Malcolm Penn

Interviewed by

Richard Sharpe

3rd March 2022

Via Zoom

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Welcome to the Archives of Information Technology where we capture the past and inspire the future. It is the 3rd of March 2022. My name is Richard Sharp and I've been covering the computer industry [coughs] excuse me, and then the IT industry since the early 1970s, but I have not been involved in it, erm, as long as the man making his contribution today, Malcolm Penn.

Malcolm is one of those people who really, I think, I would say, [laughs] is the scorer, the person who keeps score and he has done that at both Dataquest, a very important company, and now in his own company [coughs] which we will hear more about. But before we get there, we've got to get him born. So, he was born on the 19th of May, 1944 in Worcester Park, Surrey. Erm, what were your parents doing at the time, Malcolm?

[00:01:05]
Well, my parents, erm, was actually building mechanical parts for the… for aeroplanes, he was working for one of the companies that supplied Vickers, so, they were building the Spitfire and all sorts of other aeroplanes that were crucial to the war effort there. And he was a machinist and he was a very good one, so, he was what was called a centre lathe turner, where you made all these intricate parts out of metal, he ground them down and cut them to these very high precision because everything was pretty much hand-made back then on all of these mechanical items.

So, that was what he was doing and my mum, er, was a cleaning lady, so, she used to clean for some of the people who were slightly more affluent than we were, erm, just, erm, tidying up, vacuuming around, and-and stuff like that.

[00:01:48]
It is often forgotten how much important light industry there was around South West London and going, of course, out to Kingston, w-with Hawker Siddeley out there and we'll come back to that—

[00:01:57]

They're amazing, because, erm, we had Vickers in Weybridge and Hawkers in-in Kingston, so, er, where I was born in Tolworth, we were sandwiched between two of the most important aircraft factories in the UK at that time.

[00:02:08]
Indeed. You went to Tolworth County Primary School, erm, did your parents encourage you in education?

[00:02:15]
Erm, yes, they did. I think they always found and wanted to make sure that we had, er, we, a good education, they always encouraged us. Erm, there-there weren't the opportunities that you had really back then, erm, once you were at that junior school level, you just went to the local junior school and it happened to be down the road. But it was a smallish school, erm, not so many pupils in it and erm, you know, it was all the local kids, erm, girls and boys, it was mixed and, er, and we just got on with, er, learning the basics. It was very much a three R's type of curriculum back then, erm, but we did what we had to do and played and worked and it was-it was good. And they did encourage it, they-they realised that an education, er, was the way out of er… My father was very much a mechanical engineering-type of person, erm, a-a-and he saw that as a way to a-a better future.

[00:03:01]
You joined that school in 1949, erm, which was when Ferranti first sold the first commercial computer, would you believe? Erm, and they were very well ahead of it, and, the UK had a rather important role in the early history of computing. Erm, did you enjoy school?

[00:03:18]
Oh, yes, I mean, it was fun, erm, I never was one of those kids that cried and clinged onto their mummy's apron strings when I was dropped off, I was always very happy to go there, erm, it was a fun place to be. And I think, you know when you're… Home at that time was quite dire, I mean, you look in the actually-average family home and there was really nothing, I mean, we were lucky, we had a TV. Er, my dad converted a radar set erm, out, and made it into a television set, you could buy this

war surplus stuff and er, and a set of very crude blueprints, er, sold by Wireless World or-or something like that, I can't remember exactly the publication. And of course, it was hugely inaccurate and-and didn't work, but my dad fixed it. They were simple back then, devices were very simple, but that was pride of place, along, of course, with our radio set, which was a piece of furniture. I mean, people don't realise that you bought a fun-a radio back then, as a piece of furniture. So, you chose it for the wood it was made out of, and the polished mahogany cabinet a-and that was it, I mean, that the only electronic type of appliances that we had in the home.

Erm, so, we were lucky, I mean I had a TV set, a little six-inch round green tube er, which was not exactly the best way to watch TV, but we were the only kids in the street that had TV, so, I was popular.

[00:04:58]
Laughs, apart from this support in education, what else do you think you got from your parents?

[00:05:04]
Oh, I think, erm, my-my father was… There are two things that really stick about him, he was very hard-working, he was very diligent, erm. He had an-an amazingly strong work ethic and-and he really did that because that was his way of, er, trying to, a) keep the family with food and good things on the table, we always had an annual holiday. He only had two weeks' holiday but er, he saved up in the holiday club so that we could spend two weeks away. He was a very family-centric man in that very basic sort of way. So, I think that was important.

He was also incredibly generous and kind-hearted, he could always see the good in anybody. Erm, so, erm, if ever one of my friends wanted some help, erm, he was always there ready to stand by and give them the support that they needed. And-and he always allowed me to welcome my friends back home, I-I could always bring anybody back home at any time and that was a wonderful experience because it made me really feel… Erm, it opened my heart to, er, to, in fact, the generosity which I, er, I think is very important in-in living an unselfish life and fulfilling life.
[00:06:02]

You had an older sister, three years older than you, did she look after you as well a bit?

[00:06:06]

In a way, I mean, we-we didn't-she wasn't really that mothering, I mean, I think, er, she was the elder one so she was the one who had to pioneer all of the changes as one grows up, you know, being allowed out in the evenings. And, of course, she was a girl so that was even more tricky for her, erm, but she paved the way for me to do all sorts of, er, overly generous things in terms of exploiting the-the way I could have fun in-with my life.

[00:06:31]

Again, you stayed in Surbiton because you passed your 11 plus, well done, er, and you went on to Surbiton County Grammar School. And Surbiton and Worcester Park are to me, the beginning of London because you drive up the A3 from Portsmouth or Guildford and suddenly, the buildings start, don't they? [laughs]

[00:06:49]

Yes.

[00:06:49]

At Tolworth, they just-they just start and then you've got the rest of London for another [unclear] miles until the-until the other end. So, you're in this very classical suburban environment, but as I say, with quite a lot of engineering about-around it, 1955, erm, 264 computers in the world. Erm, when you went to Surbiton County Grammar you immediately went into GCE O-Levels, maths, English, physics, chemistry, biology, geography, history, and French, that's erm, er, quite a big, er, quite a big spread, why?

[00:07:36]

Erm, that was just what the-the school did. I mean, you-you had to do English and maths, so, you had no choice, erm, until the, er, I guess it was really the first three years, you-you studied everything, including art and all sorts of other things. I was hopeless at art, I mean, I still am, er, but I had to do it. When you got to like, I think it

would have been the-the fourth year, I was slightly different because I-I somehow got into the express stream and did the 5-year course in 4. Erm, so, I missed kind of a year. But then you specialise, you either did science or you did art and if you did art, you did English language and you did all those, er, kinds of things. If you did science, you did biology and chemistry and physics. Erm, but I wanted to do geography, I quite liked geography and I-I also enjoyed history, erm, not so much from learning all of the dates and stuff like that, but from the lessons that history taught you. Even then, at that early age, I could sense that we never learn the lessons of history, history repeats itself remarkably frequently.

So, I did that, we all had to learn a language. Erm, in fact, when I first started, we had to learn Latin, er, because at that time, if you wanted to enter university or Cambridge or Oxford, erm, the entrance exam was in Latin, so, erm, we all had to study Latin, which I was completely hopeless at. Erm, in the end, we did-I did French because I had to do a language, so, it was really not by choice. And when I went in to study A-Level, I immediately dropped all of those things and just did, erm, pure maths, applied maths and physics, erm, although I did study German at O-Level then, I kind of felt more comfortable with German as a language to learn. French, I always found tricky but German had a bit more structure to it and I-I liked the fact that it was a little more structured than French was, it was a much more precise language and that kind of appealed I think to my personality.

[00:09:37]
You also joined the Cadet Force?

[00:09:41]
Yes. Apparently, that was because at that time, of course, when I was at grammar school, erm, conscription was still there a-a-and so, I figured, well, if I'm going to have to go in the army for-into the services for a couple of years, erm, I've got a choice between the army, the navy, and-and flying. So, I thought I don't fancy the army much because that sounds like a bit messy tramping around in fields and stuff like that. The navy, I can't stand ships or water, I can't swim, a-and I hate the thought of being on the sea so I thought that leaves aircraft, I like aeroplanes, er, we used to do aeroplanes spotting and stuff like that, er, so, I like the aeroplanes so, I thought the

lesser of the three evils would be to be conscripted into the air force, so, I thought the best way to ensure that I might be more favourable to that would be to join the air-the air training corps. Er, so, I figured that even in the bureaucratic nature of the governments, they probably might give priority to someone that had some RAF type of experience, although that is never a guarantee, er, in the way our bureaucracy works, you know, the fact that you can fly an aeroplane, means you're probably assigned to the er, erm, the-the-the- the logistic corps in the army or something, you know, nothing to do with what you're good at and can do.

