

Interview with Robert Blair

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Atherton, California

RW: -Robert Blair was LSI Logic's eleventh employee and headed up the first product marketing and international activities from Silicon Valley. In this 2011 interview, thirty years to the month after joining LSI, he discusses establishing LSI's European operations immediately following LSI's successful U.S. IPO.

RW: Well, good morning, Robert.

RB: Good morning, Rob.

RW: Tell us about your folks and – and growing up.

RB: Okay. Well, I am one of these guys that was born in the middle of the war in London in '42 in the middle of the bombing. Obviously, survived that. Moved away from London, you know, pretty much as a result of that, and lived in the eastern part of England for most of my junior and teenage life. My family was there also. My father is a financial type. He's an accounting guy all his life. And he's still alive today at ninety-eight. So from that point of view I'm sort of lucky. So I grew up in the eastern part of England, went to college out there. I was more interested in the sciences and the arts and so I ended up channeling down the maths and physics direction. Did a degree in Applied Physics with emphasis on solid state. And graduated at the London Institute of Physics in 1966 with an Honours Pass. My first job out of school was actually at the old British equivalent of Kodak, a company called Ilford Films. So I worked in the color processing labs there for a while. I then moved on to Standard Telephones and Cables, which was a subsidiary of ITT in the landline telecom group. And after graduation, my first job as a graduate, if you will, was actually in the semiconductor industry. At that time the Brits had well-known company called Marconi Company, which was at that time had opened a semiconductor facility. And we were mostly doing bipolar, but some MOS at the time. And so I was hired as a process guy, you know, in the fab, white coat process guy. And my first major project was to develop a buried layer process for bipolar transistors to lower the collector resistance. So I set up an antimony-based process, which we used. And at about the same time, Marconi took a license from RCA in New Jersey, I believe, Somerville, New Jersey, I think, for an ECL product family. And so I ended up being the process guy on the ECL product line, bipolar, of course, and ended up going to New Jersey to transfer the process from there to Marconi. And so that was my entre into the real world of semiconductors as an R&D guy in wafer fab.

RW: And even RCA was real.

RB: Oh, yes. I mean, you know, for while I worked in processing fab, part of my daily job was, you know, reading journals. And it became clear that, you know, this company, Fairchild, was pretty good at this stuff. And so I'd end up reading a lot of these papers by these guys, Deal, Snow and Grove. I said, oh, these are pretty bright guys. And so as part of my job trying to figure out this whole process thing, you know, Fairchild popped up on the radar screen, and as I sort of got more into it, it became clear that this semiconductor thing looked like it was a very American-centric industry. However, you know, a Brit stuck on this little island out there in Europe, I didn't have much access or knowledge on how to get to the U.S., or even if I sort of should go, or wanted to go. But after about three years in process development, somehow a light went on and I said a couple of things. I got to leave England for various reasons. No nothing to do with family or anything. It's just the place was too slow. I just wanted to move quicker, and I guess I wanted to see the world like any twenty-five year old. And if I was going to stay in the semiconductor business, I should probably work for an American company. And lo and behold, I opened the London *Sunday Times* one day and Fairchild is running an ad for marketing guys in Europe. I said, wow. And it turned out, I hadn't noticed it because I didn't follow things that closely at that time, but Fairchild had decided to split with as SGS was the marketing channel for Fairchild in Europe at the time. I guess they de-terminated that agreement in about '68, I think, and decided to go it alone. So Fairchild sent over a three or four ex-pats to set up in Europe. They chose Germany because they gave them the best financial deal, I expect, and it's also very central. So they ran some ads looking for, you know, young, product marketing guys, and I applied. Had an interview in London with a couple of the ex-pats. I remember Doug Usher and Ralph Bennett were the guys that came to London, and I was in the queue of kids they were talking to. And they made me an offer, and so I said, Wow!. I quit Marconi, announced to my parents that I was going to live in Germany. And they said, you're going to do what? I said, yep, that's the deal. So I packed everything I owned into a trunk of an MGB, and drove to Germany. And those were interesting times because the day I arrived in Germany, America landed on the moon – 20th of July, 1969. So I pretty much joined Fairchild the day American landed on the moon. So I'm watching that in my hotel room and show up for work on Monday at Fairchild not speaking a word of German. And what's all this thing called marketing about? So what do you want me to do? So, okay, you're the transistor PME. Okay, sounds good. And off we go. And so I continued with Fairchild for seven or eight years in Germany, you know, with a number of ex-pats coming through the office over that period. I think I ended up being the product marketing manager for Europe for Fairchild. And at the end of that, the operation was, you know, becoming fairly large and spread right across Europe. And I wanted to come to the U.S., and Fairchild was very clear that that was my objective. So knowing that, they said, well, before you go back, we'd like you to go back to the UK and run that for a while, because, you know, the guy that was running it was leaving or whatever the conditions were at the time. So I said, fine, I'll do that, but don't plan on me, you know, retiring in the UK because I've already left once and that's my plan. And they said fine. So I worked in the UK for a couple of years for Dave Marriott, who was the general manager for Europe at the time. And we got northern Europe reorganized. We put on, I think, Fairchild's first rep program at that time, which was a new concept. You know, you had direct sales force and you had distributors. But this thing called the rep where you paid someone five or six percent to get an order for you and you drop-shipped it was a fairly new concept to the semiconductor industry. So we did that very successfully.

