VIDEOTEX

CHIP, SET AND MATCH FOR BRITAIN

Videotex, a technology invented by Sam Fedida of the Post Office and linking computers with the familiar 'telly', is poised to transform communications and business practices on a grand and worldwide scale. The largest company in the history of business, AT & T, has embraced the technology and published its own presentation-level standards. But it is Britain that is still setting the pace in worldwide videotex with companies li Rediffusion Computers at the process end and Mullard at the 'chip' level. Fo closer look at how the chip meets the set in teletext as well as videotex, Information Management visited Mullard's Southampton plant.

When Mullard set out to build the first plant in Europe specifically designed to make semi-conductors, it hedged its bets. It built the roof high enough to take overhead gantries so that the plant could be converted into a tube-making factory just in case the semiconductors bubble should burst.

Dr David Heard, manager of the Mullard Integrated Circuit Division at Southampton, tells the story with evident delight and considerable satisfaction. In 1957, there was cause to view the future of semiconductors with some caution. But the original 6000 sq. metre factory has now grown to 35,000 sq. metres and the Southampton plant has established itself as one of the most advanced semiconductor facilities in Europe and the world leader in the special integrated circuit, or chip, sets that are the basis of teletext and videotex.

Its 2000 sq. ft. water fabrication plant, one of the largest in Europe and built five years ago at a cost of £1.5 million, is a clean air environment that registers dust counts at operator stations of one to five particles greater than half a micron per cubic foot. Compare that to the five million particles per cubic foot in your lounge, the one million in your kitchen, or the 1000 to 3000 in the average operating theatre and you begin to appreciate the technology that goes into putting 6000 gate functions on a single Lucy [illegible] chip the size of a s flattened pea.

A single partic e settling on the extraordinarily com and intricate circui the present-day ch prove just as big a t to electronic sig a granite block would present to pedc e negotiating a passa through the Hamp maze.

Dr Heard, who [illegible] the start with Mu a 1957 and who is s

LUCY has been specially designed by Mullard engineers for use with viewdata information services where it will dramatically cut the cost of the add-on facilities needed to convert a television set to receive them. The photograph shows just five of the 30 sq. mm LUCY chips.

therefore, shares a silver anniversary with the Southampton plant, puts the total capital investment in the present integrated circuit facility at around £15 million over the past four to five years. It's an investment for the future since, at this level, it will take some years yet to recover the cost. Set into the Philips' context, however (Mullard has been a wholly owned subsidiary of Philips since 1927), and taking into account the worldwide potential of the markets that Southampton serves, that investment can be seen as the stakes that are necessary to play the semiconductor game at the world table.

To extend the analogy, the chips are down and a great deal is riding on the turn of a few cards. The days have long since passed when it was possible to start a semiconductor plant for relatively little capital outlay, when a few key engineers could break away from larger units and spawn the companies that have made California's 'Silicon Valley' a prototype of the present-day American dream.

The resources that Mullard can bring to the intensely competitive worldwide semiconductor battle are considerable. The company is part of the Philips components division ELCOMA (Electronic Components and Materials). It takes its basic research from the Philips Eindhoven laboratories and from the group's research facility at Redhill. The Southampton plant has its own strong development team to support its production operations; and it also works very closely with an applications group in Mitcham comprising over 100 systems engineers experienced in TV and radio systems, including professional radio

communications and telephony, across a range of industries.

It is this systems group, working in tandem with the Southampton plant, that has cooperated with Rediffusion in the development of advanced videotext facilities, including the Rediffusion third generation videotex terminal, the System Alpha Teleputer terminal introduced towards the end of last year.

This new-style device, hence its name Teleputer, incorporates an 8-bit personal computer capable of running the personal computer industry standard operating system CPM.

Rediffusion also takes all its videotex chip sets from Mullard, including the special character generators needed for foreign language versions.

The basic Mullard TROM, or Text Read-Only Memory, can be reprogrammed to generate most foreign language characters and a Cyrillic version was produced specifically to meet the needs of Rediffusion in selling videotex to the Russians. There are versions already for half a dozen other languages including French, Italian, German and Hebrew. Dr Heard's team is also looking at Arabic and Greek — indeed, as we talked, a call came through to Dr Heard from Athens and a discussion on the Greek chip ensued!

Mullard's chosen strategy in pursuing the semiconductor market is highly selective.