But anyway, I did that and er, unfortunately, in the year when I might have been conscripted, er, they cancelled it, so, I was the first group of people that didn't actually have to do it. But I enjoyed the ATC, er, it was an incredible experience.

[00:11:17]
Did you enjoy sport?

[00:11:19]
No, I hated sport. Erm, I had an ingrown toenail in my first year at grammar school and I managed to make that excuse last the whole of my seven years at grammar school. So, in the end, they just said, "Oh, Penn's not doing sport today, yeah, he's got a medical excuse" and I would hide away in the corner there keeping my head down being quiet until the end, I became a piece of the furniture. So, I just was left in the corner there when they went off to do rugby and things like that. Er, and I was quite happy because then, once they had all gone, I could sneak out the back door and go home.

[00:11:45]
You started to play in bands.

[00:11:47]
Yes.

[00:11:48]
Your-your music interest.

[00:11:51]

Yes, I did, a-a-and it became, er, erm, ultimately, a parallel career, er, I mean, I think, erm, I can't… I must have been about 13 or 14 when erm, my cousin, an elder cousin, she would have been 18, or thereabouts. Er, she-I used to go down her house every Sunday and she didn't live that far away and er, she played these records, which I had just never heard, I mean, it was Little Richard, and-and Jackie Wilson a-a-and, er, and Gerry Lee Lewis and Elvis Presley, and-and it was just like wow, who opened the door and let the light in? I mean, it was just like unreal because, at that time, all you heard on the radio was Vera Lynn, and-and all these people here on housewife's choice and forces favourites and-and-and everything else. It was so sterile and suddenly, this explosion of music er, just flooded the-the atmosphere and it was amazing.

So, I think we all then started skiffle groups, er, because that then became a bit of a craze. You could get a broomstick and a piece of string, and-and a washing board and some thimbles, and-and-and you could become a group, and so, we all started skiffle. And that eventually, then, of course, the British rock scene started to come on to the fray with people like, erm, Marty Wilde, Billy Fury. Oh Boy! was the big thing back that, that was a major TV show, where all of these erm, English rock stars, erm, they were part of a-a stable by a gentleman called Larry Parnes and he named all his singers after various sins and virtues, like Georgie Fame, Billy Fury, Kitty Pride, Vince Eager, erm, they all had these kinds of er, surnames associated with them. And they all played on this Oh Boy! Show which was like non-stop music from beginning to end for a half an hour. Cliff Richard er, was one of those early people there and he had his early hit with Move It, and-and then his backing group became known as The Shadows and we all wanted to be the Shadows, er, a-and so we did and so, that-that I think inspired a lot of young kids back then, er, to actually join groups and become part of the-the pop scene in that day. We were rubbish, of course, back then, erm, but we did win the local competition in Kingston.

[00:14:11]

Laughs.

[00:14:12]

Erm, The Battle of the Bands it was called, erm, and-and then on really, it just grew a little bit there, and in the end, er, when I was erm, finishing my senior school, I was in a band in London which was actually professional, and, er, so, I was managing to sort of keep my-my school work, my day job, my school work, erm, and erm, my music together because most of the music was London-based back then.

[00:14:40]

You, erm, decided to go into further education, your parents hadn't been in further education or higher education, why did you decide to do that?

[00:14:47]

Erm, partly, it was, erm, encouraged at school, I mean, it was expected, it was expected that you go to university. Erm, and partly because, I thought well, this is one way of, erm, legitimately avoiding not actually having to get a real job. So, it meant that I could still carry on with my music a-and still study at the same time and I was interested, I mean I like taking things apart, my dad was, he was always fixing things. The first thing that we did when he bought something new was take it apart, much to the horror of my mother, er, who saw this brand-new piece of equipment suddenly in pieces on the kitchen table, erm, but I enjoyed that. So, I thought… And I like electrical stuff, I was beginning to get involved a little bit in electronics, although it was terribly primitive.

It wasn't electronics back then, erm, it really was electrical with valves and stuff. Erm, electronics was-was interesting because the transistor was just about there and the first transistor radios were there, er, but, I mean, we never believed that they were real. We always thought, how can anything that tiny actually work, it must be a confidence trick, it's all a big con, you know?

[00:15:45]

Laughs.

[00:15:42]

So, it was like a big disbelief between it can't possibly work, it's too small, kind of thing, but I thought okay, I'll-I'll, I wanted to be in electronics, I wanted to study that,

I was getting interested in it, in a very primitive way because I didn't really understand it that much, nobody did. Erm, but I thought I wanted to do this and-and so, I decided that I would go into an engineering type of degree. Now, my school hated that, I was the black sheep of the family because I wasn't going to go to a red brick university. So, they disowned me, once I said I wanted to do engineering, that was me, I was persona non grata. Erm, but I did find a course in the UK, er, which did electronic engineering as a syllabus as opposed to electrical engineering, and er, one… There were two actually, one in Manchester and one in London and I chose London for obvious reasons, er, that's where my second life was and-and so, I-I did that and I did what was called a sandwich course back then.

So, it was a six month period of study and six months working in industry and I was—That appealed to me, er, because I thought, first of all, it's a break from the studying a-a-and a break from work, I mean, I-I could manage working for six months and then I could have a holiday for six months while I went to-back to the studying bit. And likewise, when I got bored with studying, I could go back and have fun in-in the day job. So, erm, that works out well, and I managed to get the sponsored, not sponsored, I didn't get sponsored, I was independent, er, but I managed to get part of the Vickers a-apprenticeship scheme, they took me on as an independent, er, which meant I could also continue my interests in aircraft. I was still in the ATC back then, and, er, and so, I could actually still… I had a very good apprenticeship course along with British Telecom or-or the Post Office, as it was then. Erm, they have really good apprenticeship courses there, so, I dovetailed onto that, er, for the first two years of the course.

[00:17:40]
Erm, Vickers was-was based where?

[00:17:42]
They were based in Weybridge, that was where the factory was and just across the way in Wisley was where they had the airfield associated with it. So, the aeroplanes were actually built in Weybridge and as soon as they could fly, er, they hopped over the railway line a-and flopped down into Wisley, which is now a garden centre sadly. Erm, near, Brooklands racing track, so, erm, it's still a lot of history there, er, steeped

in it but there is nothing much left of the old, er, Wisley aircraft factory there; they hopped over there to be finished and that's where they did all the finishing type work and everything else.

[00:18:26]
What were they making?

[00:18:28]
At that time, er, they were building the VC 10, which was the-Britain's answer to the Boeing 707.

[00:18:35]
Coughs.

[00:18:36]
And it was a lovely aeroplane, very sleek, it's still beautiful when you see pictures of it today, it's one of the most beautiful aeroplanes, I think, that has ever been built, along with Concorde. Now, Concorde hadn't started back then, erm, but it was on the drawing board and erm, a-a-and they were building that at Weybridge. Er, they also had… Erm, the one of the-the V Bombers was also being built, but that wasn't built at that factory. Erm, and they were also building the-the TSR-2, which was a striker reconnaissance aircraft, erm, in competition with the USF-111 and that was just being built there and, er, the very first two prototypes were actually, had been moved Boscombe Down and they were undergoing their initial flight trials and things like that. So, and BAC 111 was just starting to be built, erm, when I left.

[00:19:25]
And what were you actually doing there?

[00:19:26]
Well, the first year, I was basically doing a short circuit of their apprenticeship course, so, we started off in the machine labs there, er, making things out of lumps of metal,

we did a lot of other kinds of basic elementary mechanical-type skills, erm, learning how to do design, doing a few drawings and stuff like that. And then the second part of that there, I was actually in Wisley, erm, actually working with the groups that were, erm, doing the-the-the-the refurbishing of the aeroplanes before they were delivered to a customer. So, they could only just fly, and literally, they had only systems in them that would just simply take them across the-the railway line. And so, I ended up wiring the aeroplanes, I ended up doing all sorts of things on there, a-a-and towards the… I-I mean, I was good, the-the—I used to-I was assigned to two people, and I spent my lunch hour reading all the manuals, I wanted to figure out how this this worked.

So, I knew every solenoid, every relay, every pump, every actuator, I knew it all off my heart. I knew the fuse lumbers, I knew the whole thing and when something went wrong, I was the guy that said, "Oh, you want to change fuse 602, it's in the underground hold next to the galley." And they looked at me and they gasped then, "How the hell do you know that?" I said, "I read the books" okay.

[00:20:30]
Laughs.

