you learned with your counselor and whether you might be interested in this career.

Scouting America resources: Careers in Electronics Engineering (video)

Three careers in electronics

Career	How it uses electronics

The one I picked

Getting into the field

Topic	What I found out
training	
education	
certification requirements	
experience	
expenses	

Working in the field

Topic	What I found out
prospects for employment	
starting salary	
advancement opportunities	
career goals	

What I learned, and whether I might be interested in this career

Requirement 6 completed on _____ counselor initials _____

Counselor sign-off

Your counselor signs your blue card or approves the badge in Scoutbook, and your unit records it. This line is for your own records.

Counselor's signature _____ Date completed _____

Official Scouting America resources

Scouting America resources: Electronics merit badge page (requirements and resources) · Electronics merit badge pamphlet (free PDF)
All merit badges

Made by Cole at ScoutSmarts.com, an Eagle Scout who loves helping Scouts.
Spot an error or a requirement change? Tell me at scoutsmarts.com/contact.
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