Low-Cost Flatpack SCARA 3D Printer

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Desktop 3D printing has a massive potential market, however, due to the high cost, complexity and difficulty of use there hasn't been widespread adoption yet. My printer aims to be the cheapest, least complex and least intimidating printer on the market. Through building 10 CNC machines (8 if which were 3D printers) since I was 13, I had the knowledge that the main cost factors were the linear rail systems and the high part count due to unneeded complexity, and therefore my printer aimed to reduce these factors. I began by experimenting with SCARA arm configurations to find a system that was suitable for 3D printing. I then developed each subsystem (frame, XY axis, Z axis) independently with multiple iterations for each. After arriving at a working model, I had to figure out the Maths for the arms and integrate this into the firmware. I eventually ended up making 5 iterations of this printer, all fully functional. The final machine costs £49.22 to make as a one-off (not including laser cutting costs, but including shipping), therefore meaning that in bulk it can be manufactured for much cheaper. It surpassed my expectations, and prints at the same quality as high-end printers but at a much faster speed. In all, I'd compare it to the Google Cardboard: simple, cheap and accessible.

Awards Won:

Fourth Award of $500