[00:20:31]
And of course, and then I'd crawl up into the belly there and said, "switch, pull the switch" you had to shout back then because there was no other way of communicating. And er, I'd say, "Yeah, the actuator is running so, it's not that, okay, we-we will do that there—" And so they left me alone, I used to do these things by myself. And that is where I nearly destroyed one of the planes.

[00:20:47]
Tell me.

[00:20:48]
Well, the British tradition back then, was the tea-break, so, the whistle or the-the whistle would go a-a-at 10'o'clock for your 15-minute tea-break there. And I was assigned to do this experiment on one of the VC-10s, and it involved setting up this-

this fairly complex piece of equipment in-in the, what is the loading bay, where they used to put the suitcases. And I had it all connected up and I was just about ready to do the test, which involved heating this liquid in-in some kind of a glass jar, and then taking some electrodes connected to that into some other measuring instrument and taking a whole series of measurements. Well, they blew the whistle just as I had switched on the jar and I thought, eh, it's tea-break time. So, I leapt out of the hold and went off for my tea-break there, forgetting that I had left this liquid, erm, heating itself away in the baggage hold. Of course, when I came back 20 minutes later, the whole of the aeroplane inside was covered in this white fumed smoke in there and I thought, oh, my God, what on earth have I done?

So, I legged it in there quickly a-and tried to brush all the smoke out of the door, turned it all off, brushed all the smoke out there and then walked away and thought, well that's settled down [laughs], they'll never know it was me, yeah, right, of course, they'll never know it was me. Er but fortunately, erm, I was saved by the fact it didn't catch fire.

[00:22:26]
That was a very erm, good type of education, erm, these sandwich courses because you have the academic work the theoretical work, then you have the practical work and you were dealing with both alternately, but then applying the theory into the practice and the practice was testing on the theory.

[00:22:51]
Yes, I think they were very good, er, I-I-I really was… I think it was a sad thing when they stopped doing them because, er, it really did give you a much breadth of insight. And you were much more employable and at the end of it, erm, you were-you had a practical education as well as a theoretical education, so, you ended up with… I mean, it took four years, erm, so, you-you-you had a little bit longer to do because, erm, you had two years in industry in the end, and two years in academia. A-and the two years in academia was a full two years, so, er, you didn't have these long holidays, I mean, it really was just simply, erm, a-a straight on, you-you left work on Friday and you started back at the university on the Monday. So, you could easily condense a-a three-year course into two, er, without, er, compromising the agenda a-at all in any

way whatsoever. So, I think they were-they were incredibly valuable, they were marvellous for your work ethic, it gave you a much broader, er, view on life, you were wor… I was working with real people in a real factory a-a-and-and-and you know, these were-these were good solid, er, people. I learned how to game the system and a whole bunch of things that you-people did back then in-in industry, erm, you know. Erm, it was fun, it was good and it was eye-opening, a-a-and it was character building to a really great extent. I-I never regretted that decision one second.

[00:24:06]
And you went to, erm, Borough Polytechnic, where was that?

[00:24:10]
Erm, in-in the Elephant and Castle, South Bank, it's now called the South Bank University. Erm, it was an interesting institution, it was called a polytechnic back then, then it became something else when then they decided that names were important, erm, but we had a lot of, er, prestigious people that actually studied there. A-a-and it was good, it was a very, erm, very old-fashioned, it was very-it wasn't red brick, you couldn't compare it to the red brick universities in that same status way, er, but from a point of view of the education you got there, er, it was outstanding. I mean, there were 13 of us on our course so we really, really got, erm, personal attention from really top-notch professors, er, many of whom, er, wrote books, pioneering books, leading books on electromagnetic theory, on semiconductor theory. Erm, it really was, erm, staffed by good people, erm, who-who took a care and interest in-in their students.

[00:25:06]
So, you-you passed that, you got your BSD honours in electronic engineering and, erm, you needed a job now, why didn't you go to Vickers?

[00:25:19]
Ah, well, unfortunately, my-my time at Vickers was, er, prematurely terminated in the, er, just as I was about to go in for the third year of that course. Erm, the TSR-2 programme, er, was cancelled by the government, the-the Conservative government, er, pretty much supported it, er, but they lost the election and the-the new government

was Labour and-and they didn't support it, and they cancelled the programme. And, er, erm, Vickers had to let go or they decided they had to let go or out of spite, they let go, it's hard to know really, but in retaliation, erm, I was erm, was cancelled, I was chopped.

So, here was me, erm, lined up to go there and I had to find a-a replacement firm. So, I got on my little moped and went around the electronics companies in the whole area then and there were quite a lot, there was Decca, there was a whole bunch of companies. I had a shortlist of about 13, and I ended in New Malden, erm for a company called Venner, er, and they were famous for time switches and parking meters. They were one of the two parking meter factories.

Erm, it was run by an Austrian a-aristocrat, erm, who played polo and things like that, and he was making a fortune out of parking meters and time switches, I mean, the whole shop floor was full of machines stamping out little discs, brass discs, er, to make up the timers. But it was quite visionary in a way because he figured that electronics would eventually destroy his timekeeping business, er, because they would all be going electronic one day. So, he set up an electronics lab, quite a small lab, there were only about 15 of us in-in the whole laboratory, erm, but it was quite visionary and they were making a lot of test equipment for the British Post Office at that time. Erm, and, erm, so, they gave me, er they-they-they allowed me to continue my six-months erm, study there and at the end of the second six months, they-they said, we'd like you to stay on. Er, so, I joined them full time as an electronic design engineer.

[00:27:25]
There's erm, [coughs] there was a roundabout near here called Shannon Corner—

[00:27:31]
That's exactly where they were.

[00:27:30]
Because Shannon made gyroscopes, they've still got, erm, Decca was around here, wasn't it?

[00:27:36]

Yes, yeah, we were right on Shannon Corner there, right in there, tucked in. Er, the [unclear] w-wasn't there back then, but it, er, they built that after I left, it was just a roundabout, erm, but yeah.

[00:27:46]

[unclear] was on one side, printing banknotes, erm, Decca was there, testing, erm, testing their radar; Shannon, who else was there, I can't remember, was Plessie there ever, maybe?

[00:27:52]

Yes, Plessie was there at one time, it was-it was-it really was a hotbed of-of small, er, electronic companies, er, big ones with small divisions there, erm, it was a very f-f-fragmented, er, structure back then.

[00:28:09]

The only thing left was Grumman Northrop.

[00:28:12]

Grumman Northrop, yes.

[00:28:14]

They-they took that over, erm, [laughs] where-where the, erm, where the banknote printers are is a Tesco, and erm, where the gyroscope company was, erm, is a-a B&Q I think.

[00:28:28]

Right.

[00:28:30]

That's what's happened to it. You stayed there for three years, were you involved in management?

[00:28:40]

No, at that time I was just a-a lonely design engineer designing counter timers and stuff like that for the Post Office. Everything was on a contractual basis, er, the Post Office would put out a bid for maybe 100 or 200 units or something and you know, we'd put in a bid for it and if we got the order, you built them to order. So, I stayed there, er, during that time, and eventually, I was building… I virtually, at one time, we built a clock, which went into the, er, the QE2, erm, erm, it was just simply a timer. And now, I was building a few other bits and pieces, and I started to have to go out to demonstrate these potential customers, erm, which was another eye-opening experience because suddenly, it opened my eyes to a different part of the world, instead of being tied to a desk.

You used to go out and have lunch, and lunches were down the pub, so, I thought this is a good deal, I like this kind of life and the guy that took me there had a company car and I thought, oh, I like this, it's a Cortina 1600, I thought wow, this was pretty top-notch back then. So, I-I kind of thought, I like this side of the thing here and-and that kind of, I think planted a little seed in me that there was more to life in being a designer, be-because quite frankly, I wasn't that good as a designer and the big challenge was, they had to work and m-m-my designs never worked and after a lot of trouble I finally got them to work, erm, but I wasn't a natural-born designer, that's for sure.

[00:30:11]

Erm, you then went to ITT semiconductors. Now, ITT erm, was by then a massive conglomerate, erm, which was spun out from AT&T, erm, when it was broken up, erm, and they had international telephone networks, erm, outside the United States. They had manufacturing of telecommunications equipment, they had hotels, did they not? Erm, and it was run by a man named Geneen, I believe?

[00:30:43]

Harold Geneen, yes.

[00:30:44]

Erm, who, whenever he went around the world, I heard the story, he re-he remained on American time, so, he didn't have jet lag, and so, the local executive [laughs] had to suddenly switch to American time to have their meetings with him. Erm, what was the culture of ITT at that time, when you joined in 1969?

