

THE SINCLAIR STORY

Steve Braidwood and Halvor Moorshead travelled to Cambridge for this exclusive Electronics Tomorrow interview.

You may be surprised to learn that Clive Sinclair never went to university. When he left school he got a job as an editorial assistant on an electronics magazine, so from our common starting point he explained to us how he got where he is today (we couldn't understand why anyone would want to leave the fun world of electronics magazines . . . but apparently not all magazines are as much fun as ETI). We asked Clive why he didn't continue formal education after school:

Because I'd already been writing articles on electronics when I was at school — electronics was my prime interest then — and I decided that a university degree wouldn't teach me what I wanted to know at the sort of rate I wanted to learn it. Primarily universities then, and still many today, taught electrical engineering rather than electronics.

Clive learned by studying on his own, but it wasn't long before he was in business: The company started by selling transistors — individual transistors which I bought from Plessey and tested (they were rejects). They were rejected because they didn't meet the computer-type specs, but they were perfectly satisfactory . . . **Are these the ones that you put your own number on?** Yes, that's right — MAT101s . . .

That was 1961 and Clive was operating his mail-order business from his room in London. He was 21.

Then I did a radio kit, a thing called the Slimline. That was the first one. **Was that the one in a full-page ad in PW?** Yes.

Then there was a very tiny little amplifier module, a thing called the Microamp. **A single-ended thing with**

a power transistor? No, that came later. There was one even before that. But that's right, there was something called the TR750 — by that time though the company employed two people, three including myself.



Biscuit Tin Amplifiers

And then you went into the audio field? Into hi-fi modules. **Wasn't there a device called the X10 that caused you some problems?** In the early days we had some problems with the transistors blowing up so we did a revised design, the X20, which was much more satisfactory.

But there was the problem, fundamentally, that they tended to radiate. If you kept them in a biscuit tin they weren't too bad, but otherwise they were a bit of a problem.

In the early days the products were designed completely by Clive himself, there was no one else around. The X10 was a design that Clive got from another company, but when it caused problems he designed the X20 himself. After the X20 the company set about producing conventional amplifiers (the X10 and X20 were pulse-width modulation designs) starting with the Z12, a class-B design.

We had just done the Z12 when we moved to Cambridge and then in Cambridge we started to widen the range of hi-fi modules. And from that we went into built hi-fi units. We started with the Neoteric 60 amplifier — it was black on the top with a rosewood front and gold or silver knobs.



Enthusiastic Markets

Sinclair is no longer in the hi-fi market. But he hasn't given up the electronics hobby-kit market, it is too closely associated with the way Clive thinks.

Of Sinclair Radionics he says: We're not basically very much in the business of the hobbyist these days. Sinclair Radionics are concerned with supplying the public in general on one hand, and specialists with instruments, on the other. **But a large part of Sinclair's market is comprised of hobbyists because, as Clive says,** we tend to make products that are interesting technically because I'm personally interested in the technology. I hope our products will always be of interest to electronics enthusiasts because they're of interest to me, but they won't always be aimed at that market any more than the pocket television which, although interesting to an electronics engineer or amateur electronics enthusiast, is of use to anybody.

We asked Clive if he considered himself to be an enthusiast: Yes, very much so. Not in the sense of

wielding a soldering iron, because I have never particularly been interested in that aspect anyway. I'm much too interested in the theoretical side.

It is the way that Clive involves himself personally in the development of the company's products that makes the company so exciting — to us and to Clive. But some people in the business world thought that Clive ought to be spending more time managing the company and taking fewer or lesser risks. But before looking at the state of Sinclair today, we'll return to the history of Sinclair Radionics.



The Amazing Executive

The Sinclair Executive calculator was launched in 1972. It was the world's first truly hand-held electronic calculator and it was surprisingly easy for Sinclair to get into production, thanks to one very clever idea. That was not a product that had been a long time in development — it was only about six months. One of the fastest developments we ever did!