Helped to keep the expenses down. And then finally, the time came for me to come to the U.S., because I've obviously traveled to the U.S. with Fairchild now on business several times – mostly to the West Coast, to California. So it was very clear from like 1970 – '71 onwards when I started coming here on business that this was the place to be, not only because, you know, 464 Ellis Street was headquarters, but because this was just a great place to live. You know, the sunshine, the Chevy Camaros, and, you know, San Francisco, and so on, so forth. So I think I finally ended up here permanently in '78 or '79, and started work in Mountain View in marketing, and stayed until, you know, I left in '80 after Schlumberger acquired Fairchild.

RW: Well, did you see any of the Schlumberger management in action?

RB: Yes, I did. I was – you know, Wilf Corrigan resigned fairly soon after the Schlumberger acquisition. And, you know, I wasn't a very senior guy in the organization, so to me, it looked like he just sort of vanished into thin air. I realize now that he had a one-year not to compete clause, and so on and so forth. But I was, at that time, already, I think, getting itchy. I remember not liking the Schlumberger style. Our friend, Tom Roberts, I believe it was, pretty arrogant guy in the company – while, very, very successful in the oil-field services business. You know, that's not the chip business. And I remember a story. I didn't participate in this, but I heard about it, and I always remember it. At the time, Fairchild had a design win with, I believe, General Motors Delco for microprocessors, the 6502 probably – the Motorola processor that Fairchild had licensed. And the story goes that, you know, the senior purchasing guy at Delco, who was, you know, a very senior guy in the industry and known by everybody, shows up at Fairchild on Ellis Street to meet the new management, Tom Roberts. And he's in the lobby, you know, calling saying I'm here, you know, can we get together. And apparently, the message that came back down to the lobby was I don't meet customers, I don't meet purchasing guys. You know, I'm the CEO here, and I'm sorry. And so, apparently, this gentleman left the lobby, cancelled all the business. And that was, you know, a first taste of welcome to Silicon Valley and welcome to, you know, purchasing.

RW: Yeah. Arrogance and stupidity. Yeah.