[00:31:04]

Well, I mean, the-the factory in Foots Cray near Sidcup in Kent, er, was an old STC valve factory and er, so, it was kind of a weird place because it was sunken into the ground, erm, on the basis that it would not be damaged as much i-i-if a bomb struck nearby. A-and it ran next door to a river which regularly flooded, er, so, that always caused some interesting sort of diversions, er, in-on the factory floor when the river poured in, er, onto the shop floor. Erm, but it was very much an old England type of-of factory. Er, the semiconductor part of it, was a natural progression from some of the earlier work they were doing on silicon, or germanium, and-and-and rectifiers and things like that.

And, erm, so, they started to make, erm, both small-signal transistors, and eventually, integrated circuits because ITT, had an arrangement, a joint venture… Not joint venture, but a technology exchange er, with Fairchild Semiconductor. And so, we manufactured Fairchild's DTL range of integrated circuits and then, that led to the development, not through Fairchild, erm, but independently, and they moved on to copying the-the TI Series, 74 Series-TTL circuits there. And when I was joined-when I joined, it was very much making transistors, diodes, and DTL integrated circuits.

And I responded to the advert that basically said, erm, are you a design engineer, interested in getting into a-a business with customers, erm, can you interface with the factory, to tell the engineering what parts the customers want? And this, that, and the other and I said, "Hey, that ticks all my boxes." Er, so, I went for the interview, and, er, at that time, we were in the middle of a market boom. Now, people think that the current semiconductor boom that we're living through is quite unique, well, it's not, I mean, there's been 18 of these booms and I've lived through all of them. Er, so, I joined in this boom here. So, they were hiring, and-and, er, and I got the job as a product marketing engineer, for TTL integrated circuits and I liked that because they

were new, er, and they were—and it-it was all pioneering-type stuff. And that appealed to me, I didn't want to do anything that was established and boring, I always liked to do the stuff which was new and-and exciting and-and a bit more creative. Erm, that-that suited me down to the ground.

So, I joined and the day I joined, I walked in and the man who interviewed me, had left. So, I mean, having him told me three weeks beforehand, that this was the best company in the world, this job was fantastic, the opportunities were amazing, I turn up and they said, "Oh, he's left for a better job, er, with TI in Bedford." So, I thought, oh, this is great, so, this story he told me was, hah, was lacking in substance somehow [laughs].

[00:33:54]
[Laughs].

[00:33:57]
But it was good because I mean, you then… I was by myself so, you say, oh, well, I better do what I can do, you-you literally made it up as you went along, erm, it was a tremendous opportunity.

[00:34:06]
And you started to visit the United States?

[00:34:09]
Yes, I mean, that was the one thing about it also, this wasn't why I took on the TTL franchise, it happened to be a byproduct, but, erm, because I was-was responsible for this product line. We were the worldwide centre, er, for this particular product line, and, er, so, I was, er, invited to join a sales meeting in the United States, erm, to go over and, er, explain to the-the people there what we were doing and the project plan and everything else and get them all psyched up, er, to start selling this stuff to where the market was. I mean, the market was much more in the United States than it was in-in Europe or the UK.

The real big market at that time was telecommunication exchanges, telephone exchanges, so, er, but these were simply electronic versions of the old Strowger exchanges so, they still occupied street corners, big buildings in street corners full of big racks of equipment. Er, the only difference was that it had a-a-a kind of electronic switching connecting the cables together er, rather than, er, rather than a Strowger switch or something like that connecting the cables together. So, I went to America—

[00:35:41]
What was your--?

[00:35:42]
Miami, Florida, erm.

[00:35:43]
So, what was your first impression of America?

[00:35:46]
I-I-I was just, erm, I just couldn't believe it, I mean, I'd never seen anything like it in my life before. It was big, brash, ugly, it-I mean, it was just en-it-it just oozed energy, and-and you thought, what-what am I doing here, I mean what planet am I on? Erm, it was just amazing, I mean I just hadn't appreciated what it was like but it was just incredible. People were so confident, erm, people were so gung-ho, erm, the world was their oyster, nothing stood in their way, erm, it was always just… It-it was an amazing experience.

[00:36:16]
And of course, you were at the home of rock and roll?

[00:36:21]
Well, yeah, not so much in Miami, Florida, I mean, that wasn't really the epicentre of rock and roll [laughs], it was a while before I got out to Memphis or to, er, to some of those places, or Atlanta, er, where, where, I could see some of the—where my heroes were born. Erm, but, certainly, erm, yeah, it was a-a-a r-rock and roll country and then, of course, back then, you had these monstrous American cars with the chrome

and the big fins and everything else. And, erm, I mean, brash was better, I mean the brasher it was, the better it was and it was-it was awesome, it really was amazing, it-it was incredible. And it was so affluent, I mean it really was incredible, and from… The UK was still pretty, erm, pretty tired, erm, back in that-that early part of the day. I mean, we had-- the 60s were, had changed-- started to changed and all that, erm, but it was still poor in relative standards compared with America, and they were so advanced in their consumerisation.

Back then, it really was the consumer-led society, service was everything. You walked into a restaurant, a glass of water was on your table before you even sat down, erm, it really was very service-oriented and-and, er, and-and lots of er, consumer-type things to buy.

[00:37:25]
In January '73, you get promoted to manager, product marketing manager, does this mean you have to manage people now, Malcolm?

[00:37:32]
Yeah, three people, my God.

[00:37:33]
Three people [laughs]what does the Malcolm think--

[00:37:37]
Yeah, then I had to learn some people skills, erm—

[00:37:38]
What does Malcolm--?

[00:37:38]
It was not too bad because, I mean, I think at the end of the day, we were a good team and erm, we all had our work to do. I mean, er, from the very early days, my management practice has always been to empower people, let them get on with their jobs, not expect me to tell them what to do. There's no point, I think if-if I'm

supposed to tell you what to do, why do I need you? You know, I mean, my job is, for you to do what you need to do and to tell me what you need, to get your job done better and see if I can-can help facilitate that. So, I never try to be an overbearing kind of manager, erm, and-and so, we-we got on quite well, it-it seemed to work out.

[00:38:12]
Are you good at firing people?

[00:38:14]
Firing or hiring?

[00:38:15]
Fire, fire, bang.

[00:38:17]
Fire? No, I hate it, erm, it's never nice, I mean, even if they need firing, erm, it's still never nice to do. Erm, but at some point in time, erm, either because, erm, they-they have to go, they're not contributing, it's unfair to keep them. So, erm, you know, it's unfair on them and it's unfair on the rest of the people that are left behind because there is nothing more demoralising than a passenger being tolerated er, when everybody knows that they are incompetent and not doing the right job, er, and you not facing up to the issue there. So, you just have to be objective about it and be kind, erm, but you have to be factual and-and direct, I mean, don't linger on it, explain the reasons and-and-and-and yeah, you have to get on with it. It should always be, I think, a very fast process you know, there is no point in firing someone and saying, "Well, you can work out your notice" I mean, to a certain extent, you have to get rid of them and immediately, allow them to leave the premises and-and work off their notice at home.

[00:39:30]
Mm-hmm. By this time, you were also dealing with microprocessors.

[00:39:37]

Well, that was a bit cheeky, erm, because, erm, ITT wasn't really in the microprocessor business, erm, but we had designed this circuit for Servis washing machines, er, back in the-the mid-1970s. And er, this was an electronic circuit in, er, which was designed to replace the programmer. Erm, you had this programming thing with buttons and a dial, er, which set up the-the washing cycle. And, er, so, we designed an electronic replacement for that, and, er, it was reasonably successful, I mean it did work. But Servis was tiny, they were a very small, high-end market company and we wanted to expand that to a broader market, so, erm, we, er, we bought the Copywrite from them, so, we could sell variations of that to other customers, not their particular version of it, of course. Erm, but it was really a programmable-a pre-programmed device as opposed to a microprocessor which was programmable.

Erm, so, I took it to America and I said, we're going to go visit Maytag and-and all these big, GE and the big Fairchild, er, not Fairchild, erm, the big washing machine manufacturers, er, to try to get ourselves designed in. And-and Mallory was the company that made all the-the timer switches for them. So, we've sat down around the table and said, well, how are we going to do this? And they said, I'll tell you what, let's call it a dedicated microprocessor, er, because microprocessor was the big word back then. So, every… If you said it was a microprocessor, that opened doors. So, we said, well, this is a dedicated microprocessor, dedicated to the appliance industry. A-and we went out on that-that bandwagon, and-and we did, we got designed in. We converted an American washing machine er, with one of our switches in there, and tramped around the mid-west with this thing in the back of this estate car, wheeling it into GE, setting it up in their laboratory there and plugging it in and showing them their machine working with our controller in it. And it was awesome, it really was fun [laughs].

[00:41:31]
And you sold a lot?

