

# **Ölçme Kontrol ve Otomasyon Sistemleri**

## **6**

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Dr. Mehmet Ali DAYIOĞLU

Ankara Üniversitesi Ziraat Fakültesi  
Tarım Makinaları ve Teknolojileri Mühendisliği Bölümü

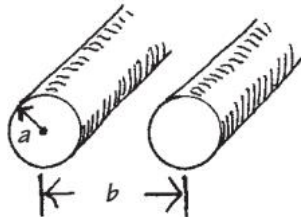
# Temel elektronik devre bileşenleri

1. Kablo çeşitleri
2. Fiş ve konektör çeşitleri
3. Dirençler
4. Kondansatörler
5. Bobinler
6. Pil ve akü

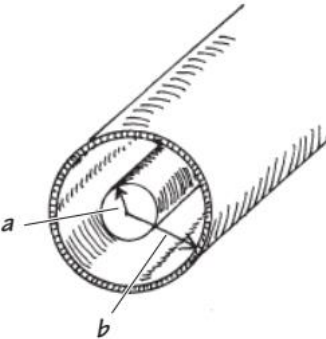
# Temel elektronik devre bileşenleri

Kablolar:

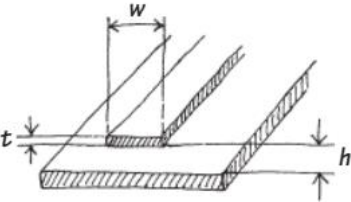
**Twin Lead**



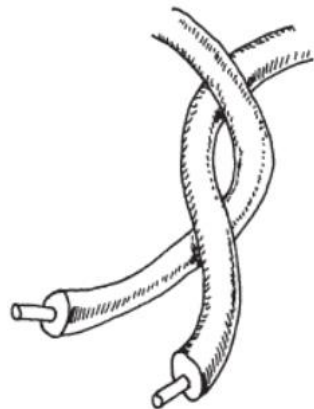
**Coaxial**



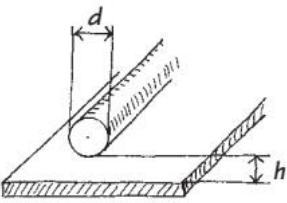
**Ribbon and Plane**



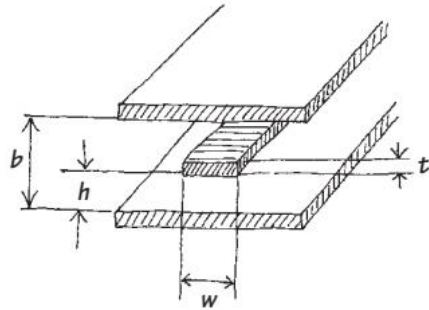
**Twisted Pair**



**Wire and Plane**



**Strip Line**



# Temel elektronik devre bileşenleri

## Kablolar:

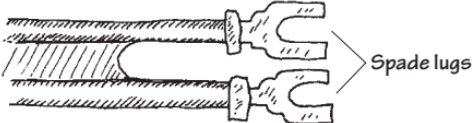
Paired Cable



