



## Oral History of L.J. Sevin

Interviewed by:  
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**Rosemary Remacle:** L.J., Please tell me a bit of your early history. Where were you born? [About] your family? Where did you go to school, why did you choose the field you did? ...Those kinds of questions.

**L. J. Sevin:** Okay. Born in Baton Rouge, Louisiana, which is a very famous place in 1930, went through the parochial schools of Baton Rouge through high school, and went to LSU briefly as a major in accounting which I learned to absolutely hate and wound up wasting two years of my life. And I wound up in the U.S. Navy during the Korean War. And after that was over, I went back to school having been fortified with an interest in electronics which I really picked up in the Navy.

**Remacle:** What kind of electronics?

**Sevin:** Just vacuum tubes.

**Remacle:** The basics.

**Sevin:** The basics. But I thought it was pretty smart.

**Remacle:** And did you go back to school or did you...

**Sevin:** Yeah, I did. I majored in electrical engineering, and was finished in, I think, three years and took a job with McDonald Aircraft in St. Louis and the aerospace industry, and determined that that was a mistake after about six months.

**Remacle:** And what year was this?

**Sevin:** 1957 and 1958, and I crawled up one of the professors at LSU and found out if I could get an instructors position while I went to graduate school, and he said, "Come on back", so I did and spent until 1960 getting a Masters degree and finding a job other than in the aerospace industry, but I found something related here in Dallas, at Texas Instruments. I had a teacher, a professor, who had a summer job with TI, and he got me one, and I spent two summers doing my post graduate years here in Dallas working for TI.

**Remacle:** What kinds of projects did you work on at TI during your internship?

**Sevin:** Building test equipment, designing and building test equipment for germanium transistors.

**Remacle:** Which at that time was pretty leading edge?

**Sevin:** Well, pretty much. TI had already, it turned out they had already developed a silicon transistor which was their big hit, and they had a big edge on their competition for about four years, and I think that's what made the company. It went on to greater things.

**Remacle:** What was TI's role in the Texas electronics industry and then in the larger U.S. electronics industry at that point in time?

**Sevin:** TI's role, well ...

**Remacle:** I mean were they seen as a leader or were they seen as a follower? I mean, they were in Texas and everybody else ...

**Sevin:** Well, by the time I joined them they were a leader, they clearly were the place to be. One thing I learned early after the experience in the aerospace industry is that I wanted to be on the leading edge of everything, I wanted to be working in places where things had never been done before, and TI was the only place in Texas to do that, in my opinion, at that time. And they were not the largest manufacturer of semiconductors, but [they were] about to be in that period.

**Remacle:** When was your first exposure to semiconductors, was it at TI or ...?

**Sevin:** It was in school.

**Remacle:** And what were the first projects you worked on when you became a full-time TI employee?

**Sevin:** Well, I became what's known as an applications engineer, and our job was to teach customers how to use these new-fangled gadgets and I spent, I think, nearly four years at that. It's hard to remember.

**Remacle:** What kinds of customers did you work with?

**Sevin:** Well, ...

**Remacle:** Were they mostly military or ...

**Sevin:** No, no, mostly industrial, I remember working with IBM quite a bit, GE, Sylvania, companies like that. They were military industrial complex companies, I guess you can use that derogatory term.

**Remacle:** And what kinds of products or projects were they working on that they needed semi-conductors for?

**Sevin:** Well, I have a hard time remembering. Obviously IBM was working on – was just about to introduce their first computer, an all transistor computer, all germanium transistors I believe, and I forgot the product number.

**Remacle:** Did they come to TI or did TI go to them to develop their products at that point? Was there synergy between the development team and the using team and the customers ...

**Sevin:** Oh, quite a bit, yeah. Throughout my career I saw that. The most exciting..., moving on ahead to Mostek, the most exciting thing was a collaboration with Hewlett Packard on the scientific calculators, scientific and financial calculators.

**Remacle:** Which of the TI products were you specifically working with at that point?

**Sevin:** Well, all the discreet transistors, it was during that period that I arrived at TI that Jack Kilby was in the process of inventing the integrated circuit. It didn't amount to much of TI's output, I think, until around the early '60's.

**Remacle:** I think it's more like the mid '60's, the 1964 kind of timeframe?

**Sevin:** I saw all the activity going on. Any company worth its salt has good marketing and sales, and of course TI had good marketing and sales, and they covered the earth, so to speak.

**Remacle:** Did you work with Kilby at all?

**Sevin:** I worked for Kilby some time in '64 or '65, in his group anyway, and this was well after the invention was affected.

**Remacle:** Was he accorded any particular status inside the company for this?

**Sevin:** Oh yeah.

**Remacle:** He was looked up to ...

**Sevin:** Jack was God, pardon my French. [laughter]

**Remacle:** So he could do pretty much what he wanted to do at that point.

**Sevin:** He could do pretty much what he wanted to do.

**Remacle:** Okay. And what are the things you learned from him?

**Sevin:** Well, I learned, this is difficult, I learned I didn't like the approach he was taking to large scale integration.

**Remacle:** And why not?

**Sevin:** Well I thought there was a better way.

**Remacle:** And the better way would be?

**Sevin:** MOS transistors. And what TI spent a lot of money on in those days was a thing called discretionary wiring project and it just never made it, and I had the glorious position of hindsight, saying "you see?".