I had always wanted to make calculators and it was the development of the single-chip that made it possible for us. And we did everything possible to get hold of it at the earliest possible time, then we moved rapidly into production.

Was it the first single-chip calculator? Yes. We weren't the first people to make one — a firm in the States made the calculator at the same time as us, or a bit earlier, using the same chip. What we did was to make a pocket calculator. Whereas theirs was a hand held calculator, ours was a pocket one. Because we had this power-saving circuitry: it cut the power consumption by about twenty times.

How did you manage that? We switched the chip on and off; off most of the time. The charges on the capacitors on the chip held the data. That's a technique we developed.

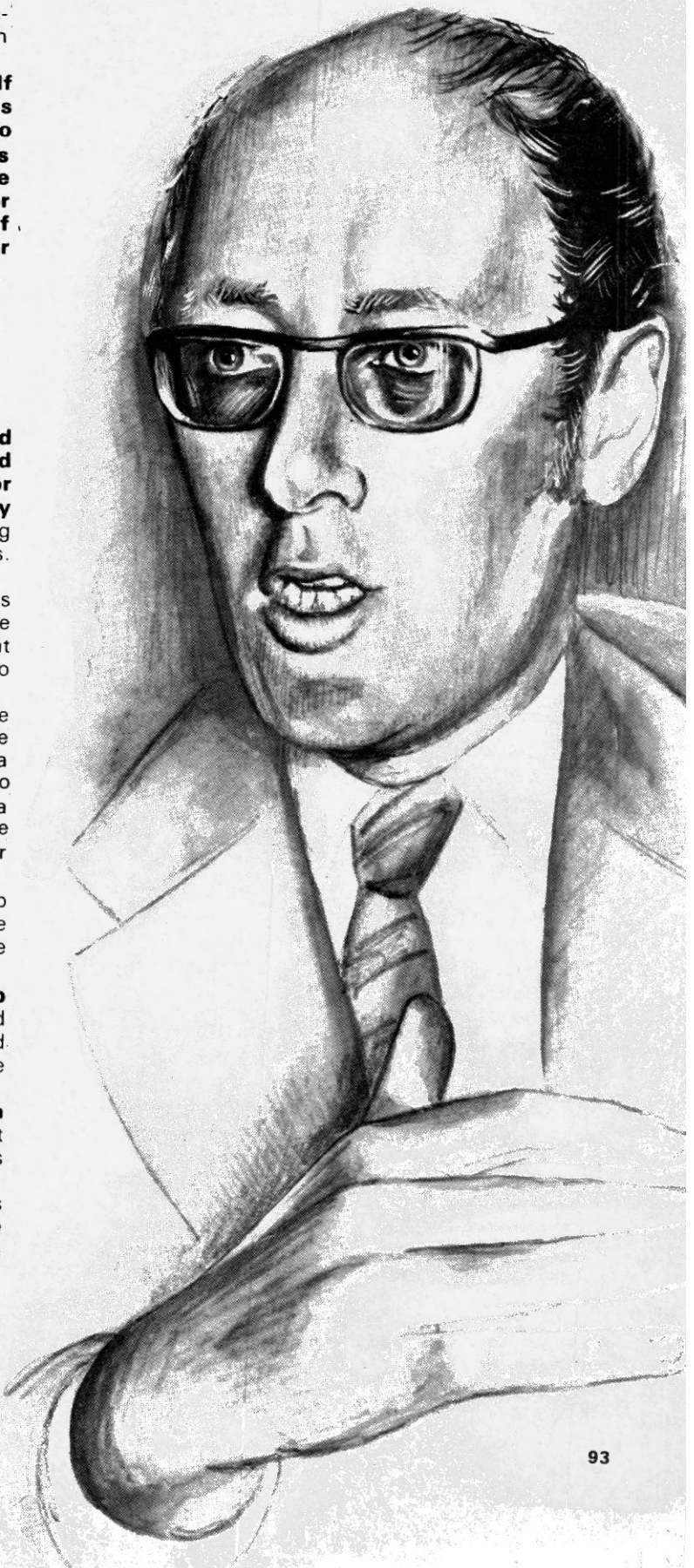
So you discovered this when you got the chip into your lab? No we didn't discover it . . . I had anticipated that this would be theoretically possible, and so I devised a circuit to do it which worked. And so we were able to make a very slim machine.