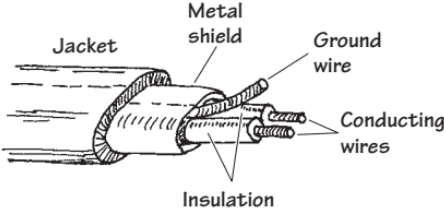
Twisted Pair



Twin Lead



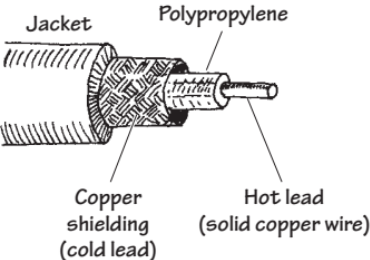
Shielded Twin Lead



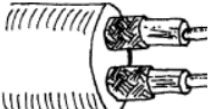
# Temel elektronik devre bileşenleri

## Kablolar:

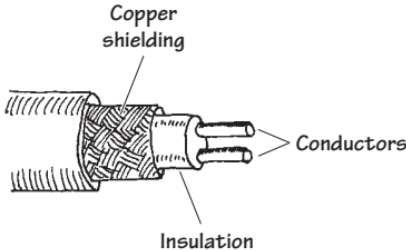
**Unbalanced Coaxial**



**Dual Coaxial**



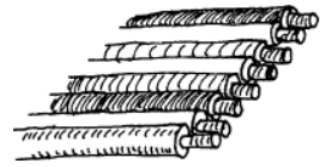
**Balanced Coaxial**



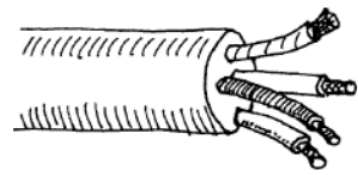
# Temel elektronik devre bileşenleri

## Kablolar:

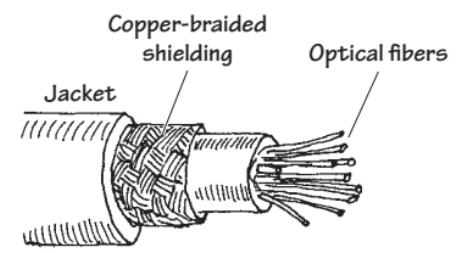
**Ribbon**



**Multiple  
Conductor**



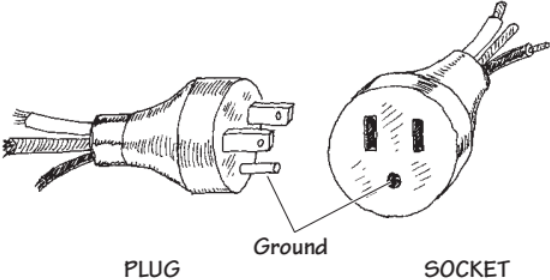
**Fiberoptic**



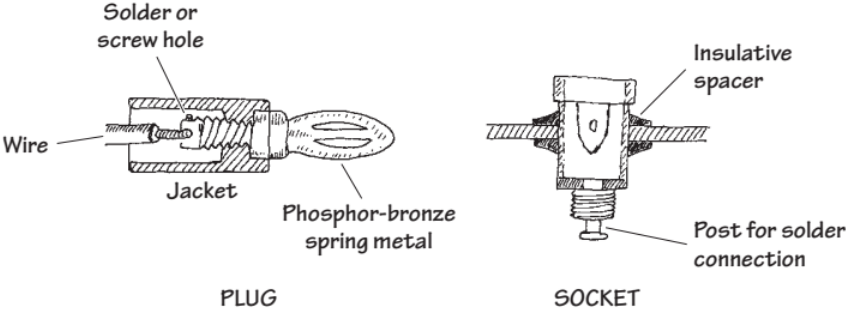
# Temel elektronik devre bileşenleri

## Fiş - konektör

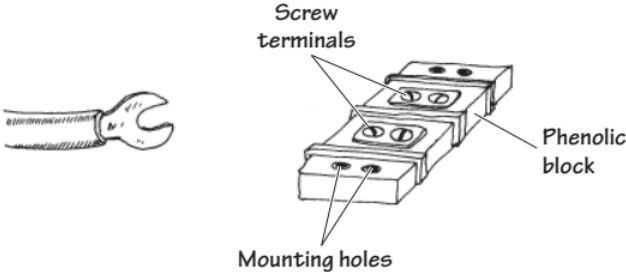
### 117-Volt



### Banana



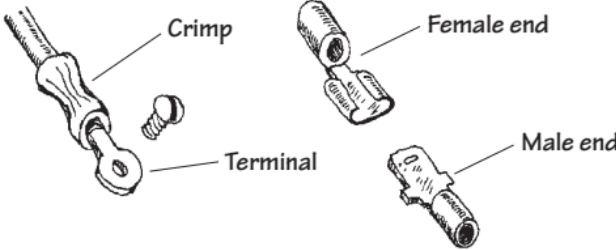
### Spade Lug/Barrier Strip



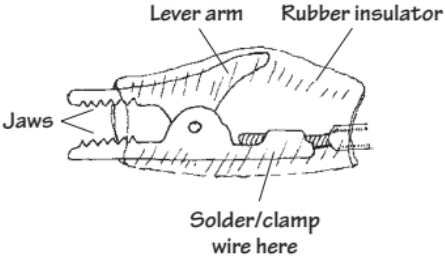
