

## Lynx: putting the cat among the pigeons

*David Kelly talks to John Shirreff and Davis Jansons, co-designers of the Lynx.*

The Lynx is a new low-cost micro from a Cambridge based company, Computers. As is the custom for British micros these days it has two designers.

John Shirreff and Davis Jansons, responsible for the hardware and software respectively, make an unlikely team. All they have in common is their Cambridge education, a sense of humour, and the Lynx.

John is substantially the elder of the two. He originally studied architecture, but admits to being something of an ageing hippy — a much travelled, soft-spoken, character who likes the Cambridge environment. He worked for GW Design Services, a sister company of Computers, before designing the Lynx. While at GW he worked on a project to develop a Z80-based business micro.

Davis is an intense 23-year-old with a quick grin. He studied mathematics at college and began Z80 programming as a part-time enthusiasm. He is a confirmed vegetarian who joined GW in the spring of this year.

Dick Greenwood, a director of GW Services, first had the idea of making a low-cost micro in March 1982. The company conducted a public opinion survey to find out where most micros fall down and how they could make a better one. From the poll it was decided that the Lynx should have at least 16K working Ram, colour, hi-resolution graphics, Basic, a full-size keyboard and potential for expansion.

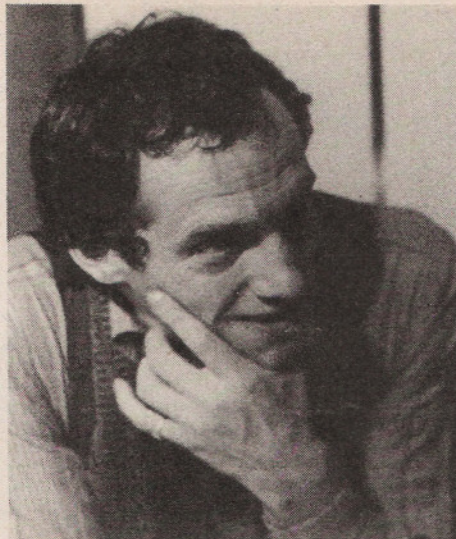
With this brief, John and Davis began work on the Lynx in May this year.

John explained how he went about the design of the hardware: "There are pros and cons to being a hardware person. I get the lead fumes from the solder. Davis gets to sit in front of a VDU all day.

"At first I sat in the garden and thought about the possibilities. Then I did a timing diagram to see if it would work. The whole design philosophy was linked to expandability — particularly now that memory is becoming so cheap.

"The main difficulty with the design was its memory banking arrangement. I think we have developed a convenient and unconventional system which has many speed and software advantages. The expanded Lynx has 64K of video space and 64K of work space with 24K of Rom. The machine has been designed to switch memory in 64K blocks — larger units than most micros.

"There are problems switching 64K units on the Z80A — you end up switching



*John Shirreff — originally studied architecture.*

the section you are executing. But, there are new ways round these problems. Because of its memory banking the Lynx can run CP/M®. Most low-cost micros will not run CP/M® because the Rom gets in the way.

"This sets the Lynx apart from other micros making it much more flexible. You can keep hanging on extra 64K blocks of memory indefinitely.

"If the Lynx is used as a graphics terminal for a main-frame — for which it is well suited — you can dump a screen full of information into the work space, manipulate it, and put it back. The Z80 is a very good processor with a long future, particularly for bit manipulation. The snag is that it doesn't have a fixed access-time, but the Lynx gets round this.

"The expanded version has a bit-mapped hi-resolution display of 512 x 248. Each dot is accessible and colour programmable, with 16K per colour giving the 48K of video memory. This makes the display flexible. You could even add on a



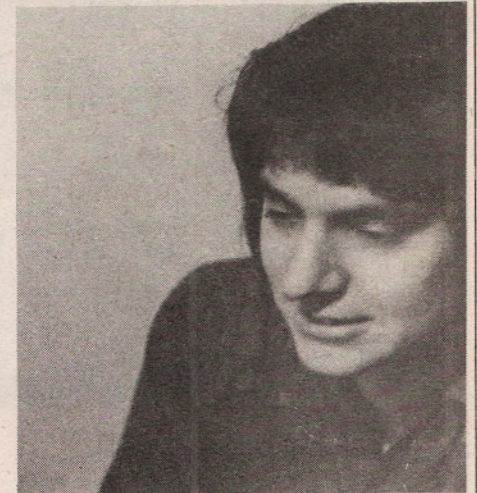
*Computers' Lynx with typewriter-style keyboard.*

parallel video bank to give a grey-scale.

"Once I thought it through, the actual design only took about three weeks. The first prototype was completed in early July and we now have the finished product, ready for launch in late October. I suppose it has all gone quite smoothly. At least, it does pretty much what I said it would."

Davis explains the software, "We wrote an entirely new Basic version for the Lynx. Most of it was written by me but the screen display driver was written by two other people — Shane Voss and Fiona Miller.

"When I started I worked out I had 10 weeks to complete it — six weeks to write



*Davis Jansons, software designer.*

it and four weeks to de-bug it, tidy it up and make it consistent throughout. "Both John and I have been working more than your standard 40-hour week — but never more than 90!"

Lynx Basic has been designed so that it is easy to modify. All the functions, commands, keywords and syntax checking are in tables held in Rom, but their pointers are kept in Ram. If you do not like one of the commands, or you want it to be more powerful, you can alter it.

Other features of the Basic are its optional single-keyword entry. You can type all the commands in full. Alternatively, you can use one key together with the *Escape* key. For example, *Escape 9* gives *Goto*, *Escape U* gives *Until*, and so on.

"The *Goto Label* function seeks out a labelled line, without looking at the line numbers, which simplifies programming. The *Code* function allows machine-code to be entered easily.

"The statement is directly followed by the hex arguments and is ignored by the Basic program. The machine-code is then executed by *Call Location* which hunts out the *Code* function. The Lynx also includes a machine-code monitor for de-bugging machine-code programs."

To produce a completely new micro in 12 weeks is fast work. Both John and Davis are about to take short holidays.

After the break John will be back to work on the disc drives, which have to be finished by November, and Davis begins work on an enhanced Level 2 Basic which is planned for Spring 1983.