





\* Arduino opta which is a PLC

PLC → Programmable Logic Controller

DIN mount : A standardized mounting system which used for electrical and electronic devices

→ A german organization

Temp range -20°C - +50°C

→ power voltage



→ output

Input : digital 0-24V

Analog 0-10V

Output : 4 outputs

250V AC  
10A

Ex : Button, Limit switch,  
Temp/Light/Color sensor  
Proximity sensor

microcontrollers (3.3V-5V) which are cheap and PLC is expensive

microcontrollers need text base coding language

PLC need logic using 5 language

- IL (Instruction List)
- FBD (Function Block diagram)
- LD (Ladder diagram)
- ST (Structured Text)
- SFC (Sequential Function Chart)

Proximity sensor detects all kind of objects.

Inductive sensor " " " " metal

PWM signal: Pulse Width Modulation is a technique used to control the amount of power delivered to electrical devices by varying width of the pulses in a signal.

BJT: Bipolar Junction Transistor

MOSFET: Metal-Oxide Semiconductor Field Effect Transistor.

It can handle way more current and comes with a lower resistance

TIP142 Darlington Transistor

- 10A
- 2 BJT

Oscilloscope: An oscilloscope is a powerful electronic test instrument that allows you to visualize electric signals as waveforms on screen

$$R_c = \frac{V}{I}$$

FFT signal: Fast Fourier Transform is an algorithm used to compute the discrete Fourier Transform (DFT) of a signal quickly and efficiently.

Piezo haptic driver ic: It is a integrated circuit designed to control piezo actuators for creating haptic feed-back such as vibrations. These are commonly used in wearable devices, game controllers.

I2C  
1 MHz  
1 Mb/s

I3C  
12.5 MHz  
12.5 Mb/s

I2C (Inter integrated Circuit)  
I3C (Improved inter integrated circuit)

Magnetic encoders: A type of sensor used to measure rotational or linear position by detecting changes in magnetic field.

BLDC motor  $\rightarrow$  Brushless DC motor

Rotary Encoder completes 1 rotation in 20 increments.

$$\text{Resolution} = \frac{360}{20} = 18^\circ$$

Solo uno motor driven: Dual H-bridge motor drivers. It allows to control speed and direction of DC motors

\* Colour ring inductor uses colored bands to indicate its inductance value

LCR meter: used to measure:

- ① Inductance (in henries, H)
- ② Capacitance (in farads, F)
- ③ Resistance (in ohms, Ω)

PFC  $\rightarrow$  Power Factor Connection

charge Pump  
- noise  
- Low current  
+ efficient

Transformer  
- AC voltage  
- not as efficient  
+ big output current  
+ no noise

Rail Splitter  
- not as efficient  
- Low current  
+ simple

RTC → Real Time clock

$$103 \rightarrow 10000\Omega \\ \rightarrow 10k\Omega$$

$$104 \rightarrow 100000\Omega \\ \rightarrow 100k\Omega$$

Laplace Transformation: A powerful mathematical tool that transforms a time domain function into a complex frequency-domain representation.

Flyback converter: A type of switch-mode power supply used for converting electrical energy efficiently from one voltage level to another.

eFuse ic is used for protection.