# Temel elektronik devre bileşenleri

## Fiş - konektör

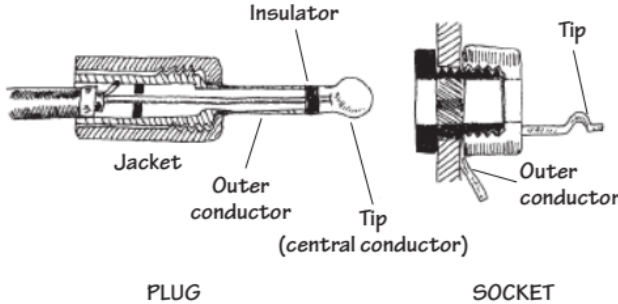
### Crimp



### Alligator



### Phone

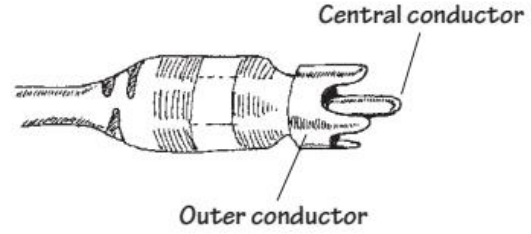




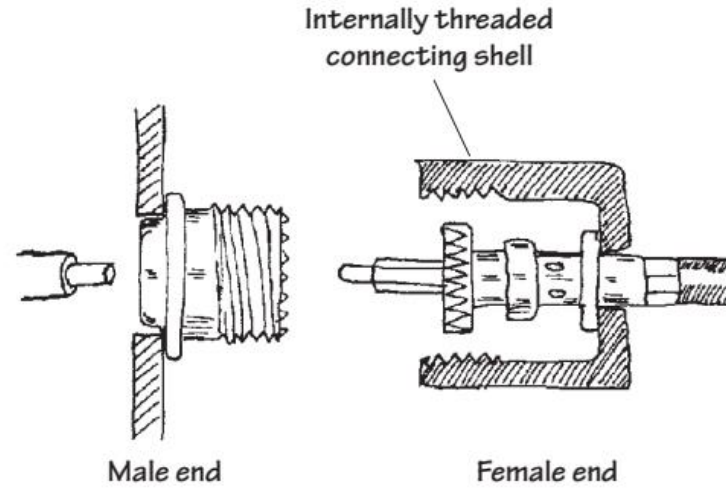
# Temel elektronik devre bileşenleri

## Fiş - konektör

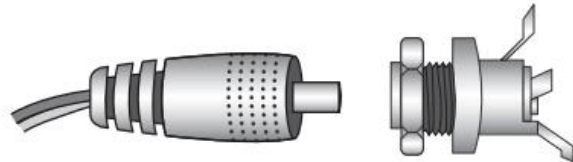
### Phono



### F-Type



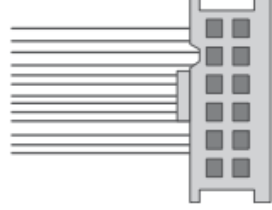
### Tip



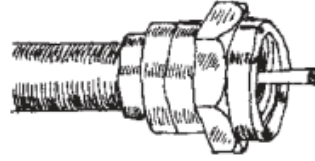
# Temel elektronik devre bileşenleri

Fiş - konektör

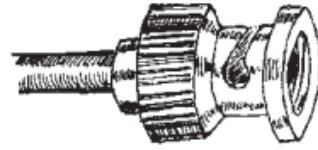
**Mini**



**PL-259**



**BNC**

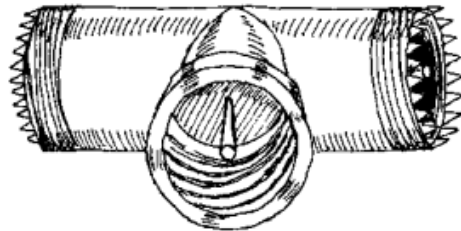


Female end



Male end

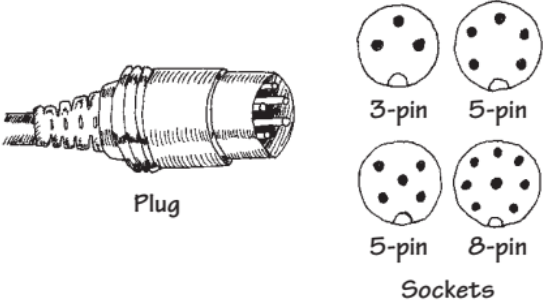
**T-Connector**



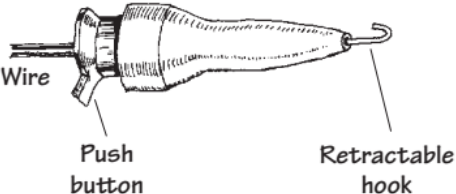
# Temel elektronik devre bileşenleri

## Fiş - konektör

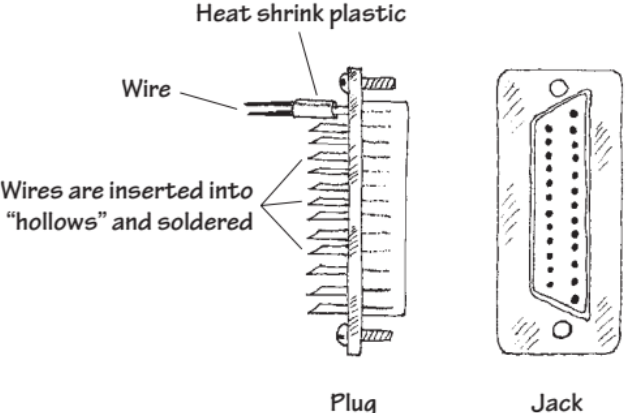
### DIN Connector



### Meat Hook

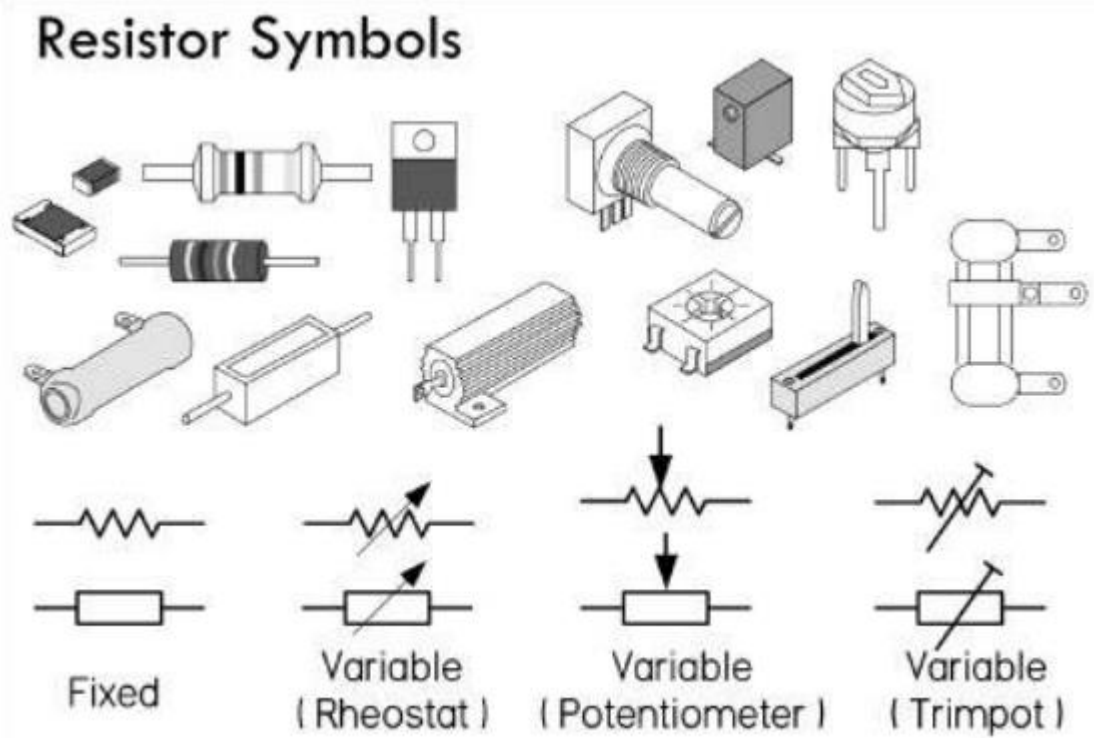