But that was before the calculator boom. Then there was no demand. It boomed because we caused it to boom. It wasn't there when we started and it was there when we advertised.

And what about production problems? It was horrendously difficult to make this product. We were making it ourselves and there were so many parts in such a small space.

How many staff did you have at that time? I'd say about sixty.

From these beginnings Sinclair have become world-famous as calculator manufacturers: today the Cambridge programmable outsells all programmables and all scientifics.





Measuring the Instrument Market

Sinclair is also in the instrument field; he has been selling the DM2 digital multimeter for six years and is now the largest manufacturer of multimeters in Europe. In October he launched another digital multimeter, the PDM35. Clive expects that by the middle of 1978 his company will be the largest manufacturer (by number of units sold) of digital multimeters in the world (but there are more meters to be released this winter).

We asked John Nicholls, head of Sinclair's instrument division, if there were any other companies competing with Sinclair in the cheap digital multimeter market: In America there are a number of meters at a hundred dollars, in the UK we have the field virtually to ourselves, in other European countries there is a certain amount of low-cost Far-East meters but their penetration is very small.

Before the DM2 Sinclair wasn't making any instruments, but after selling 25 000 units it's hardly surprising that he's going into business seriously with a new range — including, we're told, an auto-ranging 4 1/2-digit model priced at around £100 (but this wasn't released at the time of the interview).

One of the factors that accounts for the success of Sinclair in the early days was the sub-contracting of production. Sinclair would buy the components, send them out to another company to be assembled, and then check the quality of the products in his own factory before sending them out into the marketplace. He then concentrated on research and development, free from the hassles (financially and managerially) of production. But there was a danger that he might be let down by one of his contractors, with disastrous results.



The Black Watch Disaster

This happened in 1976 when he lost £355 600 thanks to the suppliers of the chip for his Black Watch. We asked Clive if technical problems played any part in the disaster. No, the chip we got worked beautifully. We had some early snags but so does everybody in watches — they're just teething troubles. It was a great shame because the chip was miles ahead of anyone else's — way ahead of the Americans.

And the chip was a Sinclair design? Yes, entirely. Was it the first production I²L chip in the world? Yes, we were ahead of TI on it. But I²L was developed by Philips and IBM, how come Sinclair used it first? They invented it and we spotted that this looked like an



Steve Braidwood and Halvor Moorshead caught in mid-interview with Clive Sinclair, at Sinclairs Cambridge headquarters.

ideal technology for watches — way ahead of anyone else. Indeed, we did all the work to make it a technology for watches, you couldn't just use conventional circuits.

We remember quite a lot of problems when the watch first came out, do you regret launching it as early as you did? There were problems with everybody else's. I just think that something as new as that can't do without having some problems.

What went wrong was one of those things that happens now and again and it was tough luck.

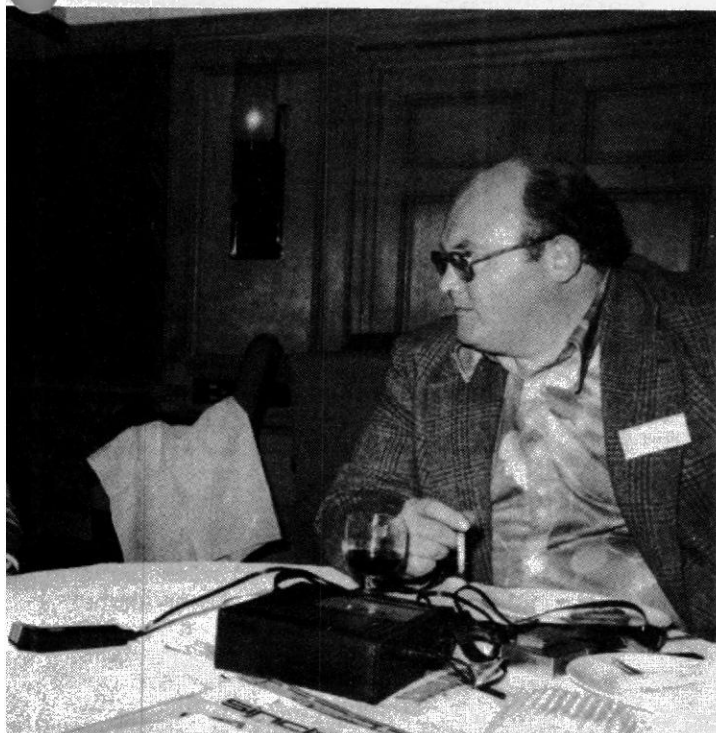
That was your only venture (so far) into watches?

