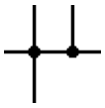
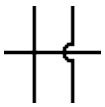
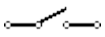
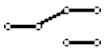
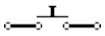
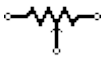
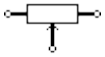
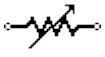
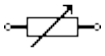
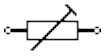
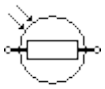
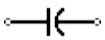
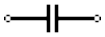
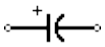
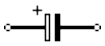
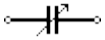
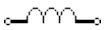
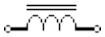
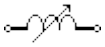
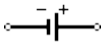
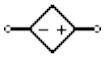
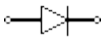
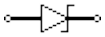
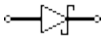
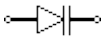
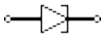
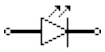
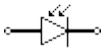
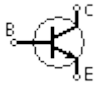
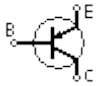
Table of Electrical Symbols

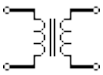
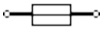
Symbol	Component name	Meaning
Wire Symbols		
	Electrical Wire	Conductor of electrical current
	Connected Wires	Connected crossing
	Not Connected Wires	Wires are not connected
Switch Symbols and Relay Symbols		
	SPST Toggle Switch	Disconnects current when open
	SPDT Toggle Switch	Selects between two connections
	Pushbutton Switch (N.O)	Momentary switch - normally open
	Pushbutton Switch (N.C)	Momentary switch - normally closed
	DIP Switch	DIP switch is used for onboard configuration
	SPST Relay	Relay open / close connection by an electromagnet
	SPDT Relay	

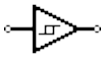
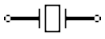
	Jumper	Close connection by jumper insertion on pins.
	Solder Bridge	Solder to close connection
Ground Symbols		
	Earth Ground	Used for zero potential reference and electrical shock protection.
	Chassis Ground	Connected to the chassis of the circuit
	Digital / Common Ground	
Resistor Symbols		
	Resistor (IEEE)	Resistor reduces the current flow.
	Resistor (IEC)	
	Potentiometer (IEEE)	Adjustable resistor - has 3 terminals.
	Potentiometer (IEC)	
	Variable Resistor / Rheostat (IEEE)	Adjustable resistor - has 2 terminals.
	Variable Resistor / Rheostat (IEC)	
	Trimmer Resistor	Preset resistor

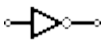
	Thermistor	Thermal resistor - change resistance when temperature changes
	Photoresistor / Light dependent resistor (LDR)	Photo-resistor - change resistance with light intensity change
Capacitor Symbols		
	Capacitor	Capacitor is used to store electric charge. It acts as short circuit with AC and open circuit with DC.
	Capacitor	
	Polarized Capacitor	Electrolytic capacitor
	Polarized Capacitor	Electrolytic capacitor
	Variable Capacitor	Adjustable capacitance
Inductor / Coil Symbols		
	Inductor	Coil / solenoid that generates magnetic field
	Iron Core Inductor	Includes iron
	Variable Inductor	
Power Supply Symbols		
	Voltage Source	Generates constant voltage

	Current Source	Generates constant current.
	AC Voltage Source	AC voltage source
	Generator	Electrical voltage is generated by mechanical rotation of the generator
	Battery Cell	Generates constant voltage
	Battery	Generates constant voltage
	Controlled Voltage Source	Generates voltage as a function of voltage or current of other circuit element.
	Controlled Current Source	Generates current as a function of voltage or current of other circuit element.
Meter Symbols		
	Voltmeter	Measures voltage. Has very high resistance. Connected in parallel.
	Ammeter	Measures electric current. Has near zero resistance. Connected serially.
	Ohmmeter	Measures resistance
	Wattmeter	Measures electric power
Lamp / Light Bulb Symbols		
	Lamp / light bulb	Generates light when current flows through

	Lamp / light bulb	
	Lamp / light bulb	
Diode / LED Symbols		
	Diode	Diode allows current flow in one direction only - left (anode) to right (cathode).
	Zener Diode	Allows current flow in one direction, but also can flow in the reverse direction when above breakdown voltage
	Schottky Diode	Schottky diode is a diode with low voltage drop
	Varactor / Varicap Diode	Variable capacitance diode
	Tunnel Diode	
	Light Emitting Diode (LED)	LED emits light when current flows through
	Photodiode	Photodiode allows current flow when exposed to light
Transistor Symbols		
	NPN Bipolar Transistor	Allows current flow when high potential at base (middle)
	PNP Bipolar Transistor	Allows current flow when low potential at base (middle)
	Darlington Transistor	Made from 2 bipolar transistors. Has total gain of the product of each gain.

	JFET-N Transistor	N-channel field effect transistor
	JFET-P Transistor	P-channel field effect transistor
	NMOS Transistor	N-channel MOSFET transistor
	PMOS Transistor	P-channel MOSFET transistor
	Misc. Symbols	
	Motor	Electric motor
	Transformer	Change AC voltage from high to low or low to high.
	Electric bell	Rings when activated
	Buzzer	Produce buzzing sound
	Fuse	The fuse disconnects when current above threshold. Used to protect circuit from high currents.
	Fuse	
	Bus	Contains several wires. Usually for data / address.
	Bus	

	Bus	
	Optocoupler / Opto-isolator	Optocoupler isolates connection to other board
	Loudspeaker	Converts electrical signal to sound waves
	Microphone	Converts sound waves to electrical signal
	Operational Amplifier	Amplify input signal
	Schmitt Trigger	Operates with hysteresis to reduce noise.
	Analog-to-digital converter (ADC)	Converts analog signal to digital numbers
	Digital-to-Analog converter (DAC)	Converts digital numbers to analog signal
	Crystal Oscillator	Used to generate precise frequency clock signal
⎓	Direct current	Direct current is generated from constant voltage level
Antenna Symbols		
	Antenna / aerial	Transmits & receives radio waves
	Antenna / aerial	
	Dipole Antenna	Two wires simple antenna

Logic Gates Symbols		
	NOT Gate (Inverter)	Outputs 1 when input is 0
	AND Gate	Outputs 1 when both inputs are 1.
	NAND Gate	Outputs 0 when both inputs are 1. (NOT + AND)
	OR Gate	Outputs 1 when any input is 1.
	NOR Gate	Outputs 0 when any input is 1. (NOT + OR)
	XOR Gate	Outputs 1 when inputs are different. (Exclusive OR)
	D Flip-Flop	Stores one bit of data
	Multiplexer / Mux 2 to 1	Connects the output to selected input line.
	Multiplexer / Mux 4 to 1	
	Demultiplexer / Demux 1 to 4	Connects selected output to the input line.