### D-Connector



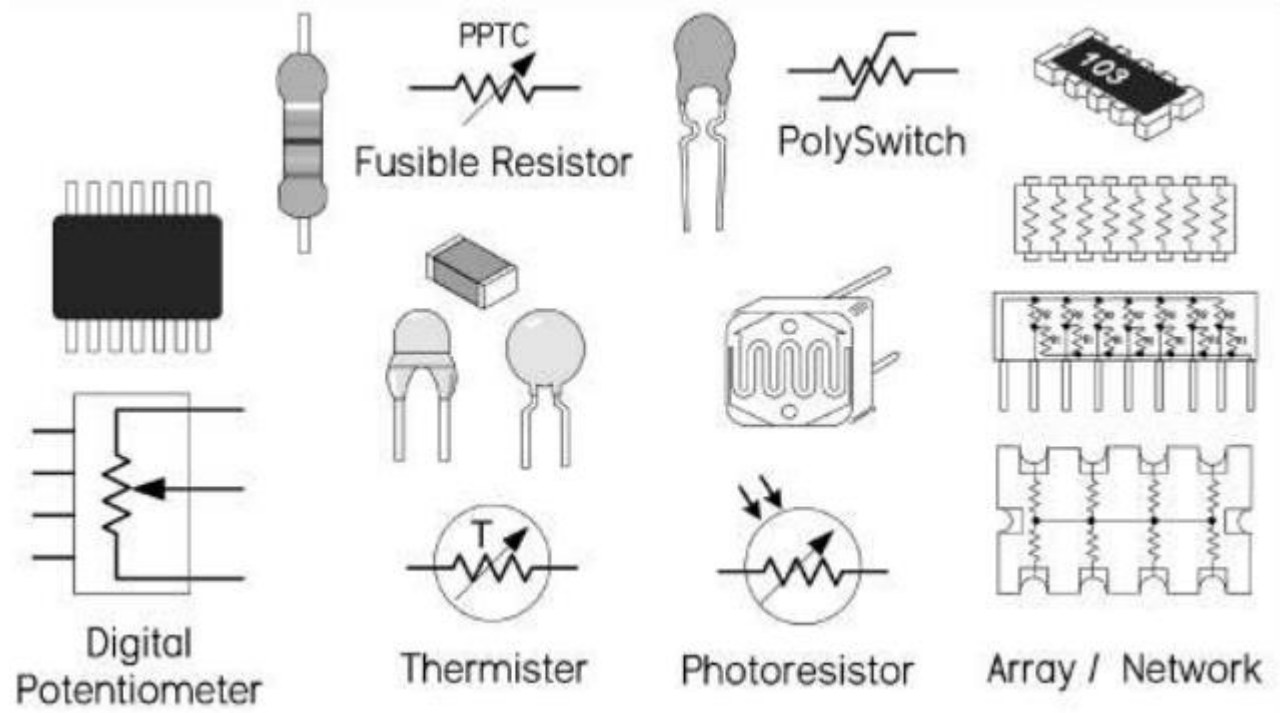
# Temel elektronik devre bileşenleri

## Dirençler



# Temel elektronik devre bileşenleri

## Dirençler



# Temel elektronik devre bileşenleri

## Kondansatörler

### Capacitor Symbols

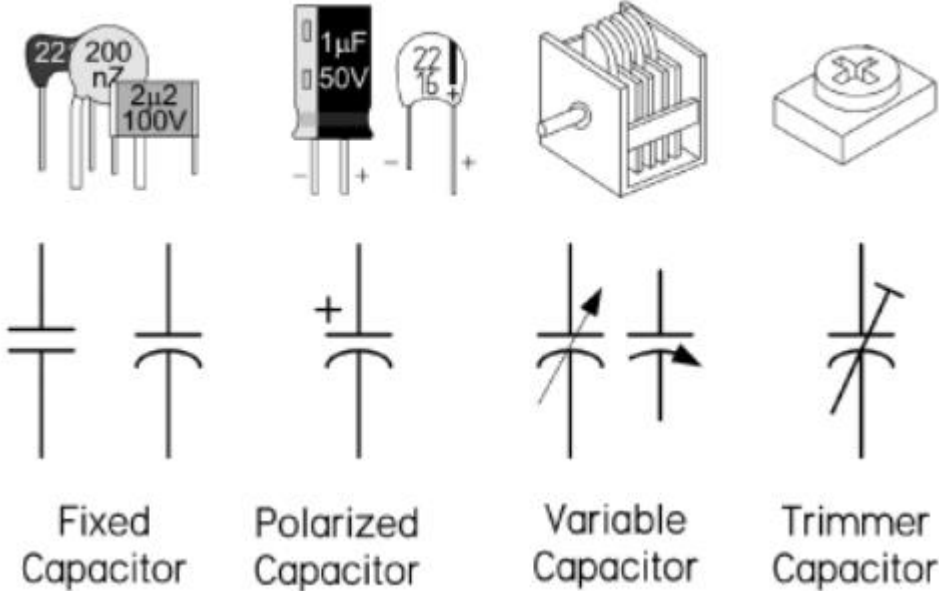


Diagram illustrating various capacitor symbols and physical components:

- Fixed Capacitor: Two parallel lines.
- Polarized Capacitor: Two parallel lines with a '+' sign on the longer line.
- Variable Capacitor: Two parallel lines with a diagonal arrow pointing through them.
- Trimmer Capacitor: Two parallel lines with a diagonal arrow pointing to one of the lines.

Physical components shown include:

- Through-hole capacitors with values: 22, 200 nF, 2μF, 100V.
- A surface-mount capacitor: 1μF, 50V.
- A variable capacitor with a sliding contact.
- A trimmer capacitor with a screwdriver adjustment.

