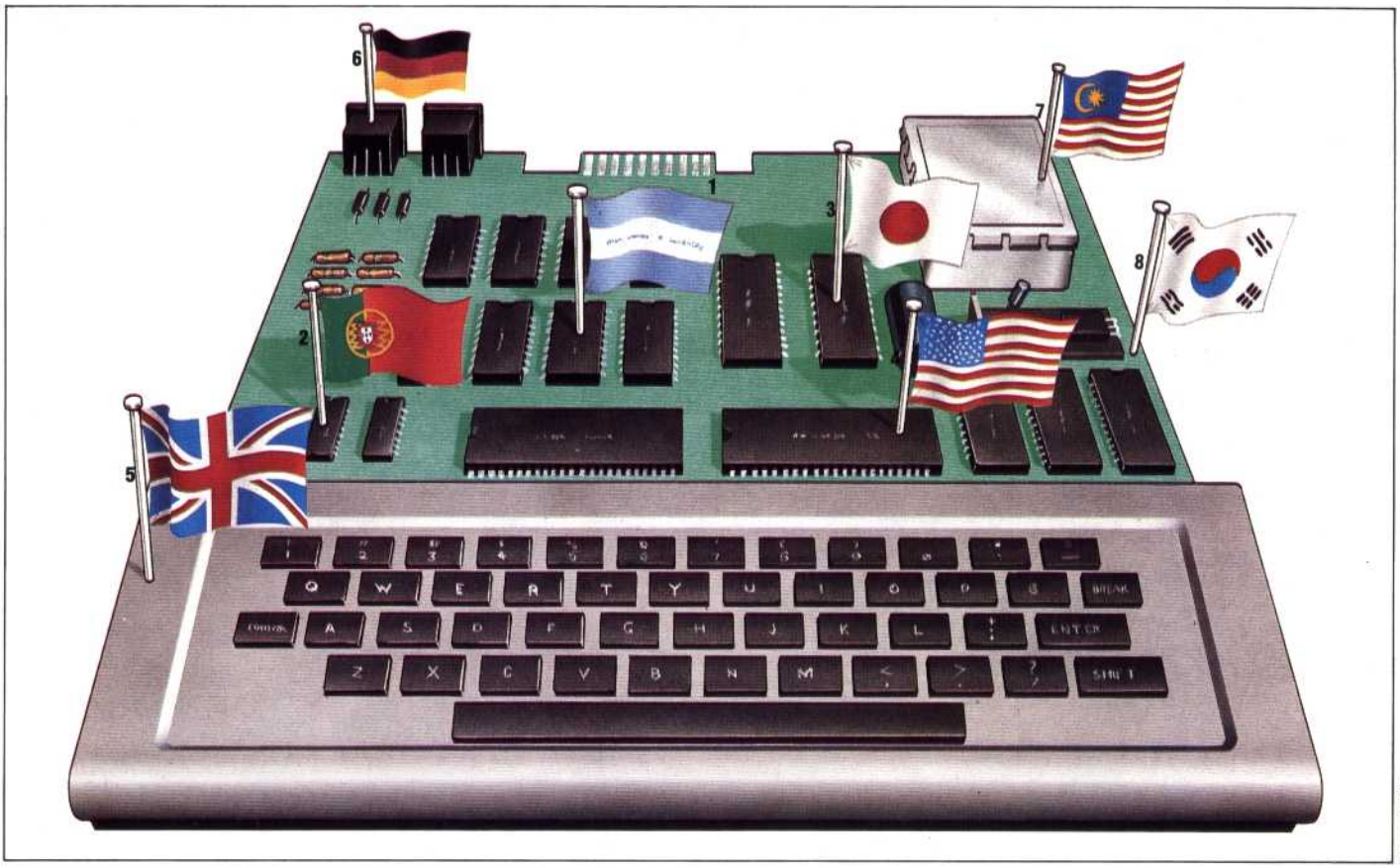
WORLDLY GOODS



STEVE CROSS

The Melting Pot
This imaginary microcomputer is manufactured with parts from many different countries. Chips are produced in: 1) El Salvador; 2) Portugal; 3) Japan; 4) USA; case, keyboard, and final assembly are done in 5) UK; sockets are from 6) West Germany; the RF modulator is produced in 7) Malaysia, and the PCB board is manufactured in 8) Korea

Home computer manufacture is one of the few industries in which the company whose name is stamped on the case often has very little to do with the making of the product. Indeed, a close look at the origin of the components inside your micro may reveal an intriguing combination of different countries.

Making micros is a multinational business. The Amstrad CPC 464, featured on page 249, for example, is made entirely in Korea, and a large proportion of Acorn's BBC Micros are made in Hong Kong. Sinclair has always followed the policy of being strictly a research and design company, sub-contracting the manufacture of components and the assembly of the final machine to outside companies.

The reason for this is the need to make the machines as cheaply as possible. Manufacturing considerations are of prime concern to the computer's designers at the outset of the whole process. In order to keep costs down, the printed circuit board must be small and simple. This means that the design must incorporate as few chips as possible. This is not because of the cost of the chips themselves, but because fitting a large number of chips onto a board is expensive and can make the final product less reliable.

This last point is the reason for the use of ULA (uncommitted logic array) chips in most popular micros. The ULA, although an expensive chip to design and make, replaces dozens of smaller chip packages on the board.

The majority of microchips are made in California, where the term Silicon Valley has been coined to describe the area in which computer companies are concentrated. Once these chips are manufactured, they need to be encased in plastic or ceramic packages. This part of the process does not require the same degree of technical skill and is labour intensive. Since labour is cheaper outside the USA, the chips are shipped to various foreign countries for packaging.

When the board design is finalised, the search for a sub-contractor gets under way. Circuit board making, like chip making, is a complicated business, involving large investments in machinery, and there are many companies specialising in board manufacture. From detailed board blueprints, the board maker produces the