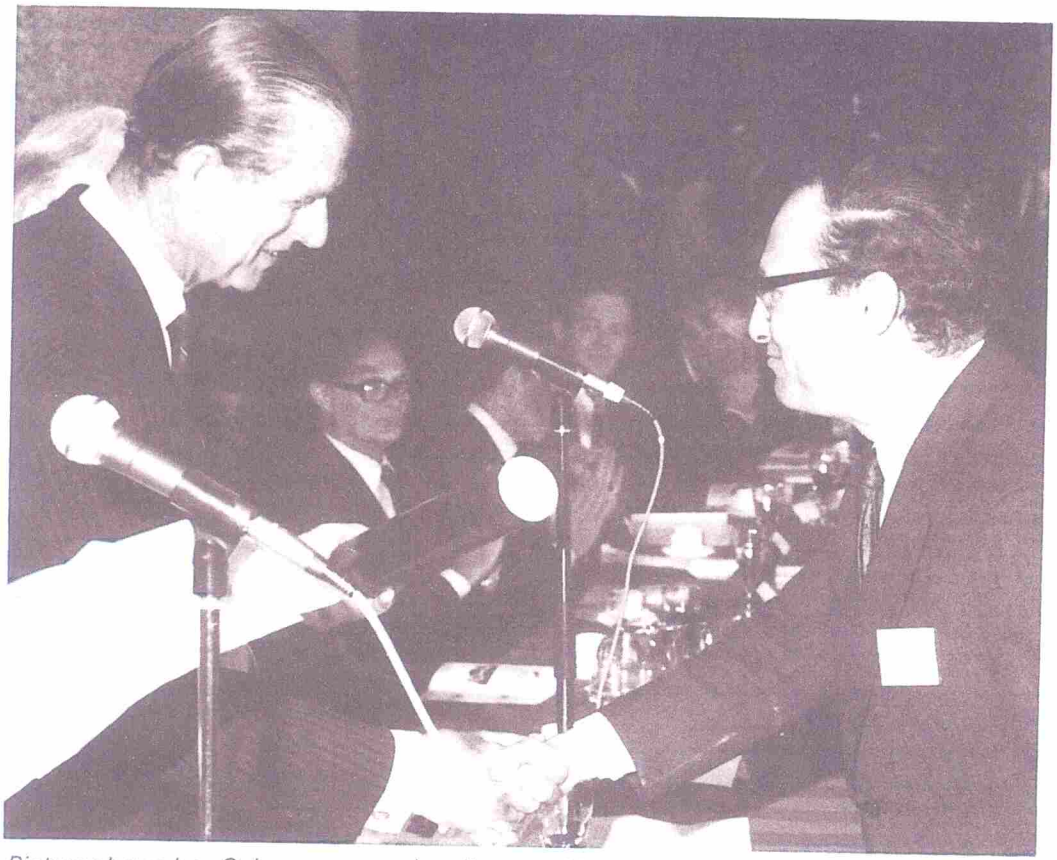
When it entered the business, it developed across a broad range of technology. At the outset in the late '50s it had two product divisions — a transistor group and an infra-red group working on discrete semiconductors. The Southampton plant through the '60s soon became a major supplier to the data processing industry of TTL (Transistor Transistor Logic) circuitry and then ECL (Emitter Coupled Logic) circuitry.

When semicondictor memory began to take over from ferrite cores Mullard started to develop into MOS (Metal Oxide Silicon) memories. This was in the early '70s and it was Mullard, in fact, that produced the first 1K MOS memory in Europe, a dynamic RAM using silicon gate technology equivalent to the Intel 1103.

