

# Full-Color 3D Printer

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The common 3D printers in the market are almost monochromatic printing, there is a large gap between the appearance of the product and the individual demand. With the development of the additive manufacturing, more and more researches have focused on the development of full-color 3D printer based on the existing printing principle and equipment. The project comes from the demand for colorful PLA printing products. By analyzing the principle and structure of common 3D printers and utilizing the mechanism of four-color printing to five-color printing, the project designed and developed a full-color 3D printer. Firstly, through a series of color matching experiments, we get the color 3D printing mixing formula to adjust the printing color of the products. And then, using this formula, the project developed the printing software and hardware. After the joint debugging of software and hardware, the core component "color control circuit board" is successfully created, which is to control PLA printing wires with five basic colors of cyan, magenta, yellow, black and white to achieve proportional item out, in time-sharing way. Under the limitation of total amount, the printing wires are guided into the "five-entry wires single extrusion", which includes wire feeding structure, detachable 0.5MM nozzle, heating resistor, temperature sensor, electric fan and other components. When the temperature sensor reaches about 210 degrees Celsius, a white insulated hose is used to guide the PLA material printing wire into the melting cavity to melt and mix, and it is extruded from the nozzle under the promotion of extrusion force and spray out from the nozzle to complete full-color printing, without increasing the total printing costs.