

3D printers will undoubtedly continue to increase the capabilities of small- and mid-sized manufacturers well into the future. The most exciting advances are yet to come. And the biggest winners out there will be the manufacturers with the vision to foresee the possibilities these revolutionary machines can unlock.

This report focuses on the design and development of a Pellet 3D printer Starting from the mechanical design, then the electric and controller selection, followed by the software, programing. Throughout this project, we delved into various 3D printing methodologies, focusing on Fused Deposition Modeling (FDM). This falls within the realm of additive manufacturing (AM), where filament, such as PLA material, serves as the primary material. FDM employs a three-mechanism movement, and for our project, we utilized the Creality Ender 3 printer, which operates on a conventional 3-axes CNC mechanism. Then we talked about plastic extrusion, a process involving the melting and shaping of raw plastic. Subsequently, we embarked on the task of designing a novel printer head using Creo Parametric. This included creating essential components through 3D printing, assembly of the extruder, and its installation onto the printer, replacing the original head. The final step involved calibrating the printer, this step is the most important step where we will make the controller deal with the mass of pellets instead of the length of filaments, setting the stage for its subsequent use in the examination of diverse material samples.