went out in quick succession, each with its own flaws. Sinclair finally settled on one called the 'AH', and this has become the first version to be released in volume.

Consumer reaction to the kludge was not favourable — it was a visible proof of the machine's inadequacy, and hardly an advertisement for reliability. To get round this, Sinclair came up with an idea guaranteed to set any electronic engineer's teeth on edge — as there was no socket on the circuit board for the third 16 Kbyte ROM chip, it was placed 'piggyback' fashion on top of the existing chip, and all but one of the chip's 28 legs were individually soldered onto those of the chip below. The last leg was connected by a flying wire to another part of the board, so that the new chip could be accessed independently of its host. This meant that the kludge could be removed, but nothing had really changed.

All the early machines used EPROMs rather than ROMs, saving Sinclair the time it takes to produce ROMs but costing the company money — these 16 Kbyte EPROMs were selling at £80 each, and each QL used three of them. Although Sinclair would have bought at discount, the price must still have been a desperately high fraction of the machine's price, thus possibly forcing Sinclair into an early acceptance of the AH version operating system, despite its various bugs. Once it was settled upon, the ROMs to replace costly EPROMs could be manufactured and installed, and the company could hope to start turning a profit on the machine. Unfortunately, a debugged AH version is unlikely to appear before 1985.

With this in mind, how can we assess the QL? It can be seen as two machines in one: a powerful home computer, or a modest business machine, and, as such, it can genuinely claim to be a pioneer. It is probably closer to the conventional idea of the home micro, however: it is small, can produce a television display, has a resident BASIC, is sold by mail order (and by the high street shops soon), and has high-resolution colour graphics and joystick ports. Two features support its claims to business machine status: the built-in Microdrives provide reasonably substantial mass-storage (certainly by comparison with cassettes), and the machine comes 'bundled' with four applications programs — word processor, spreadsheet, database and graphics support.

As a home micro, the QL looks like very good value, given the Microdrives and the software, especially since it is of good quality, and since home users rarely see databases or spreadsheets. On the other hand, most home users don't need these applications, and don't have a use for them. The typical home user likes playing games and writing BASIC programs, which is fine in the latter case, since SuperBASIC is certainly one of the best dialects yet produced. There is an obvious shortage of commercial software for the QL, given the problems with producing the machine. Software production is not helped by the new Microdrives' incompatibility with the Spectrum version, by the QL screen's having a different layout from the Spectrum's, and by the operating system differences and problems.

There are, apparently, still bugs in SuperBASIC, and the editor is very similar to the line editor used on the Spectrum; this is not a bug, of course, but it isn't exactly Fifth Generation standard, either. The addition of BBC-like procedures and functions, and a SELECT structure similar to PASCAL's CASE are very real improvements, though the ON ERROR command is not implemented. The graphics are very good, and the sound is at least audible, though otherwise disappointing.

As a business machine, the QL is less

The Competition

QL vs BBC Micro

To claim the serious home user market, the QL must compete with the BBC Micro. In the QL's favour, the BBC Micro does not include free software, mass storage, a modern microprocessor, state-of-the-art graphics or a large expandable memory; on the other hand, the QL does not have government approval for school use, nor an enormous user base in homes, schools and (to a lesser extent) business, a huge range of high-quality third-party peripherals, a vast software catalogue (much of it free), or second-processor/upgrade capability

QL vs Macintosh

Sir Clive Sinclair timed the introduction of the QL to steal the thunder from the impending introduction of the Macintosh. In doing so, and in designing a machine around the same microprocessor, Sinclair has pitted the QL directly against the Mac, a machine four to five times its price. Although the two machines share many features, including memory size, clock speed of the CPU, and integrated software, there really is no comparison between the QL and Macintosh. The QL is a technically brilliant machine, but there is nothing new in the way it operates. Apple's Macintosh, on the other hand, boasts an operating system with icons, windows, and the ingenious mouse that sets the machine apart from every other computer on the market. The Macintosh represents a quantum leap forward and sideways — the forerunner of a new generation of microcomputers

Integrated Software

All four packages have similar screen formats and commands, and clear, concise displays. Data can be moved between them via the Microdrive. All four programs have bugs in this initial version, such as non-functionihg commands and input/output errors, but these should be easy to fix in subsequent versions. Quill, a word processor, allows for 40-, 64-, or 80-character displays; typed characters are slow to appear on screen, which can be irritating. Abacus is an innovative spreadsheet with many built-in functions and the ability to label and address a group of ceils, but the 15K workspace left is virtually useless. Archive is a database with built-in commands for simple filing tasks. It can also be programmed via an internal language similar to SuperBASIC, but the Microdrives make it very slow. Easel creates bar graphs, pie charts, and line graphs of numeric data, and can switch rapidly between formats