



THE BEASTY WITHIN

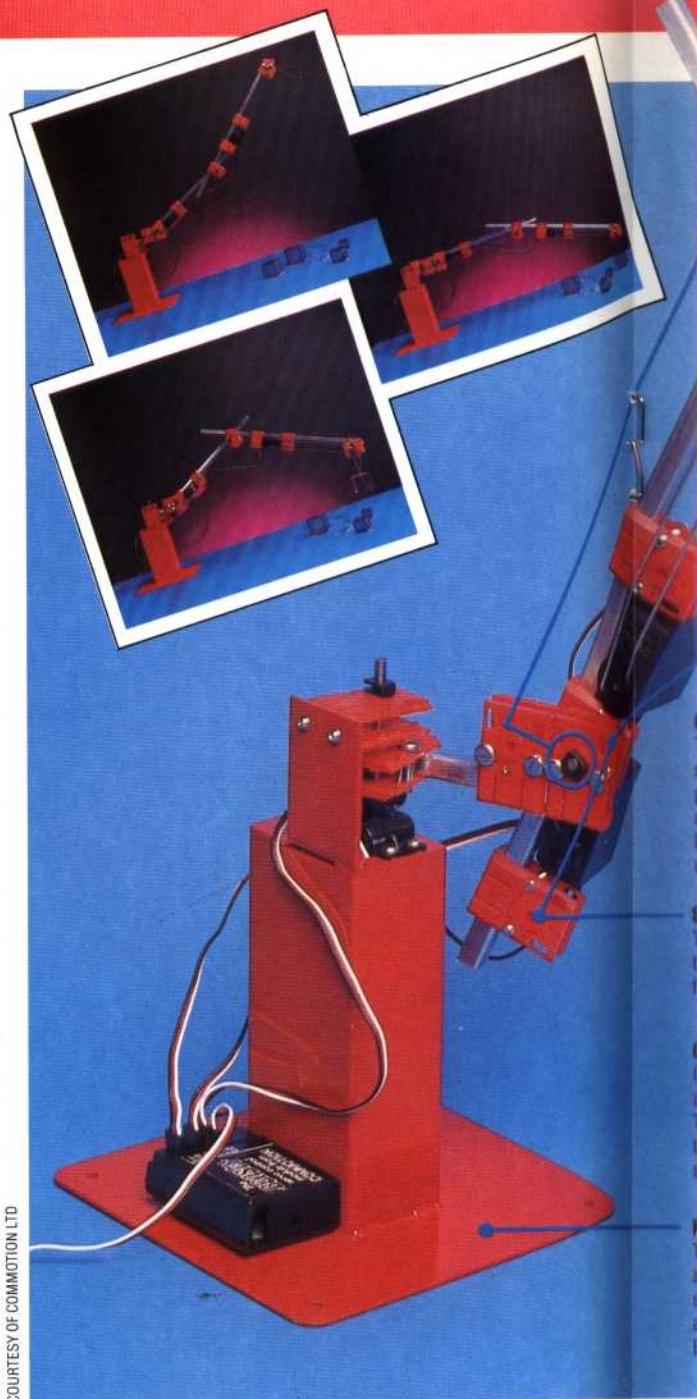
Robotics is a topic in the forefront of developments in computing, but until recently robots have been used mainly in heavy industry. Now robot designers are turning their attention to the home computer owner. Budget-priced robots are gradually becoming available and the Beasty is one of the first.

The Beasty is provided in kit form, and can be assembled by the user with the aid of a pair of screwdrivers. Also provided with the kit is the cassette-based software that contains the Robol operating system used to control the robot arm.

Two manuals are supplied. The construction booklet begins with a long introduction on the history of robotics, before going on to the actual construction details. The novice may find the sheer number of parts and the somewhat complicated instructions a little daunting; illustrations are provided, but these too could be more helpful. However, even the beginner will be able to put the arm together successfully — but it may take a little time to do so. As yet, it is not possible to buy the Beasty ready-made, although manufacturer Commotion claims that it will put one together if asked.

Once assembled, the Beasty consists of a base supporting a joint that allows lateral movement. To this joint is connected a short aluminium rod, which is attached to the upper part of the arm by a second joint. A third joint connects the forearm. These joints are powered by servo motors, each of which controls two short lengths of stiff wire, which are connected to the arm's 'skeleton'. As a servo motor turns it will pull one wire towards it and push the other in the opposite direction, thus turning the joint and moving the arm. A servo motor works by translating digital pulses into movement. The motor receives a series of pulses at a particular frequency, and these pulses are interpreted by the processor as an angle of movement. While the frequency remains constant, the motor will hold the arm in its current position; a change in the pulse frequency instructs the processor that a new angle is required and so the arm will move.

The FP128 servos used in the Beasty can generate 3.5kg/cm of pull. This means that at one centimetre along a shaft the servo is capable of lifting 3.5 kilograms, while at 10 centimetres along it can lift 350 grams. This is an important point to consider when weights are lifted — obviously, the servo at the 'shoulder', being furthest away from the weight to be lifted, will have the greatest strain



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placed on it.

The servo processor is housed in a small black box that is not attached to the arm itself. This box has sockets for the connection of up to four servo motors (the fourth connection is for an optional motor that may be used to operate a 'claw' or similar gripping device at the end of the forearm). There is also an input socket that interfaces with the BBC's user port, and a power lead that plugs into the auxiliary power socket of the computer.

Once the cassette software has been loaded, the screen displays a prompt to remind the user that the system is in Edit mode. A program line in Robol consists of a line number, a command, and a series of numbers, each of which corresponds to one of the four servo motor options. If the line contains the command MOVE, the numbers correspond to the frequency of the pulses that