Kinetic Assemblies: A Complete Solution for PCB Assembly

Dochia, Tudor (School: Colegiul National "Petru Rares" Suceava)
Turculet, Alexandru (School: Petru Rares National College Suceava)
Ungureanu, Paul (School: Colegiul National "Petru Rares" Suceava)

Kinetic Assemblies is a comprehensive solution for populating printed circuit boards (PCBs) on a medium scale. The medium scale is defined as a number between 300 and 600 PCBs, which falls into a gray area where there are too many to be assembled manually, yet too few to be populated at an acceptable price by renowned manufacturers. Our device addresses startups with a small number of boards that are too few to be sent to an assembly firm without high fees; it is also more efficient for a series of different types of boards. Additionally, we can assist companies hindered by contracts. Thus, our device solves this problem by combining the main processes of assembling printed circuit boards with SMD components, integrating them into a compact and cost-effective device compared to other products on the market. The main steps for assembling a printed circuit board are depositing the solder paste, placing the components, and heating the board to solidify the paste. The first step is solved by a solder paste dispenser using a syringe and a linear system with a trapezoidal screw; precise component placement is achieved with a pick and place system using a precision nozzle with a suction system and a rotary axis, and heating the boards is done through a heated plate. Thus, we have created an encapsulated system for populating PCBs.