RB: So I'd already decided to to move forward at that point in time. And in fact, at that time, small systems companies were starting to become very attractive. You know, computing was, you know, taking off. The Unix operating system was, you know, emerging. And I actually was ready to move to a company called Altos Computer here in the valley. Actually, started by another Brit, as it happens. But that wasn't the reason I was going. And they made me an offer to go there in some marketing role, probably to do with international. And then with offer in hand, at the last minute, a good friend in Ellis I found, Bill O'Meara, was having a party around Christmas time at his house. And actually I lived pretty close to him in Saratoga. And so I was, you know, at the party and pouring a drink in the kitchen, and, you know, it was pretty crowded affair, and so on and so forth. And there was this business plan on his kitchen table. I said, "Oh, what's that?" He says, "Oh, it's just something I'm working on. Wilf's starting a new company." I said, "Oh, really?" He says, "Yeah." So we got talking about it, and I said, "Oh, that's interesting. Any opportunities open?" He said, "Well, we don't know yet, but maybe." So in the following couple of months, you know, we talked some more, and I ended up

deciding not to go to Altos and to join LSI. Bill made me an offer for product marketing at LSI, and that's what I chose to do. And so thirty years from this month, as we speak, March 1981, it now being March 2011, I joined LSI in the valley here, as you well know as a founder.

RW: Are you aware of what happened at Altos' computer the day they went public?

RB: You know, I don't remember. After – as I didn't go there, I sort of didn't follow them too much. So I know the CEO, the British guy passed away, I believe. But I don't know – I don't remember what happened when they went public.

RW: Well, it was the day they went public, and they were having a few drinks. And he had been negotiating for a new Ferrari. And so he took it out and went into the lake, killed himself.

RB: Hmmm.

RW: So it was quite a going public day.

RB: Hmmm. Well, I should know that as a Ferrari guy. Maybe I'd forgotten that it was – I forget his name now, but I forgot it was Altos. So yeah. I mean, yeah. IPO's can do that to you, if you're not careful.

RW: Okay. So you're at LSI Logic now. And what are you doing there?

RB: Well, my first was product marketing, and you, as VP of Engineering, we go to work on defining the first product. It was obviously well established when I got there that this was going to be an ASIC gate array company. A lot of the fundamental decisions had been arrived at. It would be an ECL product family and a CMOS product family. And so the task was to define that family in terms of how big the chips will be and so on, and start to put together a marketing organization to, you know, help with this, and to also help Bill put together, you know, the beginnings of the sales organization. You know, we obviously needed some coverage outside the valley, particularly in the computer-centric Minneapolis area and the Boston area. And so I guess I handled a lot of the internal stuff, while Bill started to look at the outside stuff at the time. And I remember we needed a customer service organization in case we got an order. We had to figure out how to enter the order. So I remember our first gal there was Mary Nelson, who became our customer service manager at the time. And the first product marketing guy that I remember hiring was, of course, Keith Lobo, who came from AMD at the time. He was at AMD at the time. A very bright guy, and perfect for the job. And Keith, you know, contributed a huge amount to LSI over time. So it was really, you know, getting things going in the marketing area. At the same time, I sort of doubled up as the international sales guy, if you will, just in case there was a customer overseas somewhere that would like to do business with us. And so I went back to some of my buddies in Europe and so on and got some discussions going. We ended up doing some business in Europe out of Milpitas, you know, without having any physical presence in Europe. Those were the more aggressive customers that were willing to, you know, take a role, if you will, with an early-stage company. Europe being generally more conservative, a lot

