BOY SCOUTS OF AMERICA
MERIT BADGE SERIES

ELECTRONICS

“Enhancing our youths’ competitive edge through merit badges”
Requirements

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.

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. Do the following:
   (a) Discuss each of the following with your merit badge counselor:
      (i) How to use electronics for a control purpose
      (ii) The basic principles of digital techniques
      (iii) How to use electronics for three different audio applications
(b) Show how to change three decimal numbers into binary numbers and three binary numbers into decimal numbers.

(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.

(i) A control device
(ii) A digital circuit
(iii) An audio circuit

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.

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

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.
Electronics Resources

Scouting Literature

*Computers, Electricity, Inventing, Radio,* and *Robotics* merit badge pamphlets

With your parent’s permission, visit the Boy Scouts of America’s official retail website, [www.scoutshop.org](http://www.scoutshop.org), for a complete listing of all merit badge pamphlets and other helpful Scouting materials and supplies.

**Books**


Leon, George deLucenay. *Electronics Projects for Young Scientists.* Franklin Watts, 1991. Introduces the basic principles of electronics and includes project ideas such as a crystal radio, an intercom, and a pair of electronic dice.


**Magazines**

*Nuts & Volts*
430 Princeland Court
Corona, CA 92879
Telephone: 951-371-8497
Website: www.nutsvolts.com

*Popular Science*
Website: www.popsci.com

**Organizations and Websites**

*American Microsemiconductor Inc.*
Website: www.americanmicrosemi.com/tutorials

*ePanorama.net*
Website: www.epanorama.net

*Howstuffworks*
Website: http://electronics.howstuffworks.com

*101science.com*
Website: www.101science.com/Radio.htm

**Electronics Parts and Suppliers**

In most places, *Radio Shack* stores can be the best source for electronics parts. However, most Radio Shacks have reduced their parts inventories, which means you might have to look elsewhere to find all the parts you need for a project (or check out their website, www.radioshack.com). Electronics parts and kits also can be ordered over the internet or via mail or toll-free telephone from various suppliers.

Whenever you go online, be sure you have your parent’s permission first.

*Allied Electronics & Automation*
7151 Jack Newell Blvd. S.
Fort Worth, TX 76118
Toll-free telephone: 866-433-5722
Website: www.alliedelec.com

*C&S Sales Inc.*
150 Carpenter Ave.
Wheeling, IL 60090
Toll-free telephone: 800-292-7711
Website: www.cs-sales.net

*Carl’s Electronics*
484 Lakepark Ave., Suite 59
Oakland, CA 94610
Toll-free telephone: 866-664-0627
Website: www.electronickits.com

*Digi-Key Corporation*
701 Brooks Ave. S.
Thief River Falls, MN 56701
Toll-free telephone: 800-344-4539
Website: www.digikey.com

*Electronic Kourseware International*
P.O. Box 604
Snyder, TX 79550
Toll-free telephone: 800-453-1708
Website: www.scienclabs.com
Electronics Resources

HobbyTron.com
24700 Avenue Rockefeller
Santa Clarita, CA 91355
Telephone: 818-675-9000
Website: www.hobbytron.com

Mouser Electronics
1000 N. Main St.
Mansfield, TX 76063
Toll-free telephone: 800-346-6873
Website: www.mouser.com

Newark
300 S. Riverside Plaza, Suite 2200
Chicago, Il 60606
Toll-free telephone: 800-463-9275
Website: www.newark.com

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Wikipedia.org, courtesy—pages 41 (resistors) and 67 (seven-segment display)

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