



On Two Wheels

Robot technology is developing fast. Floor robots such as the BBC Buggy can even be programmed to detect obstacles

Floor robots and turtles are more than just educational, they are fun! The principles involved in controlling a device like the BBC Buggy are the same as those needed for full-sized industrial robots. Although they won't actually do the housework yet, they could become the next generation of domestic aids.

Robots need to be capable of being precisely positioned in relation to their surroundings and for this reason are usually driven by stepper motors. Unlike conventional motors, stepper motors do not rotate when power is applied. The spindle turns by a predetermined fraction of a complete rotation for each pulse of power that is applied. The number of pulses needed to make a complete revolution depends on the particular motor. The direction of rotation can also be controlled. It is possible to make a floor robot or turtle move in very precise distances, in any direction, by letting the computer drive the motors separately. A floor robot can turn on the spot simply by driving the two wheels in opposite directions.

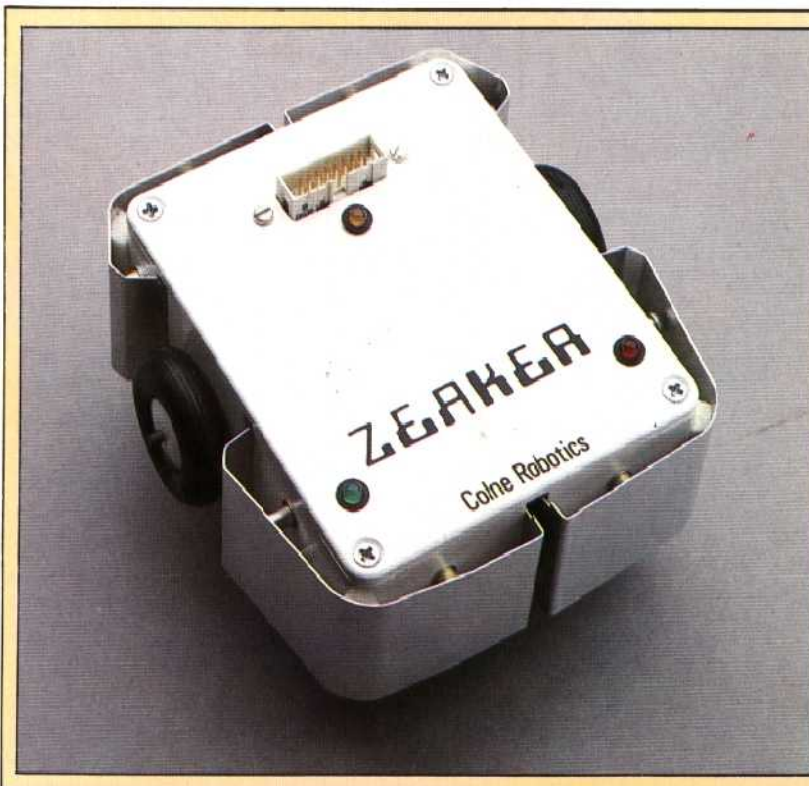
However, it is equally important for the robot to be able to report back to the computer when it encounters something. Collisions are usually detected by mounting bumpers around the body

of the vehicle, which are connected to microswitches. These, in turn, are connected back to the computer's input port and the closing or opening of each switch will cause one of the bits to change between '0' and '1'.

Other sorts of input from the robot are often required. An ability to follow white lines on a black floor may be useful. This is achieved by arranging a light source on the robot to shine down, with a detector next to it to measure the amount of light reflected back. This amount will vary according to the surface that the robot is passing over at the time; it is an analogue quantity rather than a digital one. The BBC Micro is fitted with an analogue input which enables a detector of this sort to be used directly. Most other systems will have to convert the signal to a digital one before sending it back to the computer.

Another use for this sort of detector is as a bar code reader. Codes relating to the nature of items stored in a warehouse could be scanned as the robot searches for the correct item. The BBC Buggy is supplied with some demonstration software that uses its bar code reader to play music; the principles are the same.

Other kinds of analogue signal that the floor robot might like to follow are light, sound and



On Course

This 'micro-turtle' is really halfway between a floor robot and a purpose-designed turtle in that it possesses collision detectors and so can be given a degree of 'intelligence'. The Zeaker is capable of moving forwards, backwards, left and right and moving a pen up and down. Control is made very simple by the provision of a version of the LOGO language called 'SNAIL LOGO', so commands such as FORWARD and BACKWARD can be used directly. Computers other than the BBC Micro will require an interface unit. This is an extra expense, but the interface unit does have its own power unit and therefore doesn't place any strain on the computer's power supply

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