of companies weren't willing to do that, but there were a few that were. And we ended up winning some business from them. In particular, one customer stands out, namely Nixdorf Computer, run by a somewhat eccentric, but very bright, hundred mile an hour guy called Heinz Nixdorf. And I remember, they had an R&D facility in Berlin, which, of course, was still East Block/West Block at that time. But they were in West Berlin. And the VP of R&D there was a kind of an unusual character. His name was Dr. Hartmut Fetzer. And he was one of these guys that had a vision and was willing to take a few risks. He wasn't just a, you know, my way or no way kind of guy. And this gate array thing seemed to appeal to him. And so he sent a guy over from Nixdorf to California to do some simulations on the famous Rob Walker design tool environment now. And he reported back to Berlin that this is pretty neat stuff and, you know, we should try and do this. So they ended up giving us a real design. They didn't bet on us, but they gave us the design in parallel to what they were otherwise doing. And it ended up being a three thousand gate CMOS chip, a 5320, and the application was for the German post office, the Bundespost. And so they designed and simulated the hell out of this chip, according to the LSI Logic rules and using the LSI Logic tools, in the cubicle in Milpitas, and signed off on the design, paid the bill, not really knowing whether the chip was ever going to work or not. I think they told the post office that they were intending to do this, but the prototype equipment back in Germany carried the original TTL board still, because if this chip didn't work, they had to, you know, still ship the box. So I remember finally we shipped the part, tested according to the Nixdorf spec, as you guys had demanded, and they plugged it into the socket that they had, you know, prepared on the board, and it worked. And they were just totally amazed. Sort of over the moon that this thing, you know, actually did work – quote-unquote – "first time right," and from that day forward, you know, gate arrays were an approved technology at Nixdorf. And sort of more designs followed from that, of course. And Heinz Nixdorf got to know about it pretty quickly, of course, which resulted eventually in, you know, Wilf coming over to Europe, you know, after I went back to set up Europe. And Heinz Nixdorf personally, you know, picked up Wilf at the airport, and I remember, took him to the plant, and walked him around the plant, and so on, and so on, and so on, and they became good friends. And Fetzer went on to give us several more designs. So LSI played a big role in Nixdorf getting ahead of their competitors in replacing TTL boards with ASICs. So those were good times. So finally then – I say finally, but this was sort of part-time job for me, if you will, this international thing. And then, of course, LSI went public very successfully in 1983. Friday the 13th, by the way. I remember us all standing around and having a glass of wine or whatever the hell we did at the time. But I mean Friday the 13th, a hundred and fifty-one million dollars net I believe was the number. Everyone was very happy. Twenty-one dollars a share. And with all that money in the bank, then Wilf obviously moved into high gear and said, you know, this thing's working in the U.S. pretty well. We should clone this thing worldwide. There's no reason why it shouldn't work in Asia and Europe as it has worked or is working in the U.S. And so I was anointed to go back to Europe, because knowing Europe pretty well at the time, and basically clone LSI in Europe. You know, don't try and improve it, don't try and do anything too different. Just take this technology, put it in a suitcase, take it to Europe, set it up in the major markets, UK, Germany, France, Scandinavia, Israel, Italy, put design centers in that basically mimic those that we have in the U.S. that are working, use Jim Koford's computer architecture and tools, follow Rob Walker's design methodology, and send the PG design files back to Milpitas for mask making. So it's exactly what we did.

So in mid '84, I moved back to Europe to get LSI going. And we set up in the UK as headquarters. Not particularly because I'm from Britain per se, it was the best tax deal. At the time under the Thatcher government, taxes were pretty attractive in the U.K, both for corporations and for me personally as an ex-pat. My deal at the time was half tax because I'm not normally a resident there. So we set up in the UK. It made the language easy for, you know, the U.S. corporation to report the numbers and so on. Everything was in English and the accounting rules were pretty much the same. So we set up LSI Logic Europe Limited. And then in addition to that, set up subsidiaries in Germany, France, Italy, Scandinavia, and so on, to replicate the technology locally so that we looked like LSI local in all the major markets. We moved in Amdahl Computers. We built nice, little design centers with cubes and glass walls and so on and so forth, hired apps engineers, like David Bailey, and these guys. And I set about finding sort of regional managers for each of these, you know, major markets around Europe. And reaching back into my old rolodex, we obviously hired Peter Turner in the UK who was a very experienced semiconductor guy, Horst Sandfort to run Central Europe, and following that, Francois LeCain in France, and also Italy and Scandinavia. So we had a pretty strong organization that came up very quickly. Cloning the design centers was pretty straightforward because everything was, you know, pretty much turnkey. We just had to deal with the time difference between, you know, Europe and the U.S. and getting you guys comfortable with talking to us at, you know, at funny wall talk time. And once, you know, we got through all of that basic stuff, things seemed to go pretty well.

RW: How was this funded?