[00:41:32]

We sold a con-we got a contract with, erm, with Mallory, erm, to do it, and, erm, with Maytag, er, to do it there and-and then the whole thing went-just went sadly wrong, we-we hit a recession, and-and the programme got cancelled and-and we lost everything. It was too early, to be frank with you, Richard, I mean, the-it was very hard to compete with the electronic timers that-that Mallory were turning out there, and er, and it wasn't really that robust enough. I mean, you think about it, er, washing machines work in hot steamy atmospheres, and that's not an ideal environment for an integrated circuit. Erm, there was ceramic, erm, to give it a bit of a head start, er, but it-they worked okay, but we couldn't really meet the cost price that was aimed at. And so, when the recession hit, erm, the programme just got cancelled.

[00:42:18]
And you were promoted to UK Marketing Director in June 1975, tell me about that?

[00:42:23]
Yes, so, now, I took over all of the products being made at Foots Cray, a-a-and, er, that is when we-we do-we had started the memory programme back then, that was one of my programmes, and, er, we became, er, the worldwide centre from that. And that actually was being run out of New York, so, er, I had to-I had regular meetings in, er, in New York, at headquarters there, for this programme, because it was a-a very high visible programme, high profile programme.

[00:43:23]
IC Test Manager, you became that [coughs], also, at Foots Cray, and then, erm, here's a weird title, Director of Special Operations.

[00:43:31]
Yeah, well, I think I complained so much about the factory when I was m-m-mar-marketing director, they never delivered things, always late, always on-never on time, always making the stuff we don't want and not making the stuff we do want. And in the end, I think they got so fed up with me, they said, "Well, you do it then, if you think you can do any better." So, suddenly, I found myself on the other side of the fence in operations, and I thought, well, hmm, okay, interesting. And the first job

they put me in was tests, I-final test. And Richard, that is the worst job I have ever, ever, had in my life.

[00:44:03]
Oh, God.

[00:44:05]
It was awful, erm, you were hated by everybody. You were hated by the factory because you throw away things that they've built and say they don't work, you are hated by the-the marketing people because you stopped them selling the parts there, you know, you're the gate, until they've gone through you, they can't sell it. You are hated by finance because they can't invoice it until there is a part there to be shipped. You are hated by everybody, and of course, everybody is late in their operations schedule, so, the parts never get to you until like, five or six days later in-in-in the cycle and then you're expected to make that up, erm, because you're the last [unclear] there.

So, I mean, it's a losing game and it was horrible, it was the worst ever job I've ever had, I hated every second of it, but I did good, I got it organised a bit better and we-we… But, and then the said, "Oh, you're doing so well, we-we'd like you to work directly for the Director of Operations in a firefighting role, er, so, er, we'll put you in charge of setting up a task force to go in there and sort out operational things when they're there." So, erm, that was a bit more fun, but, erm, it-it was okay, I-I learned the other side of the fence, er, which was, erm, a humbling experience to be on the other side. It's easy to moan about a factory not doing what you want them to do, but when you're on the other side of the fence, erm, you begin to realise, the-the-the challenges associated with it.
[00:45:14]
Erm, you only lasted a year as Director of Special Operations and then, er, you went to erm, to Brussels.

[00:45:21]
Yes. I mean that was, erm, that was a-a-a move where they actually took me out of that job there and said, "We want you over here" erm, because, at that time, ITT

corporate was building, er, what they called the System 1240, which was the world's first software-controlled electronic telephone switch. Er, so, this was really quite advanced for its time, it used erm, advanced microprocessors, the most advanced ones that were available at that time there. And it was completely software controlled. So, er, a-and this was a global programme because as you said at the beginning, erm, ITT had factories all over Europe as well as in the United States. So, the design centre for this was actually the United States, but the design was sub-contracted out to the factories.

So, in Europe, we had all of the ITT factories whether it was Bell Telephone in-in Belgium, erm, er, CQCT in France,[unclear] in Madrid, er, all of these factories, here, there were about 13 different locations throughout Europe, er, which had responsibility for parts, of the design and-and the manufacturing of those parts there. And the whole thing had to be coordinated so that it all fitted together. And, erm, and they said, "You're the only guy that we know that knows anything about, erm, advanced electronics, semi-conductors and microprocessors, and, er, you seem to understand this, so, we want you to put in a-a-a programme which coordinates, erm, the engineering activity, which circuits do we choose, which manufacturers, through the approval process, with the purchasing people that basically said, "I'll buy what I want to buy from whoever I want to buy it at the cheapest price", er, to try to get some sort of configuration control over this very complex system.

So, I was challenged to setting up the system to bring these people together, er, to agree on erm, the fundamentals of component engineering, like, which microprocessor shall we all standardise on; which microcontroller, er, which memory, which whatever? I mean, erm, and then, you had to… Back then, I mean, they had this very formal approval system here, which was all paper-driven a-and by the time you had written the spec it was out of date because the diod had been revised five times and you were on to the next generation part. So, the purchasing people, it was anarchy, I mean, they just said, "Well, there's no spec and there's no one approved, so, we can go and buy from anybody." So, we had to put a stop to that, so, we put in some very pragmatic er, procedures, er, for actually putting a degree of control on there. Er, we introduced a concept of self-certification whereby the component

engineers, self-approved themselves a-and showed to us the data which meant that these parts met the reliability criteria.

Er, it was quite radical at that time, erm, but it worked very well, and er, at the end of that, er, two years, we actually had the purchasing and the engineering groups working incredibly well in harmony. And we had the first computer system, electronic system back then, and I remember the first time we did it, we had a handset where you plugged the hand-the phone-the phone handset into these rubber kind of suction cup things, and-and the modem went over the telephone line. You had to dial it up first and whip the handset down quickly er, while the two ends talked to each other, and-and then they could access the database that we had set up on a Wang word processor in the beginning. I mean, we turned this Wang into a-a-a data centre, er, for documenting all of the parts and the attributes of it, just using what today, you would call an Excel spreadsheet, it was done in a table, it wasn't a spreadsheet back then, they hadn't existed. Erm, but it worked, and it-it was practical and it was useable and it-it-it brought some degree of-if control, er, to the whole system there. So, that was- that was a good challenge.

[00:49:19]
But you're dealing over a large number of different cultures, okay, you've got an IT&T culture, but also, you've got a Spanish, a French, a German, a Belgian, etc.

[00:49:33]
Yeah, that was fun, and even [unclear] for me, but [unclear] would not talk to [unclear] okay? I mean, it was-it was like, the two sides just would not talk to each other. And-and you had a situation whereby, but if, if the Germans were going to do something one way, by definition, the Belgians would do the opposite, they would not agree. I mean, erm, so, we formed, erm, a-a-a component engineering workshop group, which I can't remember the exact name we called it, a working party or a working group. And I got these people together, and, er, and the first meeting we had, I just got them drunk. We sat down, we had a meeting, we went out to a-a-a-a Greek restaurant in London, and, er, I fuelled them up with wine, we were throwing plates, in the corners and stuff like that and got them completely drunk.

We had the meeting the next day and I said, "Right, this is what we'll be doing guys, okay, this is what we're going to do, how are we going to do it. And, and eventually, I wore them down and got them talking to each other, and they-I kept it very objective. I said, "Here's the objective, okay" I took out-I tried to de-emotionalise it, took out the emotional aspect of it and said, "Here is what we're trying to do, okay, how are we going to do it, what's the best way of doing that there? We need a microcontroller, we can't have 10, how do we whittle it down to the-the-the best compromise that we can all live with?" A-and-and tried to encourage them to focus on the problem a-a-and not on, I want this device because I like it and you're not going to use it because, you know, I don't trust you and I wouldn't let you use any part of that programme or approval programme because you won't do it right. Erm, eventually, er, and then I starved of funding as well because I thought, if I starve them of funding, they're going to have to work with each other.

[00:51:11]
[Laughs].

[00:51:11]
Because they're going to have to—[laughs]

[00:51:12]
[Laughs]

[00:51:16]
So, I made sure they didn't have enough funding to do it all themselves, they had to cooperate horizontally. A-and then they learned the benefit of trust and they learned that actually, if two of us are working on this, oh, we can actually get the same amount of work done and more because, er, you know, one plus one really did equal more than two.

[00:51:32]
And you jumped out of all of that into Dataquest in 1982 to Cupertino, tell us about Dataquest?

[00:51:40]

Yes, erm, I went through a lot of soul searching in-in a way. I've known Dataquest from my ITT days, because when I was running the memory programme, er, Dataquest semiconductor group, which was really the heart of Dataquest started, erm, doing memories—Doing a memory research programme, erm, and-and that… I think that was because it was very well-bounded and easy to get your head around. Erm, so, I was a memory client of theirs, er, using their reports, and then when I transferred to ITT Europe, I used all that data, I took it across with me, I took the subscription across with me and became a-a-an end-user, user of the Dataquest type of material. Kind of a—gamekeeper turned poacher sort of relationship and I was looking at it from a purchasing point of view now, rater than a-a-a selling point of view.

