Component Identification

This presentation will...
• Introduce common components used in electronics.
• Define a resistor and present various resistor types and package styles.
• Demonstrate how to read a resistor’s nominal value and how to measure its actual value with a Digital Multi-Meter (DMM).
• Define a capacitor and present various capacitor types and package styles.
• Demonstrate how to read a capacitor’s nominal value.

Resistors
• A resistor is an electronic component that resists the flow of electrical current.
• A resistor is typically used to control the amount of current that is flowing in a circuit.
• Resistance is measured in units of ohms (Ω) and named after George Ohm, whose law (Ohm’s Law) defines the fundamental relationship between voltage, current, and resistance.

Resistors: Types and Package Styles

Carbon Film Resistors
4 Bands
5 Bands
Variable Resistors (potentiometer)
Surface Mount Resistors
Resistors: Size Comparison

Determining A Resistor’s Value

Color Code
- Resistors are labeled with color bands that specify the resistor’s nominal value.
- The nominal value is the resistor’s face value.

Measured Value
- A digital multi-meter can be used to measure the resistor’s actual resistance value.

Resistor Color Code

How To Read A Resistor’s Value

Resistor Value: Example #1

Example:
Determine the nominal value for the resistor shown.
Resistor Value: Example #1

Example:
Determine the nominal value for the resistor shown.

Solution:
10 x 100 $\Omega$ $\pm 5\%$
1000 $\Omega$ $\pm 5\%$
1 K $\Omega$ $\pm 5\%$

Resistor Value: Example #2

Example:
Determine the nominal value for the resistor shown.

Solution:
39 x 100K $\Omega$ $\pm 5\%$
3900000 $\Omega$ $\pm 5\%$
3.9 M $\Omega$ $\pm 5\%$

Resistor Value: Example #3

Example:
Determine the color bands for a 1.5 K $\Omega$ $\pm 5\%$ resistor.
Capacitors

- A capacitor is an electronic component that can be used to store an electrical charge.
- Capacitors are often used in electronic circuits as temporary energy-storage devices.
- Capacitance is measured in units of farads (F) and named after Michael Faraday, a British chemist and physicist who contributed significantly to the study of electromagnetism.
Capacitors: Types and Package Styles

Size Comparison

Surface Mount Tantalum Capacitors

Surface Mount Ceramic Capacitors

How To Read A Capacitor’s Value

Electrolytic Capacitors

10 μF

0.47 μF

Capacitor: Example #1

Example:
Determine the nominal value for the capacitor shown.

Disc Capacitors

4 7 2 K

4700 pF ±10%

Code
A
B
C
D
F
G
J
K
M or NONE
N
O
S
T
Z

Tolerance
±0.05%
±0.1%
±0.25%
±0.5%
±1%
±2%
±5%
±10%
±20%
±30%
±5%
−10%, +30%
−20%, +50%
−10%, +50%
−20%, +80%

Note: Units on Disc Capacitors are always in pico-farads
Capacitor: Example #1

Example:
Determine the nominal value for the capacitor shown.

Solution:
330 pF ±5%

Capacitor: Example #2

Example:
Determine the nominal value for the capacitor shown.

Solution:
10000 pF ±10%

Common Electronic Components

Displays

1) Seven Segment Display
2) Light Emitting Diodes (LED)
Common Electronic Components

Integrated Circuits (IC’s) & Sockets

1) 8 Pin Solder Socket
2) 14 Pin Solder Socket
3) 14 Pin DIP IC
4) 8 Pin DIP IC
5) 40 Pin DIP
6) 14 PIN SOIC
7) 8 Pin SOIC
8) 44 Pin PLCC

Misc Components

1) Fuses
2) Transistor
3) Diodes
4) Dime ©