RB: Well, originally, the plan was to take the European company public. And so a business plan was put together and some funding was raised, primarily in Europe, and the U.S. company participated in that funding. So we got off to a pretty fast start. We had cash with no revenues to set up these design centers and so on, with the intent of going public on the London Exchange. And that cash would then fund the manufacturing expansion. So Wilf's strategy to go global vertically included not just sales and marketing offices, but also design centers which we'd already put in place by then. But also to build fabs because the prevailing mentality at the time was, you know, Made in the USA, Made in Japan, Made in Germany, and it was strongly felt that if we made our product in Europe, we would be more competitive because we wouldn't have the import tariffs, number one, and number two, you know, we'd have the advantages that Texas Instruments and Motorola already had. And National, at the time, already had the manufacturing plants in Europe. So we wanted to look like a real semiconductor company, which meant doing everything vertically. So that was the plan.

RW: But that was to occur after going public in London.

RB: Yes. However, things started down that track before we went public. And so we chose our first manufacturing country and site to be Germany, West Germany. Still, at that time, you know, the wall wasn't down. That didn't happen till '89. So we chose a site in Northern Germany, and we received additional funding from the state of Lower Saxony at the time to put the plant in that location. It was a nice site. Plenty of room. We hired an experienced plant manager, Wolfgang Spalik, who joined us to set that plant up. And we got the shell up. It was a state-of-the-art facility as of the time, designed to

be vibration-free as, you know, because of steppers and so on and so forth. So it was designed to be a Class-A fab. We started off with assembly and tests there, of course, as most plants do. And then as time moved forward, the going public part of the strategy faulted, primarily because the London Stock Exchange was not at all comfortable with us going public having a majority parent shareholder, and having, you know, people on both boards. It was seen as a conflict. And so it started to become difficult. And while we'd started the process with investment bankers in London with Schroders and others, it ultimately came to the point where this wasn't going to happen. And LSI-US was unwilling at the time to be a minority shareholder. And so the IPO process faltered at that point. And so we slowed down on the manufacturing facility and continued to be in assembly and test. And rightly or wrongly, we entered into another manufacturing relationship with a company called ITT in the UK. They had a fab that was already running and producing wafers. So we worked out a deal to take over that fab and to slow down the wafer fabrication in the German plant. So now we had two plants, a fab in the UK, and assembly and test in Germany, which, of course, was, you know, a fair amount of overhead for a company with a small amount of revenue. Personally, I liked the idea of the UK fab strategy because at the time, I personally felt quite strongly that the mixed signal business rather than just the digital business was an important piece of the future. And so part of my personal vision was to have LSI – I won't say convert, that's not right, but to embrace a certain amount of mixed signal business, because the value in the mixed signal area was high. It was very prominent in Europe from, you know, Motorola and Siemens and some of these other companies, and this fab at ITT – of ITT in – in the UK had a lot of analogue talent already built in and ready to go. So the master strategy became to develop that fab as not only the mainstream LSI digital products, but also to add a mixed signal product line primarily for the European market, but of course, saleable worldwide as the market demanded. And so we shifted gears and moved into that strategy. Then I returned to the U.S. in '88, I believe, at the end of '88 thereabouts after my tenure was up, because I didn't intend to move back to Europe permanently. So it was a temporary assignment for four or five years. And then I handed over to – let's see – Gerry Thomas thereafter, who was, you know, then president of LSI Europe. And I came back to the U.S. and came back to run U.S. global sales and marketing, if you will, and Europe continued on its strategy under Gerry. And of course, as we now know, that continued to falter. The manufacturing strategy continued to falter. And LSI ultimately closed those facilities, in a nutshell, and LSI became essentially a satellite subsidiary thereafter with design centers in sales and marketing, but with no manufacturing presence. And that's the way it ended up finally, rather like Japan in many ways, without actually going public. And so most of the manufacturing for the corporation worldwide was maintained by the parent company.

RW: Now, there was a BiCMOS process that was to be used for both digital and for the mixed signal –

RB: Correct.

RW: So it was going to be kind of an analogue LSI ASIC thing.