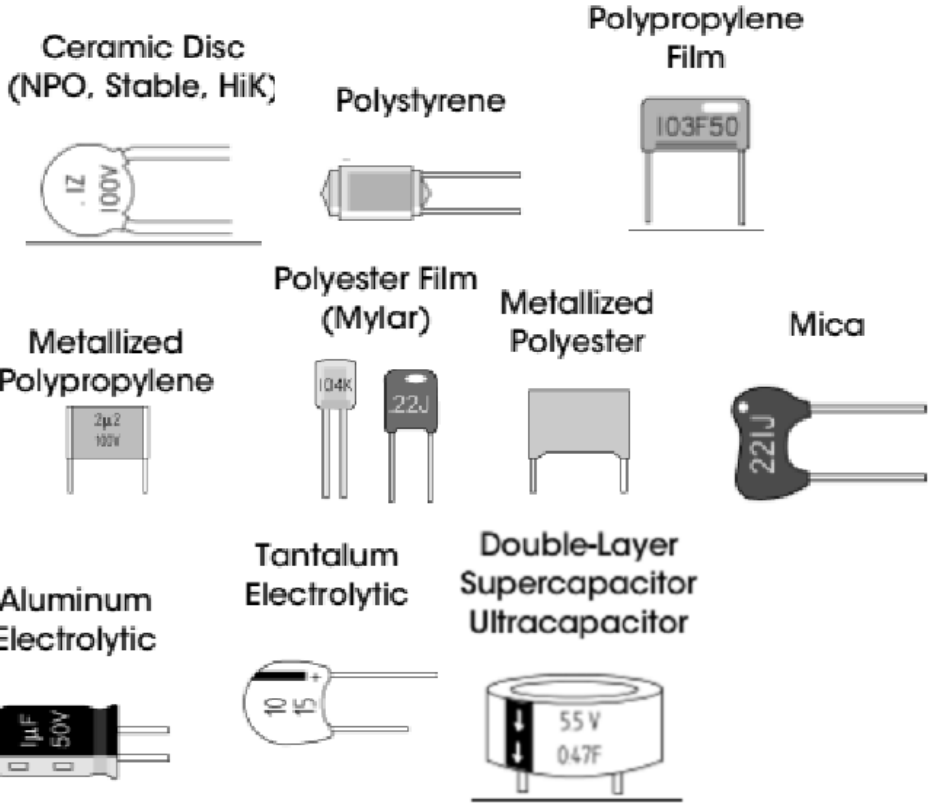


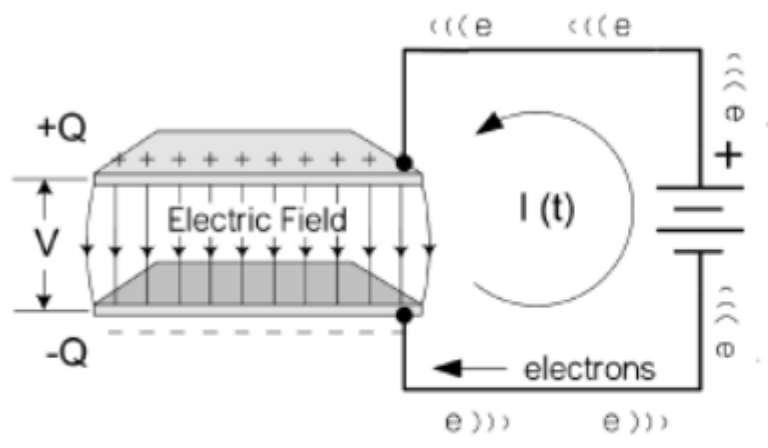
Diagram illustrating various physical capacitor types:

- Ceramic Disc (NPO, Stable, HiK): Disc-shaped capacitor with values like 12, 100V.
- Polystyrene: Small cylindrical capacitor.
- Polypropylene Film: Rectangular capacitor with value 103F50.
- Metallized Polypropylene: Rectangular capacitor with value 2μF, 100V.
- Polyester Film (Mylar): Rectangular capacitor with values 04K, 22J.
- Metallized Polyester: Rectangular capacitor.
- Mica: Disc-shaped capacitor with value 221J.
- Aluminum Electrolytic: Cylindrical capacitor with values 1μF, 50V.
- Tantalum Electrolytic: Disc-shaped capacitor with values 10, 15.
- Double-Layer Supercapacitor Ultracapacitor: Cylindrical capacitor with values 55V, 047F.

# Temel elektronik devre bileşenleri

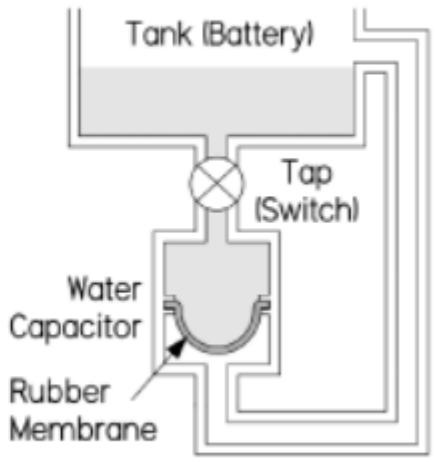
## Kondansatörler

### Parallel Plate Capacitor



$$\text{Capacitance} = \frac{\text{Charge}}{\text{Voltage}} \quad C = \frac{Q}{V}$$

### Water Analogy



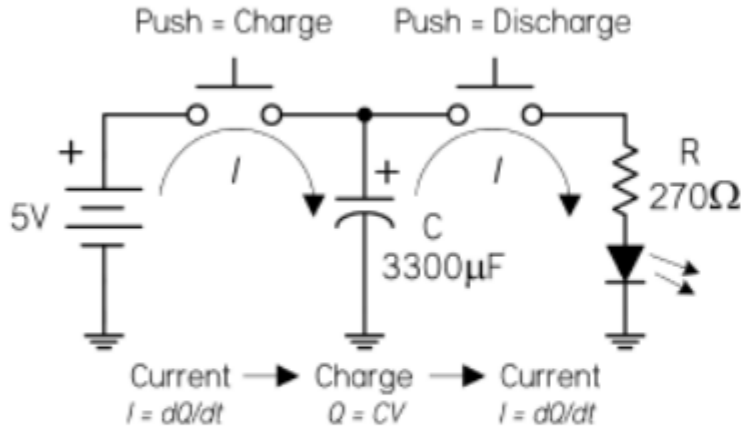
Kapasitans:

$$Q = C \cdot V$$

# Temel elektronik devre bileşenleri

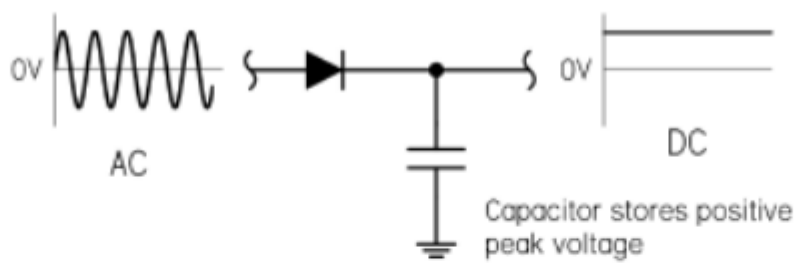
## Kondansatörler

### Basic Charge Storage and Discharge

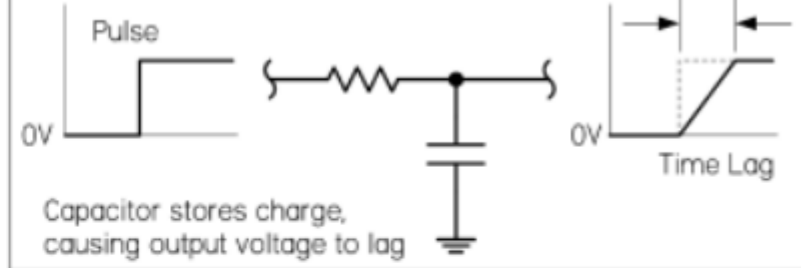


C	LED on-time	C	LED on-time
4300µF	12 sec	1000µF	4 sec
3300µF	8 sec	100µF	1 sec

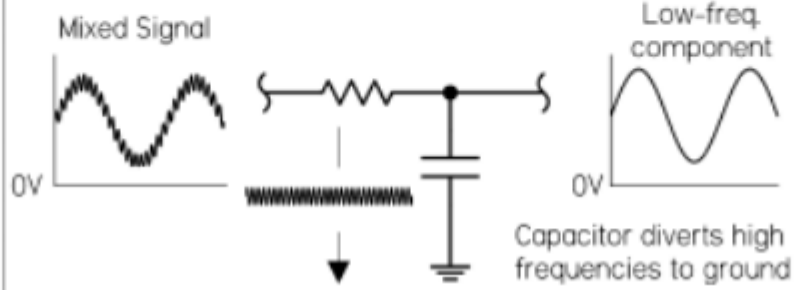
### Smoothing Circuit



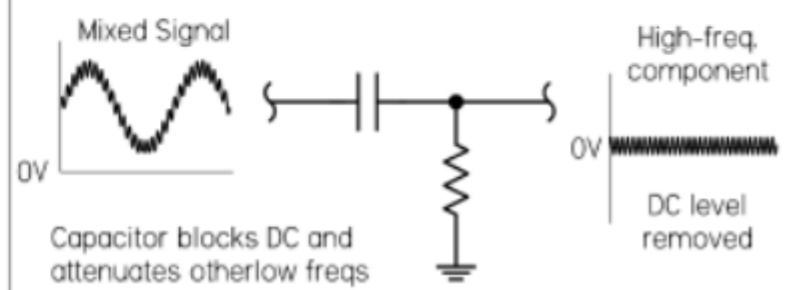
### Timing & Waveform Shaping



### Bypassing and Low-Pass Filtering



### Coupling and High-Pass Filtering





# Temel elektronik devre bileşenleri

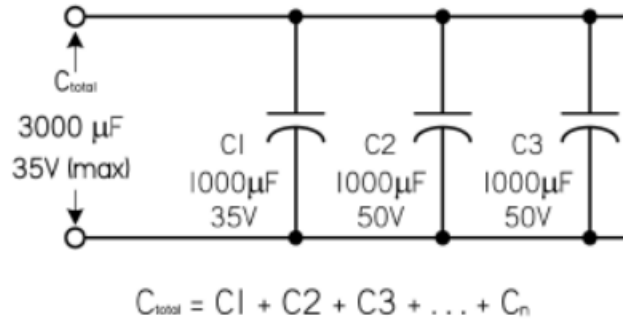
## Kondansatörler

Kapasitans:

$$Q = C \cdot V$$

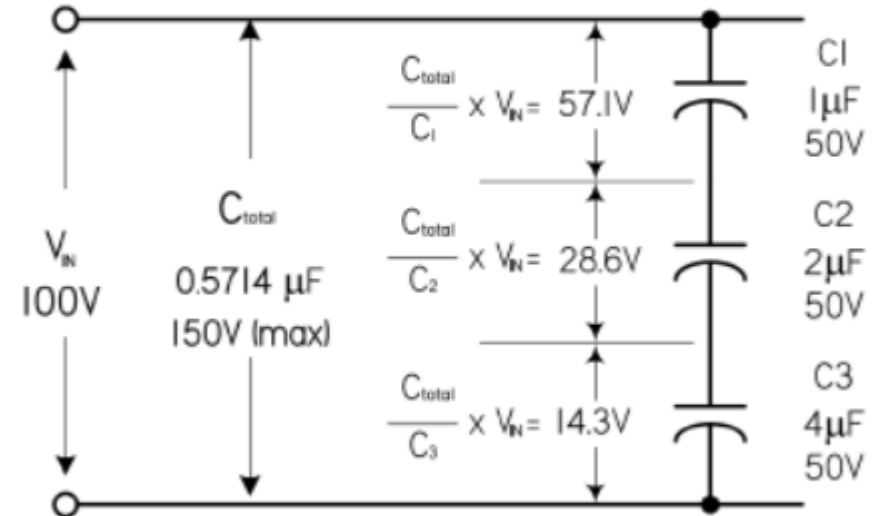
### Capacitors In Parallel

Increases the total capacitance, but limits max. voltage rating to that of smallest rated capacitor.



### Capacitors In Series

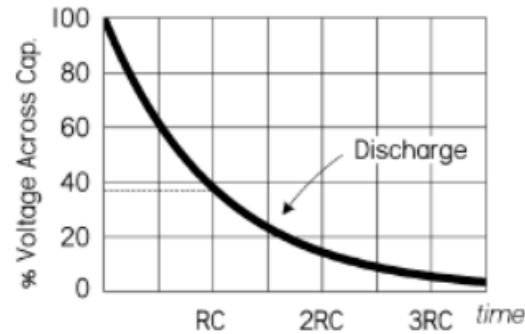
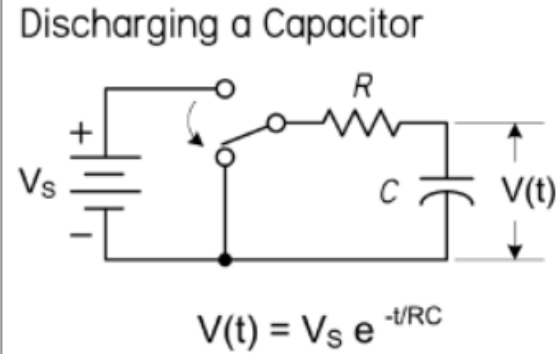
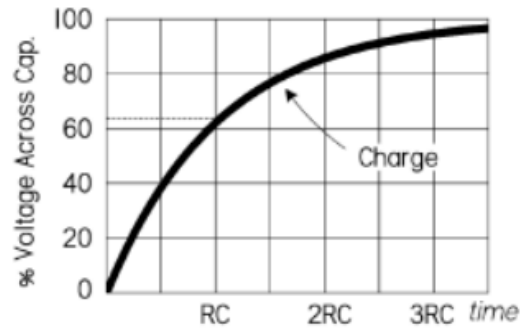
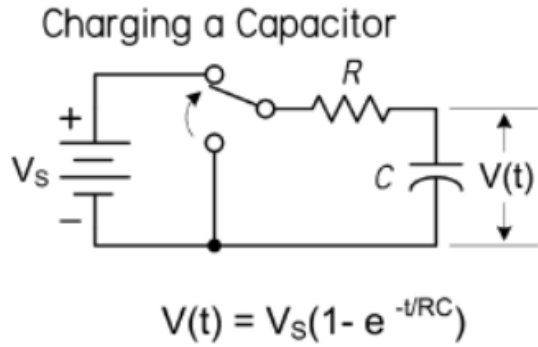
Increases max voltage rating, but decreases capacitance.