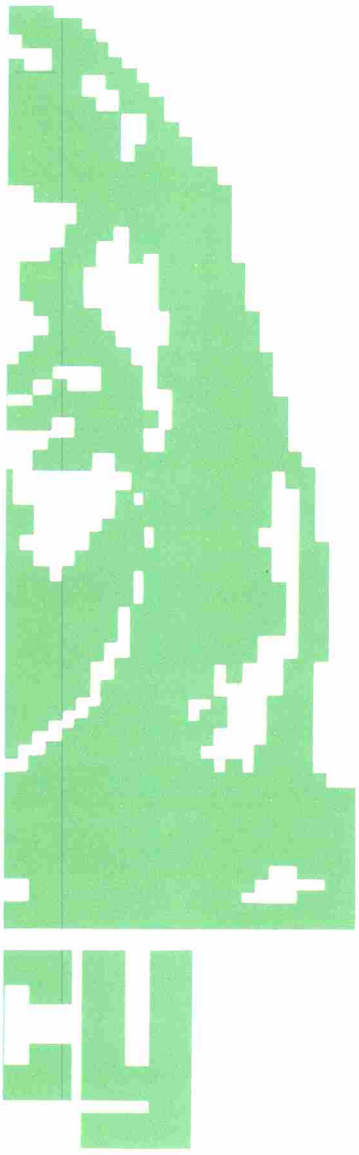
The acquisition in 1975 by Philips of a West Coast manufacturer of MOS memories called Signetics, however, produced a change of direction for Southampton. Logic, according to Dr Heard, said that Signetics should concentrate on memories, leaving Mullard to use its systems knowledge in the pursuit of 'the large market we saw for proprietary integrated circuits'.

"It was logical for us, as part of Philips, to concentrate a lot of our attention on TVs — to se- to develop proprietary circuits to integrate functions for remote control and digital tuning TV sets," Dr Heard commented. Teletext followed and Mullard, through the applications group in Mitcham, was able to define 'systems' f both the BBC and ITV. Dr Heard's team then translated those systems into integrated circuits using the so-called N-channel MOS technology.

The first teletext chips were produced in 1977-7 and in the short period t has followed Mullard has captured over 90% of t



Picture shows Ivor Cohen — managing director of Mullard Ltd — being presented with the 1982 Design Council Award for the Lucy Chip by HRH The Duke of Edinburgh. The presentation was held at the Barbican Centre, London, on Wednesday, April 28.



world market for such devices. A key factor in this dominance is one chip, appropriately named the VIP (Video Information Processor) chip, which nobody else in the world has been able yet to duplicate. This acts as the analogue interface that provides the driving signals that put the text up on the TV tube.

In 1982 Mullard will produce over a million chip sets for teletext alone, a figure which next year will grow to five million — an illustration of the take-off and the explosive growth that is happening to teletext currently. The number of teletext TV sets in British homes following national teletext month last October was over 300,000 or nearly three times as many as a year earlier.

Parallel developments in the corporate videotex field have seen the production from 1980 onwards of the Lucy chip set, Lucy being a corruption of LCUART which is an acronym for line coupling universal asynchronous receiver and transmitter. Further developments of Lucy are well in hand to produce a chip set code-named Lucinda which will add a lot of the signal filtering functions to the chip in addition to handling the basic modem, and tape output functions and interaction between one TV and another.

Other developments under way at Southampton are a programmable computer-controlled teletext chip set and a European CEPT-standard videotex chip. The latter, Dr Heard said, will be ready for production in 1983. At the same time, with an eye on the US market, Dr Heard is carefully assessing the conflicting standards being proposed, including the AT&T chip, though he points out that all that AT&T has designed so far is a presentation protocol defining what the user sees — not enough detail, in other words, to allow anyone to develop a chip set, but enough perhaps to stall the marketplace!

Other related and leading-edge development projects that are based at Southampton include the chips for Philips laser-based Compact audio disk — the hi-fi standard of the future — due for public release at the end of this year; and a voice synthesiser chip — the talking chip — for use in video games and a range of consumer products.

So when the time comes when you get in your car and a voice says 'fasten your safety belt', there's a good chance that it will be Mullard speaking!

Mullard's 'Movies' project is a proven success

To improve their customer services relations, Mullard Ltd installed some 12 months ago, a Rediffusion R1800/30 computer system with Viewdata Plus, to introduce their 'MOVIES' project. The system has recently been upgraded to an R1800/50 with 512KB memory and 33MB disk. The contract is worth over £100,000.

By using IBM 3270 passthrough, which enables the system to act as a videotex front end processor to the company's IBM mainframe, customers are allowed to access Mullard's 'OLOB' system (on-line order book) to check on the delivery progress of their outstanding orders.

Shortly, customers will also be able to place orders via their videotex TV set direct to the mainframe.

MOS integrated circuit production at Mullard, Southampton. Ion Implanter. Ions of boron, arsenic, etc, are implanted into the surface of the silicon wafer to form doped regions.