Yes. We did then make a version of the Black Watch using CMOS chips but only to fulfil obligations of supply, because we couldn't then be particularly competitive.

The watch business has been a particularly bad business for everybody who's been in it, really, because there's been such absurd competition and price cutting. Even if we hadn't had the problem with the supply of the chips we would probably have seen some other problems.

But the same applies to the calculator field, to some extent, where you certainly have been able to hold your head above water? That's right, and so we would have done in the watch field, had we had the chance. So we much regret that the chips weren't available.

As a company you're quite remarkable as innovators. But you've been hit down a bit — w



the PWM amplifier and the 1²L watch. Has that made you a bit more cautious?

No, not a bit. In both cases the technology was right and something else was wrong. In the case of the PWM, we were a much smaller company then and we didn't do our homework properly. We didn't test it thoroughly enough before we launched it, but we soon put that right.

In the case of the 1²L watch, again the snag there was the people who were making the chip who suddenly found themselves with a processing problem which had nothing to do with the fact that it was that chip.

Haven't you become just a bit more conservative? No, I don't think I have. The television is a massive risk by any standard. **But you did go to the NEB.** That was of necessity. The risk was such a damn big one. Generally, large companies are not prepared to take big risks, but I personally am.

Since the misfortunes of 1976 Sinclair has been helped out by the National Enterprise Board with cash and a 43% shareholding, and by the NRDC with £700 000 for further development of the pocket television.



Satisfaction Guaranteed

One nice thing about Sinclair is that from the start, before the law came in to protect the consumer, he offered an unconditional money-back guarantee to his customers. So when innovative new techniques caused problems you didn't need

to be one of Clive's guinea-pigs if you didn't want to be, but it was so much fun to be at the forefront of technology that most hobbyists didn't mind coping with teething troubles themselves. **Clive's views on the money-back deal are double-edged:** In mail-order it was likely to succeed in helping sales; it was also quite a genuine policy. We stuck to it and meant it. We didn't want a situation where customers weren't happy — at the end of the day. It was very deliberate. It is a genuine policy we've stuck to ever since: we don't argue with customers, we do replace products.

We asked Clive if he had got over the bad name he once had — in the hi-fi days it was commonly rumoured that he had a 20% failure rate on some of his products. True. The quality control wasn't as good as it should have been, there's no doubt about it. The reason was that we sub-contracted production and really didn't have enough experience of quality control in those days.

Our quality is superb now.

And the bad name? There was indeed, yes. I think that's behind us now. We don't seem to get that at all now — we did until a year or two ago. Our reputation with the big stores, who have got very quality-control conscious themselves (and do their own goods-inwards checks), is excellent.



Exporting Success

What percentage of your products do you export? Seventy per cent overall, now, I think. **Mainly the USA?** No, it's only recently. We haven't been very big in the USA, although we've got our own company there, but just this year it's suddenly taking off there. For two reasons: the television is the obvious one, but the multimeter is pushing out very heavily in the USA, hitherto it's been mostly Europe.