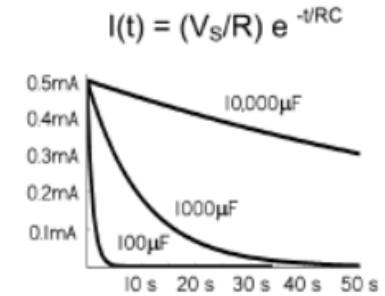
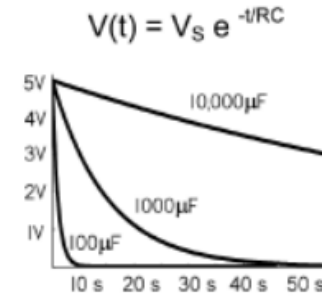
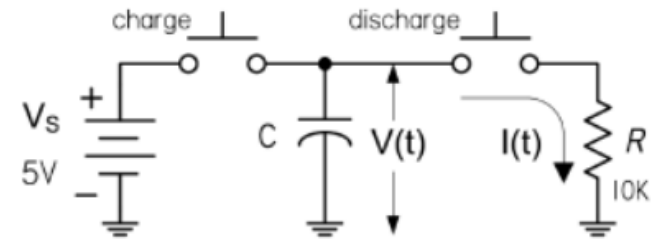
$$C_{total} = \frac{1}{1/C_1 + 1/C_2 + 1/C_3 + \dots + 1/C_n}$$

# Temel elektronik devre bileşenleri

## RC zaman sabiti



## 100 $\mu$ F, 1000 $\mu$ F, 10,000 $\mu$ F Discharge



Stored Energy:  $E_{cap} = 0.5 CV^2$

$$V(t) = V_s (1 - e^{-t/RC}) \text{ (Charging RC)}$$

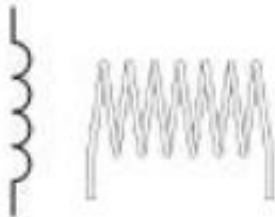
$$V(t) = V_s e^{-t/RC} \text{ (Discharging RC)}$$

