



Electronics

Merit Badge Workbook

This workbook can help you but you still need to read the merit badge pamphlet (book). No one can add or subtract from the Boy Scout Requirements #33215. Merit Badge Workbooks and much more are below: [Online Resources](#).

Send comments to: craig@craiglincoln.com. Requirements revised: 2004, Workbook updated: February 2008.

Scout's Name: _____ Unit: _____

Counselor's Name: _____ Counselor's Ph #: _____

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

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.

(b) Tell the purpose of each part. Resistor _____

Capacitor _____

Transistor _____

Integrated circuit _____

Other? _____

3. Do the following:

- (a) Show the right way to solder and desolder. _____
- (b) Show how to avoid heat damage to electronic components. _____
- (c) Tell about the function of a printed circuit board. _____

Tell what precautions should be observed when soldering printed circuit boards. _____

4. Discuss each of the following with your merit badge counselor, and then choose ONE of the following and build a circuit to show the techniques used: (Hint: an electronics kit may be used. Consider one of the kits from your Scout Shop.)

- (a) Tell how you can use electronics for a control purpose, and then build a control device circuit. _____
- (b) Tell about the basic principles of digital techniques, and then build a digital circuit. Show how to change three decimal numbers into binary numbers and three binary numbers into decimal numbers. _____
- (c) Tell about three audio applications of electronics, and then build an audio circuit. _____

Show how to read the schematic diagram of the project you chose and, to the best of your ability, explain to your counselor how the circuit you built operates. _____

5. Do the following:

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

(b) Tell about the need for and the use of test equipment in electronics. _____

Name three types of test equipment. Tell how they operate.

6. Find out about three career opportunities in electronics that interest you. Discuss with and explain to your counselor what training and education are needed for each position.

Online Resources *(Use any Internet resource with caution and only with your parent's or guardian's permission.)*

- Merit Badge Workbooks:** usscouts.org -or- meritbadge.org ► **Merit Badge Books:** www.scoutstuff.org
- Boy Scouts of America: <http://www.scouting.org/> ► [Requirements](#) ► [Intro to Merit Badges](#) ► [Guide to Safe Scouting](#)
- Electronic Kits Through the BSA: www.scoutstuff.org
- 101science.com: [http:// www.101science.com/Radio.htm](http://www.101science.com/Radio.htm)
- Carl's Electronics: <http://www.electronickits.com>
- Digi-Key Corporation: <http://www.digi-key.com>
- Hobbytron.com: <http://www.hobbytron.com>
- Howstuffworks: <http://electronics.howstuffworks.com>
- Institute of Electrical and Electronics Engineers: <http://www.ieee.org>
- Mouser Electronics: <http://www.mouser.com>
- Nuts & Volts: <http://www.nutsvolts.com>
- Popular Science: <http://www.popsci.com>
- Radio Shack <http://www.radioshack.com>