Erm, but I was a user of the data a-and quite frankly, I think I was probably the only person in Europe that Dataquest knew, erm, because I had been a client of theirs for like, six or seven years. Um, and they wanted to open up a European research activity to tap into the European semiconductor industry and market and they asked me if I would take on that job. And initially, I thought, well, I'm not sure about this, I mean, I could do market research because I had done a lot of it in-in ITT, erm, but I wasn't quite sure that it was the job, a real job. Erm, and then they interviewed me and, er, the interview was in New Bond Street in London. So, I drove up from Foots- no, I drove down from Harlow on that one, I was in Harlow, er, at that time. I used to commute between Harlow and Belgium, Brussels.

I drove down from Harlow, which isn't the brightest town in the world, down Bond- New Bond Street, and I looked around and I thought, oh, this is interesting, I could quite like working here. And er, we went out, we went out for dinner, had a very nice dinner, and they explained to me what it was and everything else, and in the end, I thought, hey, it's worth a risk. If the worse comes to the worse, I can go back in-in- onto the other side of the fence and erm, I went out and they had already sold the subscription to 13 clients in Europe and they hadn't got a single piece of paper written yet. Erm, so, they had sold the subscription on the promise of within two years, we'll have the service up and running.

And, erm, I mean, I think for the first six months, they wasted completely doing absolutely nothing and then, I joined maybe about nine months into that-that two-year cycle, and I went round to see all the people there and they said, "Well, you know, we're expecting great things, Malcolm." Er, er, and I thought, okay, fine, er, and but, you know, never one to decline the challenge, erm, we got stuck in and-and I had an assistant there and we started to build a database. Er, the whole concept that Dataquest at that time, was clients could phone in with questions, and I used to encourage that, er, most of the people in the US didn't, they hated it, they considered it to be an interruption. I didn't, I liked it because I thought, if you've got a question, then, I've got-I can find an answer to that, then I can make you happy and you'll be a-a-a good client.

So, I used to encourage them to phone in and it made me, it-it helped me build up a database because their question became part of a database, and gradually, I could piece it all together and then eventually, before the two years was up, we published the very first, erm, set of er, er, of database services. And-and, er, my 13 clients were deliriously happy and stayed with me throughout that whole time there and we built it into a very good service.

[00:55:16]
Erm, but you were based in Cupertino?

[00:55:20]
At that time, I was based in London.
[00:55:21]
Right, okay.

[00:55:22]
Er, I managed—yeah, my head… I was reporting into Cupertino, my boss was in Cupertino, and there you have the ideal scenario. I had a boss in Cupertino, who let me do what I had to do, he didn't interfere in the slightest, providing I delivered the reports and the newsletters and everything else, he left me alone. And I was working in New Bond Street. I thought, I mean, this had fantastic restaurants, wine bars, it had everything I wanted; shops I couldn't afford to shop in, of course, but it was beautiful.

And you know, y-y-there were no clients there, but you could say to a client, "Oh, come to the office, we're in New Bond Street" and go and have a nice lunch around the corner a-a-and things like that, a-a-and you would have a wonderful time. Fleet Street was down the road so, we had a good relationship with-with the press. So, it was an incredible environment to-to-to actually be allowed to, er, to do one's own thing.

[00:56:12]
Er, you were looking at, analysing and reporting the impact of what is called Moore's Law, now—

[00:56:30]
Yes.

[00:56:34]
It wasn't a law, it was an observation of Gordon Moore of what they were doing and what they might be able to do. And then, it became a road map, did it not? Now, I want your opinion, Malcolm, this is a-a tricky question, I hope I get it right. Erm, how far was this road map, erm, really turning Moore's Law into a normative thing, into that thing, that they would achieve because they had to achieve it?

[00:57:11]
What-what—Yeah, I think it absolutely was a critical catalyst in bringing it together because life was getting more complicated so, erm, as we were-even when I was there, life was getting a bit more complicated, I mean, I think, when I left ITT, semiconductors, the-the CMOS process, it wasn't even CMOS back then, it was nMOS. Erm, it was maybe eight or nine masks, erm, and it was gradually creeping up, CMOS added a couple more masking layers and-and then suddenly, we went into, er, double-layer metalisation, that's another couple of masks and things like that. A-a-and it was starting to get a little bit more complicated, so, you ended up that the industry had to be a lot more in line with each other because if they didn't all come together at the same time, er, it wouldn't work. So, I think that it-it very rapidly became the-the conductor of an orchestra, bringing all the pieces together.

So, it-it was a natural assumption for it to take on this role of being the heartbeat and-and the-the two-year kind of cycle that we associated with it, turned out to be one that was practically realisable within the resources of the industry without overstretching it too far, without putting in too much, er, padding in there. Er, still keeping people on their toes because it did enable a competitor to come in, er, you-you may have been the-the bee's knees at one, er, layer of deposition but someone would come in with a new way of doing it and take over that market, at the next layer there. So, it kept people on their toes, but it was the heartbeat, it was like the drum major, out there in front, and keeping everybody coordinated and I think that has been its real value to the industry.

Being able to double the complexity every two years is a given, I mean, that is what we're able to do, okay, so, it's a very important observation, er, I mean, it really was, erm, it took a certain degree of risk and analytical mind to say, hey, do you know what this means, it means we can do this? That was quite visionary, but to actually then turn it into the-the orchestra leader, the drum major, whatever you want to call it, I think industry did that, erm, it did it by its own accord and it became, hey, this is what we've got to do. We know in two years' time, we've got to be here, let's all march towards that goal. And it became self-fulfilling.

[00:59:23]
It also created a road map which was quite complex because it went back and said, okay, lithographics have to be here, yeah, erm, and machine has to be there, etc. you know, the FABS have to be there. And so, er, I was always surprised and-and erm, enchanted about the, er, the real quality of these road maps. Now, what happened to the European semiconductor industry, Malcolm?

[00:59:57]
Well, the semiconductor industry; when I, I mean, when I grew up in the semiconductor industry, it was highly fragmented, Europe was highly fragmented. So, every single country had its own national champion and it-not only in the semiconductor field but in the end-user application field. So, we had ICL computers, we had our own computer, our own telecom companies, Plessie, GEC, STC, erm, all of the big markets were, er, very much nationalised, nationalistic. And-and everybody

worked within their own market and er, whereas, the Americans didn't. Er, the Japanese weren't really a huge player at that time, i-in those days.

So, our market was tiny compared with the American market and, erm, and-and it wasn't sustainable and so, gradually, all of the European semiconductor companies were finding it harder and harder to stay in business and they all relied upon government subsidy, government support, er, to actually maintain some level of presence there. They were all losing money a-a-and it became a-a very difficult situation.

In the-I guess in the, er, the early 1980s, erm, er, three pioneers in Europe in particular, erm, decided that enough was enough [coughs]. One of the key people was Pistori Peshwari Pistorio, who was a-a-an Italian, actually, he tells you he is not Italian, he is Sicilian, er, which is a big difference if you are from Italy.

[01:01:37]
[Laughs].

[01:01:38]
Erm, so, he was a-he was a big wig in-in Motorola, he went over to Motorola, erm, in the very early days and worked his way up to run the whole operation there on-on the marketing, sales and marketing side. And, he was offered the job to revive SGS at that time. And he took the job, partly because erm, I think his-his family, his-his parents were getting old and he wanted to be closer to them, a-a-and I think because he-he is an Italian at heart, okay, so, he-he couldn't help not think, I can maybe do something with SGS. And at the same time, you had Jaques Noel, er, who did his career in Texas Instruments, and was hugely successful there, he then ran Thomson, a-and he wanted to do the same thing.

Having grown up with TI, er, one of the real, er, business leaders in the world in terms of how to run businesses, erm, very objective with the OST programmes and stuff like that, they're pricing-forward pricing concepts. And they-they did a lot of the pioneering work behind the business aspect of semiconductor technology. He felt the same way about, er, reviving Thomson and-and, er, in-in Siemens, erm, you had a

similar bunch of people, or one person there, er, in particular, who, erm, and Phillips, of course, don't forget Phillips, Kreichman, and he wanted to come in there and do the same thing.