The pocket television was obviously designed with the export market in mind — the switches on the front allow you to select UHF or VHF, US, UK or European standards. The marketing effort has so far been concentrated in the US, with the result that most of the 1977 sets have been sold there. Marketing in Europe (except for the UK, where the set was available from the start) starts at the beginning of 1978. Now 40% of the turnover is attributable to the TV (20% to multimeters and 40% to calculators) but the production of the TV (and consequently the sales) will double between October and December 1977. Clive Sinclair is confident that the television is a success, but with twelve years of research and development behind it and massive investments, let's hope that he doesn't get let down by his suppliers (he has only a single source for the two-inch picture-tube) or be price-cut into bankruptcy by Japanese competition. But at £200+VAT I can't see many being sold in the UK until the price does come down.



Researching for the Future

Clive has about a dozen people working in research (as opposed to development) but he says he isn't about to enter any new areas in the immediate future. We asked him about the electric vehicle research: The electric vehicle side have done work over quite a long period and are still doing work on the motor side, but it's not a 'product development' area, it's a 'research' area.

If you were fifteen years younger what area would you now go into, if you had the same starting point you had in 1962?

Personal computers, probably, in the constructor field, if you have to be in the constructor field. I only did so in the first place because that's an area where it's possible to start small.

We would have expected to see you in personal computers by now. Well, I'm waiting to see what happens. I think the programmable calculator is, in a way, a venture in that direction. Evolutions of that type of product might meet that demand. It's hard to see which way it's going at the moment.

We've spent an awful lot of time looking into this problem and we're still not definite which way we'll go. But I suspect it'll be from calculators upwards to computers.

Do people buy calculators to play with, or to use?

There's certainly a market sector, the calcaholics, God bless them. It's quite an important one, but it's not that big.

What about innovations in calculators, like bigger memory?

We offer a service to our customers whereby we'll write programs for our calculators, for them. When we did our first programmable, to 50% of those who wrote in we had to say I'm sorry but our programmable won't do it. On the present machine only two of the many hundreds who've written in did we have to say that to, and one of those couldn't be done on a programmable anyway. So, basically, we're offering a machine, which, much to our surprise, already meets the overwhelming majority of people's current needs.

How long will it be before you are using bubble memories? The problem today is that there aren't enough suppliers for there to be competition; there's TI and nobody else. Intel are coming out, and if the competition builds up things could happen quickly. Charge-coupled devices might come in faster.



Over the Horizon

Is there anything on the horizon that will make a significant change in our life-style, do you think the



Uncle Clive holding his world stunning pocket TV, you too can hold one for the sum of £200 plus VAT!

home computer will: I think there's not much use for the computer in the home. I think what will change our lives much more is robots. This is the thing that intrigues me — looking quite a long way ahead — the electronics is becoming available to make simple robots practical.

I don't know why, for example, we can't already buy mowing machines that mow the lawn and learn where the trees are and where the humps are. There's nothing in the technology preventing them appearing now. Nor is there anything in the technology preventing, say, a robotic vacuum cleaner that could learn the layout of a house and busily set about cleaning the house every day and plugging itself into the mains at night to recharge itself. And so on. The first robots will not be made by the traditional companies, they'll be made by new companies. Then the large companies may take it up.

Are you researching this at the moment? No. It's too early? It's too early in the sense it's something that evolves out of general computer work. It's too early to put everything together today.

What will you be selling in 1984? What we're selling now, but lots more of them.

Did you know seven years ago what you'd be selling today? Yes I did, very much so.

In 1984 we'll be more into computers than we are now. We see ourselves as on the beginning of computers with the programmable. I'm sure that will have gone a lot further by them.

If you look at the areas that we are in — television, instruments and calculators — you'll see that there are some common factors that could lead to some interesting product areas. I won't say more than that.

Things like a two-inch pocket scope? Scopes are an example, yes. There are a lot of others. **A miniature VDU?** Yes, things just like that.

Well, thank you for a most enjoyable afternoon, Electronics Tomorrow readers may be the founders of Robotic companies after reading this interview. They could well be, it has been a pleasure talking to you.