RB: Yes.

RW: That didn't work either.

RB: Well, the process worked in the ITT environment, but it didn't integrate well into the then very digitally-centric LSI design system. You know, my sort of master idea was that, you know, the mixed signal would not be more than five percent of the chip area. But that could command a fifty percent premium on the price, and the gross margin, of course. But when it came to integrating the analogue macros onto, you know, the wholly digital LSI chip using the design tools that, you know, Koford and company had, I don't think the design tools had anticipated having to integrate mixed signal. And so I was ended up almost trying to force a square peg into a round hole with my objective. And we, of course, didn't have the resources to rewrite the whole CAD system in Europe, and that wasn't the plan, and that wouldn't have been a good plan anyway. So while the physics of the bipolar process was really pretty sexy and worked very well in terms of the of these things, and so on and so forth, there was a very, very good analogue design engineer set that came with the package. Its integration into the whole LSI system, the design methodology system, the EDA tools, and, you know, the rest of the world manufacturing proved to be more difficult. And so eventually that was nixed in reality, and LSI continued forward with pretty much with its pure digital strategy until many years later, after my time, when it started to buy other companies that did have some analogue. I believe they bought a company in Colorado that was a mixed signal company doing stuff for the disc drive sensing and so on. But, you know, long after my time. So I was kind ahead of the curve almost at the time, and it didn't fit into LSI during that period of time.

RW: Well, it was also very difficult to test because the circuits, the BiCMOS ASIC circuits were faster than the than the computer controlled tester, so that to really test them you'd have to build a special test rig for each design.

RB: Yes. And that clearly was our intent. In taking on the fab and the potential mixed signal product line, then obviously it was our intent to do the testing right there in the UK, in the town of Fooks Cray, which is where the fab was. So that was all part of the grand plan. But, of course, without an IPO, there was this small issue of who's going to pay for all this. And our revenue ramp wasn't there in that timeframe. And even taking an optimistic revenue ramp for the revenues in Europe, it wasn't going to support to manufacturing facilities and the relative upgrades that, you know, they would require going forward. So it became a non-starter at that point.

RW: Well, the European market itself decreased, didn't it? Went down?

RB: Well, yeah. I mean Europe was obviously subject to all of the ups and downs of the semiconductor industry. That's correct. I don't remember the exact numbers. But I don't think that was the driving factor. I mean the semiconductor industry's become pretty good at driving through recessions. I mean costs are trimmed and things are delayed and so on. But you don't close all of your manufacturing plants because of a recession, typically, unless there's something fundamentally wrong with the financial model. Certainly, European customers would have liked us to have a manufacturing plant. They weren't willing to pay a super premium for chips from a manufacturing plant. We had to be at "market price" quote-unquote. So that wasn't grounds for continuing. If

we'd of had a ginormous IPO success like LSI had in the U.S., it might have been a different story. But, you know, once that strategy faltered, then I think things changed.

RW: So now you're back in the U.S.