So, there was this groundswell of unrest in Europe of the industry leaders at that time, wanting to do better. So, they got together, they started to cooperate with each other, informally, in the beginning, because cooperation is-could be antitrust. So, they had to be very careful about, erm, how they did it and the very first programme they did was called the Mega Project where they decided that Siemens would build a one megabyte, erm, S-RAM, no, Philips did the S-RAM, erm, Siemens did the D-RAM, and, erm, SGS, sorry, SGS, did the-the EROM, the-the-the erasable memory. And they worked together on doing that and then that led to another to JESI being formed, which was an official programme under the EU.

And I was with [unclear] at that time, and I helped them by organising a European semiconductor conference, or I got together all of these leaders in the same room, and-and-and got them focused on how do we revive the European semiconductor industry, what do we have to do? And it was very, very successful and by the end of JESI, Europe had caught up with the world in technology, and in fact, in certain sectors, they were ahead in technology, we had technology leadership. And now—

[01:04:11]
What did, just pause for a minute for the record. What did JESI stand for?

[01:04:17]
Er, Joint European Semiconductor Initiative.

[01:04:22]
Right, thank you, good.

[01:04:26]
So, it was an initiative, it was a European con, er, er, commission-led initiative and erm, and that gave it-that gave it the legality, er, to be a cooperative. It had to still be precompetitive. Erm, so, it had to be still at the research level, that is an important

criteria with a lot of these European programmes, they do allow companies that are competitors to cooperate with each other, but only as long as it is pre-competitive and doesn't then encroach upon the end market so they can't be accused of collusion and market for manipulation at the customer level.

So, erm, Midea was again, very successful, but erm, was, on an applications side of things, looking more end-market driven. Erm, but there were some people there were very instrumental, [coughs] in making that happen. So, they did, and they caught up and then we lost the plot, erm, and sadly, we lost the plot completely and-and-and everything fell apart. And at that time, ST was actually almost number one, number two in the world, erm, they were just-just, one quarter, I think they managed to be number two, and then they slipped back to number three. But they were really up there, all three of the major European manufacturers were in the top ten suppliers.

[01:05:56]
And now, they're not.
[01:05:58]
Now, they're not.

[01:06:00]
What about China?

[01:06:01]
China?

[01:06:03]
China.

[01:06:05]
[unclear] I mean, I-I've never been that closely involved in China, erm, to be frank with you. Erm, when I had to make a decision at the Future Horizons level, do I focus on China, or do I focus on Russia, erm, I rightly thought I chose Russia because I was given a project by semi, erm, to investigate the semiconductor capability in the former Soviet Union and Eastern Europe, er, when-when Communism broke down in 1989,

just about the same time as I started Future Horizons, that was one of my very first projects. So, er, within a year, I became the world's leading expert on Russian semiconductor and East European semiconductor technology. So, I kept that going, er, rather than er, working on China. Probably, with hindsight, not the good decision, er, to have made because the Russian semiconductor industry has gone absolutely nowhere in-in that last 30 years. Whereas China, erm, has become, erm, er, is on its way to being a very strong independent force in the semiconductor world.

[01:07:01]
Erm, in April, er, 1989, erm, you left Dataquest and formed your own operation, as founder and CEO, well done, of Future Horizons, basically carrying on, erm, your research and being a scorekeeper as I-as I like to say. Erm, you have a colleague who works from Russia or on Russia with you, don't you, in your operation?

[01:07:30]
Yes, I do.

[01:07:32]
What about—?

[01:07:34]
Sorry?

[01:07:35]
What about his future, given what's going on now?

[01:07:38]
Oh, well, [sighs] I mean, we do-what we do in Russia now, is much broader, erm. I don't know what the impact is going to be since the last week has-has happened, okay?

[01:07:53]
Yeah.

[01:07:53]

Erm, but we-we don't do that much work in Russia. We do a modicum of an amount of work there, there are still factories working, there are… Er, from a research point of view, design point of view, it is very strong. Erm, most of our work there is introducing people, finding relationships, bringing people together, erm, and-and-and stuff like that. At the individual level, I'm not quite sure what of that would be impacted in some way. I mean, the Russian intellect is very high, erm, they are an extremely bright engineering-centric people, they have an amazing ability to think out of the box and create, erm, novel, innovative solutions to problems. And I think partly, that was because in the Cold War, er, they were starved of Western technology. I mean, they got a hold of it because you always can, erm, but they had to be creative. So, they would make equipment do things it was never meant to do, er, by writing creative software, limiting the-and being much more creative in the software than we have to be because we just throw resources at it, and they didn't, they had limited resources so, they had to make it much more efficient.

So, I don't know what the future is going to hold for us, but we do a lot more work in terms of helping people understand the market there, finding partnerships for them and things like that. But obviously, the ability for Western companies to work with Russian enterprises, particularly in high tech, erm, at the moment is-is not possible. So, it's a little bit of a hiatus, erm, but like all good Russians, he is very stoic and he is very resourceful, so. He was a medical doctor at one time, so, maybe he'll go back to being some sort of medical practice.

[01:09:40]
Maybe they'll call him up, hah [laughs].

[01:09:42]
[Laughs] no, I don't know.

[01:09:43]
Erm, so, what was your reaction, erm, to the great hullabaloo about Y2K, the Millenium bug?

[01:09:53]

Ah, the Millenium bug, yes, erm, I guess, erm, I've always been fairly kind of stoic about these things here, I mean, at-at the end of the day, if everything was going to sort of stop working and revert back to, I don't know, the default date code built into the code there. Erm, I think people were overly-overly aware of that, that they took extraordinary steps to try to stop it happening, but we all sat with bated breath at one minute to midnight on the year 2000, erm, wondering what would happen when the next second passed by, and nothing did, er, of any real significance. Erm, but I mean, what it did was it created a huge, huge surge in demand for electronics, so, that was a real boom year. And of course, created a huge recession in 2001, erm, because, erm, everybody had overawed, and overstimulated their demand in that previous build up there, so, it was kind of an interesting part of the cycle. Erm, but we have lots of these things in here, I mean, there are always the doom-mongers that say the world is going to end because computers won't be able to deal with it. And maybe, to a certain extent, there are instances where it does fall over, erm, a piece of kit won't work. But, erm, one would like to think that our systems were slightly more robust that they, er, could stand up to some of these things, I know maybe that's a bit wishful thinking.

[01:11:23]

In, erm, last month's edition of your excellent newsletter, and I think it is excellent, erm, you reported on Intel building new FABS in Ohio, what is the future of Intel?

[01:11:35]

Wow, can I have my lawyer present?

[01:11:39]

[Laughs].

[01:11:39]

Intel is not the company it used to be, I-I think, you know, Intel was a very strong engineering, manufacturing, ethos-driven company. It was never really a very good market-driven company. Erm, their attitude to market was create as close a monopoly as we can, a-a-and the customers then have no option but to come to us. So, they survived for years on that with their X-86 type products there and, er, it-it-it's you

know, it's not my-it's not my ideal way of doing business, okay. Erm, I'm a more of a marketeering type of guy and I believe you fight your corner and you win it fairly and squarely. Erm, but they did come through with a reasonably good product line, erm, that, that delivered the goods, albeit, at an inflated price, when you compare it to, what would the cost of that be, er, when measured against the industry norms? We-we have a very basic norm for the industry, we work out simply er, how-what is the size of the semiconductor market overall and how many square centimetres of silicon is processed to support that market? And you come up with an industry average of 9 dollars a square centimetre.

Now, interestingly, it's been 9 dollars a square centimetre since the beginning of time, so, er, this is one of those really interesting statistics of the industry, that even though we've had Moore's Law enabling us to create more complex integrated circuits. The flip side of Moore's Law is that you reduce the price of that integrated circuit o-on a fairly steep level. So, for every chip you introduce more complex, you have one chip of the same complexity you're reducing the price on. And the net-is a net-is a net balance, it's a wash, it's a [unclear], you know, so, er, you end up with a-with a net balance there.

When you look at Intel's revenue per square centimetre, it was 100 dollars per square centimetre. So, okay, 9 dollars is the average, erm, analogue circuits were a little bit higher, microprocessors a little bit higher still, memory, a little bit lower but 100 versus 9, that's not normal, okay. So, that-that was an extreme distortion and to some extent, there was a bit of price forging going on there, which, er, which we all, er, really knew about, but Intel could get away with it. Then they lost the plot, they lost the plot by losing their edge on manufacturing, and they lost the plot on losing, er, their, ability to bring in new designs on their tick-tocky-type regular pendulum schedule.

I mean, they-they really, you could set your watch by them in the same way as you can set your watch by Apple now with the iPhone, you know that in November of this year, there will be a new iPhone out, we'll be on the next-generation technology. You also know that in November 2023, there will be the next iPhone coming out on the technology they're designing in today, which will be the next-generation technology.

