## The Sinclair Keyboard

Sinclair advanced the art of keyboard design with the 'membrane' type used in the Spectrum. A moulded rubber sheet, with key-shaped protrusions, is mounted over a pad of contacts forming the keyboard grid or matrix. When a key like this is pressed, a protrusion under the keytop presses the contacts together. The computer checks which pair of contacts have been closed and is able to work out which key this corresponds to. The contacts closed by the key are normally held apart by an air bubble trapped between two plastic sheets. The restoring force to pop the keys back is provided by the elasticity of the the rubber which is stretched when a key is pressed. This original approach to keyboard engineering has certainly cut a few corners but it allows the product to be manufactured more cheaply and the benefit is passed on directly to the customer
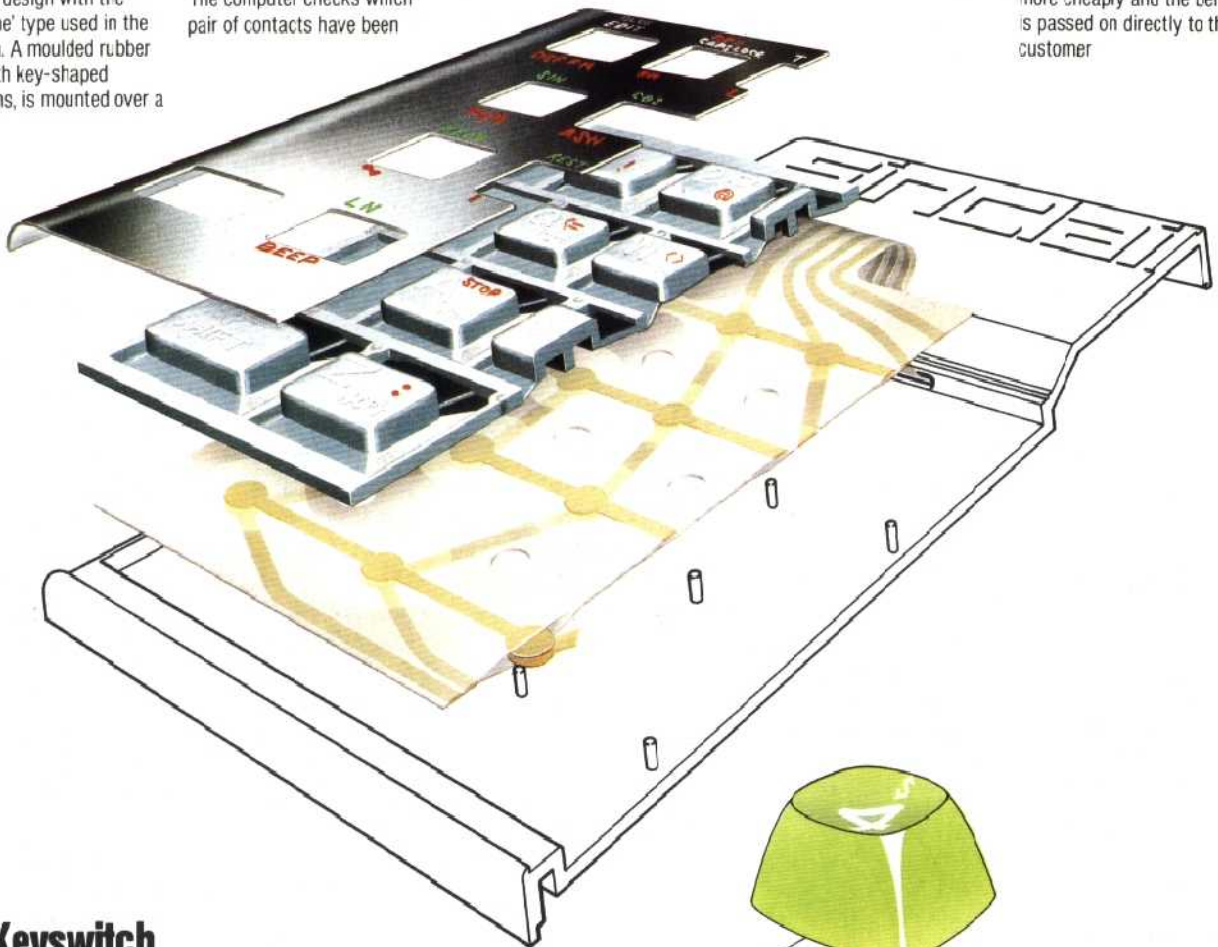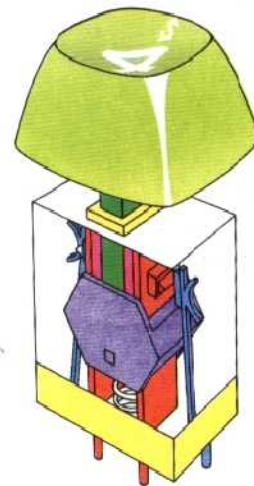

The Keyswitch

Typewriter-style keyswitches usually incorporate a pair of contacts. These are normally held apart and do not allow electricity to flow. When the key is pressed a plastic moulding (shown in mauve) moves down and allows the contacts to come together and close a circuit. An internal spring is provided to restore the key to its 'up' position. Closing the contacts allows a current to flow and the computer detects this. The wires connected to the contacts in each switch are arranged in a grid. The computer is able to know which key has been pressed by checking which of the 'vertical' wires on the grid and which of the the 'horizontal' ones is conducting the current. Keys of this type are mechanically complex and manufacturing costs are higher. They offer great reliability and have a more positive 'feel' than rubber membrane keys. This feel or 'touch' comes from the resistance provided by the spring. A well designed key gives a tactile feedback so that the user instinctively knows when the key has been pressed properly. The tops of the keys are also sculpted for more comfortable typing. Keyboards with this type of key are a better choice f the computer is going to be used extensively

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tactile feedback from touch-sensitive and membrane keyboards is to make an audible 'beep' each time a key has been pressed. It reassures the user that the key has actually been pressed and recognised by the computer.

The designers of the Sinclair ZX81 and the Spectrum introduced a novel and very useful way of cutting down on the amount of typing required when entering in BASIC programs. Each key is made to represent more than just a single letter of the alphabet or a number. By using a special 'function' key in conjunction with the ordinary keys, whole BASIC words can be made to appear on the screen without the need to type out the word in full. For example, the BASIC word PRINT can be produced by simply pressing the special function key and the key for the letter P together. A similar idea is used by Sord in the M5 model.

The End of Typing

Not that long ago, the only way to get a computer to do anything was to key an instruction into it by way of the keyboard. This in itself was often a tedious business, made worse if one did not have much skill as a typist. Faced with the fact that these barriers were actually putting people off using (and therefore buying) computers, the manufacturers came up with the brilliantly simple solution of the 'mouse'. The mouse can be shuffled around on any flat surface and, as it moves, the cursor moves around the screen display. One can thus move very rapidly to any part of the screen one wants, press the button, and the operation one wants starts to roll. Mice can also be used in graphics to draw lines or 'paint' colours on the screen