RB: So, yeah. Now I'm back in the U.S. again. That has to be about '88. So quickly – I never sold my house or anything, of course, so it was very easy to sort of get back into the groove. LSI was a bigger company now. There were new buildings that, you know, weren't there when I left in '84. A lot more people. It started to feel a little bit more like a large company rather than the – the startup I'd left in '84. And of course, it was. In the meantime, you know, Japan had come on the stream with K.K. Yawata in – like around '85. George Wells had joined as president since I left in '84. So I came back and now George was – George was my new boss. And so the natural fit for me was, you know, sales and marketing. So I started off, I think, as U.S. sales and marketing, and proceeded down that – that path. Organized the sales conference that year, which was kind of exciting I think. And as you know – well know, I'm sort of a car guy, so I remember we made the 1988 sales conference theme Team LSI in honor of Formula 1. I remember we got the VP of Public Relations from McLaren to come to the conference and speak. You might remember him. So it was, you know, pretty much back to routine sales and marketing stuff for me. And I did that for – for a couple of years. There was quite a lot of work to be done in the U.S., of course, expanding. There were more competitors popping up. ASIC was not, you know LSI-only anymore. CMOS ASIC was not LSI-only anymore. Excuse me. So there was lots of – a lot of work to be done. And then I kind of got back to this thinking that I really enjoyed the early days of LSI, and the early days of LSI Europe, and the startup thing. And by now, I'm forty-something. And this big company thing didn't feel like the fun anymore. I mean it was in the Fairchild days because that's all I knew. But having gone through, from Employee Number 11 at LSI, to CEO of LSI Europe, and back again all in about eight years, it wasn't the model anymore. So – and I was probably getting bored, and Wilf probably noticed that, and I happened to, you know, go through a divorce. And so Wilf and I were talking one day and he says, "You know what? You know, I think maybe it's time for a change." And I said, "Yeah, you might be right." In the meantime, I had noticed that Xilinx and Altera had taken off. And I personally became like I was sort of a fan of mixed signal, which goes back to my roots at Fairchild where I was the linear PME for a while. So I was fairly heavily involved in analogue. I also seemed to embrace the programmable gate array concept. And Xilinx and Altera didn't start till like '83-'84. And by, you know, 1991, they were rolling. And here we were, LSI, with MOS programmable, and here they were with, you know, customer programmable. And that came pretty attractive, I think. And I remember after I came back from Europe, in those two or three years before I left LSI, I was pretty positive on programmable gate arrays. And I know I'm – Wilf and I had several discussions on that, and probably with you, and – and some of the other staff. It felt to me like LSI should make a move and move into programmable gate arrays, as both a good business, and a as a defense against, you know, the metal programmable gate array phasing out for whatever reason. That didn't come to pass. And for whatever reason, Wilf, George and Cy, or whoever, didn't make any moves in that area. And so eventually I think I just decided to move on, and with Wilf's agreement, or maybe he helped me – I don't remember the details – and so, you know, he gave me a deal and – and I left and went on my own way. And that was it. And that was probably '91 I would

say. So I did ten full years. Loved it. Do it again. No real complaints, other than we didn't go public in Europe, which, of course, was a disappointment to me and all of the folks in Europe, and the investors that we'd sold that deal to. But, you know, other than that, it was a great ride. It was a great company, and and great people. And the timing was right, the execution was very good, and – and LSI became a brand name, you know, all within – all within ten years.

RW: Yeah. In retrospect, 20/20 hindsight, we should have bought one of the programmable gate array companies.

RB: Yes. I think at that time, we had particularly close relationships with Altera because Rodney Smith, who was, you know, an ex-Fairchild guy, very bright guy, he – you know, Wilf obviously knew him extremely well. I sort of knew him because he ran automotive at Fairchild and I had him over on several customer visits when I was at Fairchild in Europe. And a Brit actually, again, a very bright guy. And he was the CEO of Altera. I don't know if he would have sold, but, you know, I agree with you that I think LSI's move in that period could have been to either try and acquire one of those two, or someone smaller, or start a genuine internal effort before it was too late, before those guys had gotten so much traction. I mean today they share a third of the market each, so it's all over. You can't buy them today, and, you know, they're the leaders. But at that point in time, they could have been beaten. Now it's too late. But, you know, LSI didn't walk through that door, so –

RW: 20/20 hindsight.