But you know that it's going to happen, er, and you used to be able to do the same thing with Intel, they really, really lost the plot, lost their manufacturing edge. And, now, they're paying the price.

So, now, they've got to catch up, now, catch-up is hard in this business. If you lose that leadership position, rule of thumb, it takes 10 years to catch up, so, and you've got to throw a lot of money at it because you're chasing a moving target, you know. So, you're now chasing the market leader, and for every year, you catch up, they move forward a year as well, so, you know, it's two steps forward and one step back, two forward, one back, and it takes a long time to close that back. You can close it, erm, but it does take a minimum of five years. Erm, it took Europe seven years to catch up with JESI, that was fast. Erm, so, I think Intel has got the same catching up job to do now.

Now, they can throw money at manufacturing and they're talking about building this massive complex in Ohio, they're talking about building a-a factory in East Germany, erm, and they're talking about building lots of things around there, erm, asking governments for support, why not? You know, if governments are willing to support this thing, good luck to them. I mean, I'd ask for money if the government would give it to me and I'd take, thank you very much, very-very gladly. Erm, but do they really need all this extra capacity, do they really need this-these spread around the world like that; where is their market? Erm, [coughs] I-it doesn't really make too much sense from a-a-a really forensic market analytical point of view.

[01:16:02]
What about ARM?

[01:16:02]
ARM? Oh, God, I need another set of lawyers present [laughs]. ARM did an amazing job. I think, you know, hats off to-to Robin Saxby he was an-an awesome rock star when it comes to semiconductors, he did what had to be done. He was fighting the might of Intel, of Motorola, of National Semiconductor, of every manufacturer of microprocessors in the world, and he turned that product, that little rinky-dink processor, designed in some rinky-dink place in the UK, into a world-class product,

that became usable by everybody. Now, to a certain extent, it was the right place at the right time, we all need that, we all need a bit of luck, but Robin drove that as a hero, through, and got the whole concept of licencing onto the market. He had some luck, but a-a willing customer in Nokia a-a-and things like that. Erm, but nonetheless, with all the luck, he made it happen, and he turned ARM into a powerhouse.

It also became their Achilles Heel, er, because they became king of the mobile era, but then lost and forgot about the other market. So, when the mobile market, was-was doing what it was doing, and when that plateaued and peaked out, suddenly, the new markets, the automotive markets, and solar receptors there, which we're also starting to use core technologies, erm, they were not so immediate con, er, convictabout the ARM process. ARM had to fight the-from the ground upwards again, against, a fresh bunch of competitors and that's tough. They also made a hugely, in my view, my own opinion, it's not an industry opinion, it's my own personal view, I think they made a huge mistake by backing what they called IoT.

Now, we-I've always said, "What the hell is IoT, can someone please explain to me what IoT is, who is going to buy it, how many do they want to buy and how much are they going to pay for it?" They-and-and I could never find out, who is the IoT customer? I mean, all I found out was well, this particular product will have IoT in it, so, well, okay, so, it's just a few square centimetres of transistors in a corner of a bigger chip; how much are you going to pay for that? Nothing, okay. How much did you pay for all the other things, how much did you pay for Bluetooth when it became on the chip? Nothing, you know. So, all of these markets which are just IP centric, providing a little bit of-of extra resource, onto a bigger chip, they have no market value, whatsoever. No one, you couldn't even tell me who the customer was, how many they were going to buy, what price they were going to pay for them. Three fundamental questions of marketing.

I remember my first presentation to my boss in ITT when I went up with the plan and I said, "Here is the market." He threw me out the door, I thought, my God. He said, "Come back to me when you can tell me who are the customers, how many do they want, and what price they're going to pay for them? There is no such thing as a market." Oh, I learned that lesson.

[01:19:12]

What mistakes have you made in your career?

[01:19:15]

Ah, [laughs], probably, er, hanging onto things too long, is one of my biggest

mistakes. I mean, you always—

[01:19:19]

Tell me?

[01:19:20]

Sorry?

[01:19:21]

Tell me?

[01:19:22]

Yeah, I know, I mean it's just human nature, erm, it's very hard to terminate

something, erm, but in some ways, you've got to be like Andy Grove. Er, you've got

to go away on Friday, and come in on Monday morning and cancel Intel's memory

programme.

[01:19:33]

Yeah.

[01:19:34]

Erm, but it's hard to do, so, I tend to be a little bit too romantic in that remind there,

er, and-and that's er, that makes me a little bit less hard-nosed than perhaps I should

be at times. I probably didn't expand fast enough as well. Erm, I probably should

have, erm, been more aggressive in the early days of Future Horizons. Erm, but I

tried not to over-extend myself in terms of getting into too much debt. There wasn't

really the opportunity for, er, e-er, private equity money or-or-or-or venture capital

money into market research. So, er, it tends to had to be kind of back, er, bootstraps

on your own revenue basis there and that held me back a little bit there and that held me back a little bit there.

I don't regret it, erm, really because we-my whole ethos in Future Horizons was to concentrate much more on the analytical side. I-I've never been a great fan of publishing databases of numbers because you project forward a-a forecast of numbers, you-you know it's going to be wrong, okay? So, erm, I've never been a great enthuse… If people want it, I'll do it, and I'll do it diligently, and I'll do it with credibility and I'll explain the logic and the thought processes behind it. Erm. But I was much more interested in what does the number mean to me, what does the facts, the data mean to me? Because on the basis of, if I talk about a simple statement, prices are going up, it-it-it's irrefutable, it's fact, it's what it is, but it means two different things to a different group of people. To a buyer, prices going up is really bad news, to a cus-a seller, prices going up is really good news.

So, the same data point can mean biometrically different things to different people depending on where you are in that picture. So, I get a lot more, erm, satisfaction about sitting down with people, trying to help them understand what does this data mean to you, how can you use that, how can you exploit that, how can you position yourself, er, to be in the right place, er, when that-these kinds of trends a-a-are gaining some traction. And that is a lot more of an intimate relationship than-than-than we had at Dataquest and that's one of the reasons why I left Dataquest, er, was to be able to do more of that. Dataquest wanted to do less, er, less of that. And I thought, you-you're going in the wrong way, you-you've got to be doing more, something which is more personal, er, than doing something which becomes more mechanical because if you're just doing something which is a number-crunching mechanical process, you could be replaced by a spreadsheet and I did not want to be replaced by a spreadsheet.

[01:22:18]
This is probably why you liked history, and particularly geography at school.

[01:22:22]
Yes, yes. I mean, I always look back, erm, I like reading about history, I like reading about all those kinds of things, what caused this to happen, and-and er, one of the…

Every presentation I make when we do our industry updates is always ignore the lessons of history at your peril, it will teach you so much. Er, it never repeats itself, but as Mark Twain says, it sure as hell rhymes a lot.

[01:22:41]
[Laughs]

[01:22:43]
And er—

[01:22:44]
[Laughs]. Now—

[01:22:46]
The first thing a new management team, when they move in, is to scrap all the old ideas because that was by the old group. We're in here, new broom, sweep clean, we've got new ideas.

[01:22:54]
Yeah.

[01:22:55]
And yet, a lot of the ideas the old team were probably were pretty good, and, you know, you should focus on learning from what they did right and learning from what they did wrong. Change what they did wrong, keep what they did right and build on it.

[01:23:08]
I'm going to, erm, introduce a personal note, and you needn't answer this. Erm, you are not a young chicken, are you?

[01:23:15]

Er, well, that's from your point of view, I consider myself to be a very young spring chicken, I've got more energy than people half my age.

[01:23:19]

Are you going to carry on, that's my question?

[01:23:22]

Yes, yes, of course, why shouldn't I? I'm having fun, this is-this is the best industry in the world, okay. I mean, I'm having fun, and I still pursue my musical career, I still play drums in a band, so, erm, that was never er, going to be a real professional career, I mean most of the friends I made back in the '60s and '70s, very few of them actually made it into the-to make some really serious money. But we go in it for having fun, so, a good diversion, and the semiconductor industry, has nowhere near run out of steam. It-it's not as fun as it used to be, I mean, it used to be a bit sort of wild and woolly, I mean, you would have to-to be a bit more respectful these days, one can't do some of the things that we got up to back in the '70s, I think would turn peoples faces in horror today. Erm, it's a different world, but, erm, but it's still fun, there is still a lot going on, there is still, erm, so much change, so much excitement, so, much opportunity, erm, it-no reason to stop, it's not boring. The day it becomes boring is the day I'll stop.

[01:24:23]

Malcolm, the, er, object of the, er, erm, Archives is to capture the past, which we've done, and inspire the future, which is what you've done today, inspiring us by having fun and insisting on fun. Thank you for your really good contribution, Malcolm Penn.

[01:24:45]

Thank you.

End of interview