# Temel elektronik devre bileşenleri

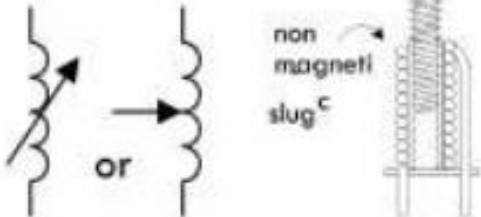
Bobinler

## Inductor Symbols

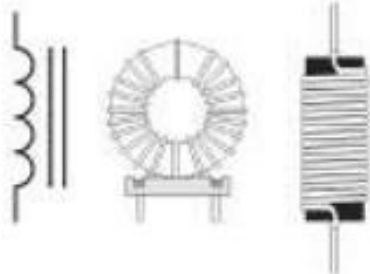
Air Core



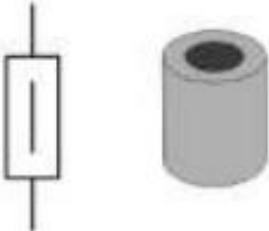
Adjustable



Magnetic or Iron Core

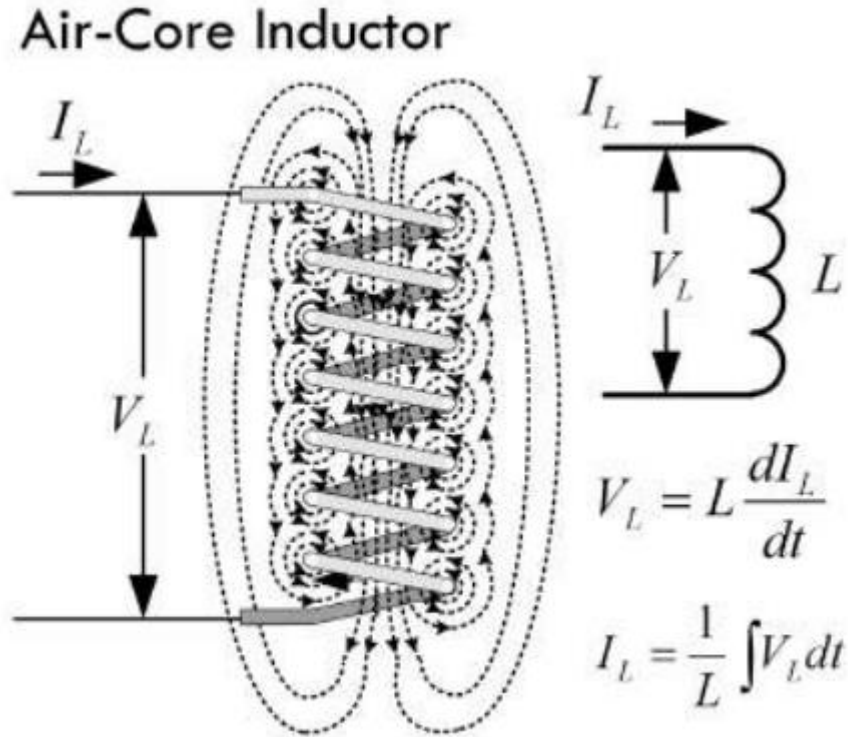


Ferrite Bead

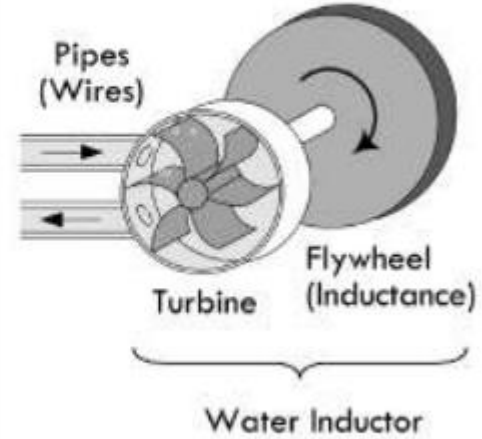


# Temel elektronik devre bileşenleri

## Bobinler



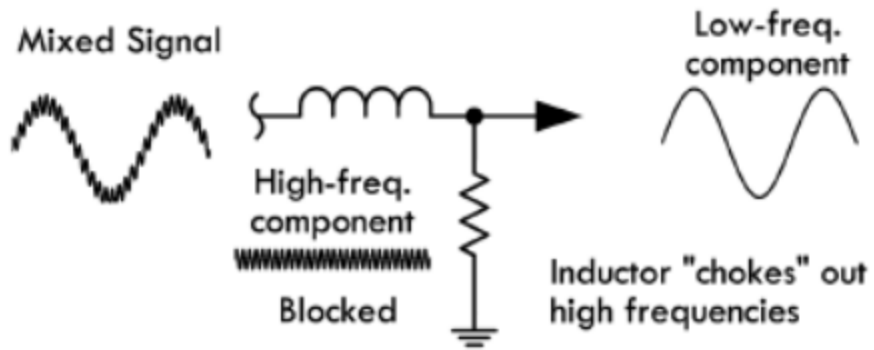
## Water Analogy



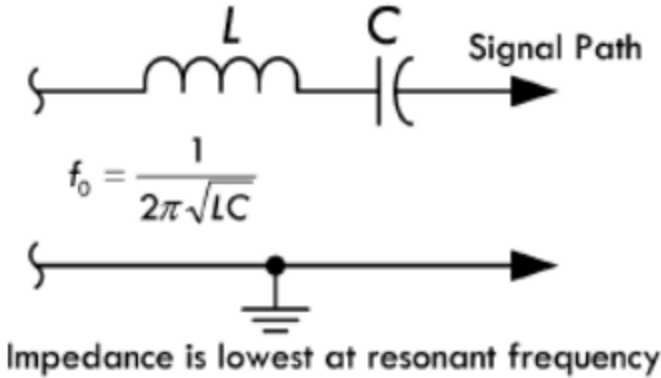
# Temel elektronik devre bileşenleri

## Bobinler

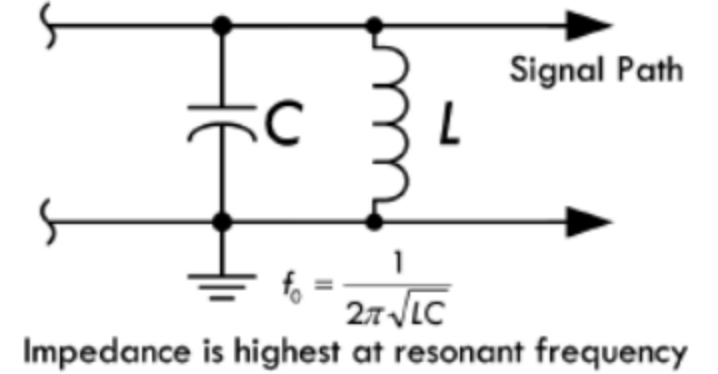
### A. Low-Pass Filter - Coupling



### C. Series Resonant Circuit



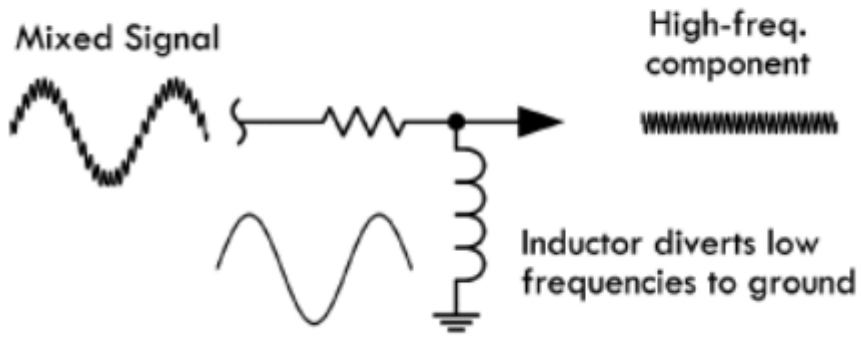
### D. Parallel Resonant Circuit



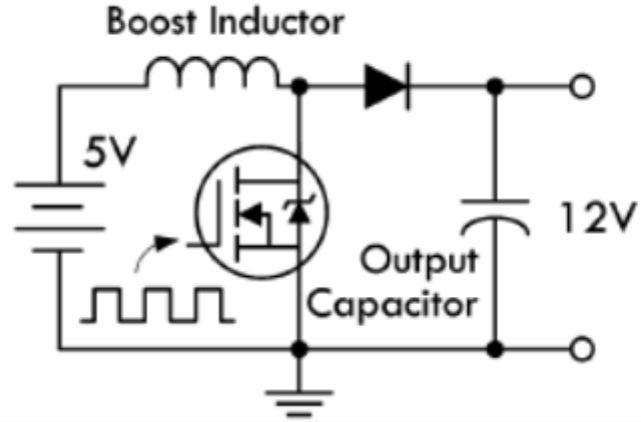
# Temel elektronik devre bileşenleri

## Bobinler

### B. High-Pass Filter - Bypassing

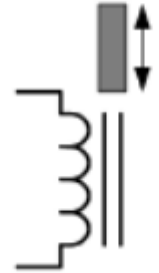


### E. Boost Converter



### F. Miscellaneous

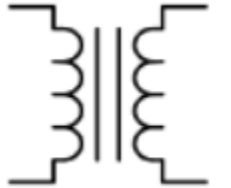
Solenoid



Relay



Transformer



# Kaynaklar (References)

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