RB: Yeah. I mean that's always fun, isn't it? So it was great. I mean I enjoyed it. After that, I've been pretty much focused on startup companies. I'm a consultant to the industry at this point. A couple of years after LSI, there was an opportunity in programmable. There was a U.S. company that was funded by a Japanese – a Japanese company, but in reality, an individual, called Crosspoint Solutions. And I became CEO of that company because the story was really attractive. It wasn't it was different from Xilinx and Altera in that the architecture for the Crosspoint chip was pretty much the LSI architecture. And that was the big difference. With Xilinx and Altera, you had to have custom tools to design the chips because of the architecture. You couldn't use LSI Logic's tools to design Xilinx and Altera's chips. But what you could do is to use LSI-type tools to design the Crosspoint Solution architecture. It was a very fine-grained architecture. It didn't have a cell that was, you know, twenty or thirty gates big. It was basically a single-gate cell structure just like, you know, the LSI system. Excuse me. And fortunately, or unfortunately, the programmable element was an anti-fuse, whereas Xilinx and Altera had an SRAM cell. And so scaling the anti-fuse became an issue, whereas scaling the SRAM cell for the other guys was relatively easy. We had to go through a custom process every time we moved down Moore's Law on the anti-fuse, which, of course, was very difficult. So ultimately, we were not able to make a big dent on Xilinx and Altera. And the Japanese investor, who had put in forty or fifty million, decided to pull the plug. And so the assets ended up being sold at that point in time. So Crosspoint today, is a name of the past, and one of the, you know, many companies that have tried to outdo Xilinx and Altera at what they're good at and has failed. So we closed that down. Following that, the next interesting thing for me was that the LSI ToolsXXX

founder, Jim Koford, by this time had himself left LSI. And he had a vision to do a toolset for the EDA industry for chip design that was kind of a next generation plus, if you will, taking the basic concepts of EDA design, but respinning the code in the toolset to run on a multiprocessor multithread platform, and have enough computing cycles on hand to essentially do a chip design on the fly without having to recycle through each simulation then go back and, you know, fix things on an iterative basis, which we did at LSI, and that was reasonably successful at those densities. But when you get up to, you know, a million or more gates, that becomes much more time-consuming. So Jim's idea was to just have, you know, a mega powerful computing platform to run this on and just incrementally do the design, but not have to go back through the design loop. And so he started a company called Monterey Design to do that, and I joined Monterey Design in, I think, '97. It was VC funded. We got off to a very good start. It was a good – an exciting story. I think its timing was good. Maybe a little ahead of the curve. It turned out that, you know, the customer base wasn't already equipped with these multiprocessor hardware machines, which you had to have to take the benefit of the Monterey Design system tools. And so in order to do business with us, you had to buy new hardware, which, of course, wasn't cheap, and it was in itself just emerging still from Silicon Graphics and and so on. So the market was tough. In my opinion, you know the VC's that we had at the time were slow to move on the IPO. I believe we could have taken it public. The window was there to do that. Our major competitor was Magma, and their technology didn't use this multiprocessor base. It used a classic hardware base. And so they became an easier sell, if you will. And they aggressively moved through the IPO window. And they went public and we didn't. So that made it difficult for Monterey after that. And so Magma ended up, you know, being a fairly major player. A distant number three or four, but, you know, a fairly major player in the EDA industry. And Monterey unfortunately didn't. So that was a disappointment for all of us also. So following that, I changed plans somewhat. That was really my last semiconductor-centric company. And I moved my focus for a while to medical devices. My son happens to be a diabetic, and so I started a company to try and measure blood glucose in diabetics without any blood so that they did not have to prick their finger. We looked at measuring glucose in sweat and correlating that to that blood so that the – the blood sugar measurement for diabetics was extremely easy and totally noninvasive. So that was a departure from my semiconductor background. And so after Monterey Design, I've sort of diversified into some medical devices. I'm working now in the energy area. Some things in solar, a couple of things in automotive. So today I'm primarily a hi-tech business consultant for hire. And I have closed the door on the days of being a CEO and running several hundred folks. But I'm enjoying it, and still in pretty good health. So that's where I'm at today. But it's been a great ride! I'd just like to add that I'm glad you started this Silicon Genesis project. I think it's excellent. I think it's worthwhile. It hadn't been done. I think it needed to be done. The impact of semiconductors and the chip on the world is probably underrated, as of course was the steam train and there are a lot of other things today that are taken for granted. And in today's world of Googles and Facebooks and cell phones, and so on and so forth, some of the great semiconductor stuff tends to be forgotten. And I'm glad that it's on record. So good job.

RW: Well, thank you.

RB: Welcome.