**Remacle:** [You thought] "I knew it wasn't there, I knew it was never going to work, let's look at MOS...."

**Sevin:** Well, yeah, I didn't believe it was going to work. No one knows for sure that anything ...

**Remacle:** What made you feel like it might not work?

**Sevin:** It consumed too much power, that was the main thing, and the scale of the circuits would be much more difficult with those bipolar transistors to scale them down to a size where you put thousands upon thousands, even millions of transistors, on a single chip or substrate or whatever.

**Remacle:** And when did you get dedicated to MOS?

**Sevin:** Well, while I was an applications engineer there was a new product introduced in the industry, I don't know who did it, but TI picked up on it really quickly. It's probably JFET or a junction field effect transistor. And I got very interested in it because it looked like a vacuum tube to me. I had difficulty understanding some of the physics of the bipolar transistor, and I had a philosophy that anything that's less complicated is more likely to work. And this was very uncomplicated physics compared to the bipolar transistor.

**Remacle:** Were you the lead engineer or just part of a team? How big a team?

**Sevin:** Well, I was a part of a team, always part of a team. I was the lead engineer on a project when I left TI.

**Remacle:** The teams at that point were how big in size?

**Sevin:** Oh, I hardly remember.

**Remacle:** I mean were there three people or twenty people? Just a scale, as you're not ...

**Sevin:** Probably ten in a group, in the order of ten, eight, ten people.

**Remacle:** And what were the most challenging thing about getting MOS widely accepted within TI? What kinds of problems did you have getting people to understand the efficacy of MOS?

**Sevin:** Well for one thing, the technology was not highly thought of, there was a lot of difficulty with producing transistors that were stable and whose parameters didn't drift with time and temperature. And Jack, for example, had a very low opinion.

**Remacle:** Was his low opinion based upon lack of reliability and predictability or was it something else?

**Sevin:** Yeah, and they were very slow at the time. We could beat the speed, anybody could see that the speed could be scaled up.

**Remacle:** And how could somebody see that the speed could be scaled up?

**Sevin:** It was strictly a matter of geometry, being able to take pictures of higher and higher resolution. And that's what the semiconductor process basically was in those days, the process of developing pictures similar to the development of pictures. And the same resolution problems existed for those chips that as with photography.

**Remacle:** Were there other people outside of TI working on the same set of MOS related problems?

**Sevin:** Oh yes. There was Fairchild, there are names of companies who I can't remember, American Microsystems ...

**Remacle:** AMI.

**Sevin:** AMI. There was a gentleman at AMI who was president of AMI for a period of time and I forgot his name, but he turned out to be a shipmate of mine in the Navy.

**Remacle:** It's a small world.

**Sevin:** It is a small world.

**Remacle:** The fact that others were working on it and you were aware of it, I presume through industry associations or paper publications ...

**Sevin:** Publications and associations, yeah.

**Remacle:** Did you communicate with each other at all, or was it a sense of high degree of competition and everybody kept their secrets to themselves or ...

**Sevin:** I'd answer that question with a yes. There was a lot of interchange but there was also a lot of competitiveness. By the time I left TI, Intel was a year old for example, and AMD was just forming up.

**Remacle:** All which would become formidable competitors certainly. What was the role of the military by this point in the funding of new technologies and new products in the semi-conductor industry, because early on they and places like Bell Labs had huge influence. Had it begun to wane at this point?

**Sevin:** I can't really pin that down, but it was very important in the late '50's and early '60's, and especially with the Minuteman project, and others who I can't remember.

**Remacle:** But they were less visibly involved or noticeably involved by the mid, late '60's?

**Sevin:** Well, there were several top secret projects coming out of NSA in the development of secure communications, and we were involved in a project like that at TI. And I don't know, this is fifty years ago, I don't know if I'm still bound to secrecy or not.

**Remacle:** It's probably really ancient history now.

**Sevin:** Fifty years, no it's not, it's forty years ago. Forty.

**Remacle:** So can you talk from ...

**Sevin:** Fifty years ago.

**Remacle:** Can you talk about the mid '60's, the development of MOS at TI and your role in it, and then how that was the foundation for your decision, yours and others' decision to leave TI and go to Mostek?

**Sevin:** Well, when we actually formed, Mostek didn't exist. By about 1965 or '66, I had become acutely interested in MOS technology. I worked in a development lab in one of the integrated product

departments to try to find out what it would take to develop products and get in to the MOS business, and needless to say it didn't – not much capital associated with it, they didn't have much money allotted to our project.

**Remacle:** Was that because senior management at TI didn't recognize the possibility or opportunity that was associated with MOS? Was it because you as a team were not able to get your way through the politics of the company, or what was holding it back?

**Sevin:** I wasn't a very good politician, that may be it. I wound up working for Charles Phipps, who you'll talk to later, and I always felt the project was his stepchild, but it was probably – I have a hard time fishing up words that I have used all my life.

**Remacle:** Don't worry about it.

**Sevin:** I'll have to ...

**Remacle:** So the project was a stepchild at TI. Were there other stepchild projects or was this one a particular?

**Sevin:** This one is the most notable of all, I would say, since it was the technology which took over an entire industry.

**Remacle:** What was the status of MOS at that point? You said earlier that it was not predictable and stable and reliable as people like Kilby would have liked. But had it progressed?

**Sevin:** It had, and companies were already offering products, like General Instruments was involved and they were offering products before we got out in to the world.

**Remacle:** So Fairchild, AMI, GI ...

**Sevin:** I was a project leader on a contract with Honeywell Corporation to develop communications equipment for NSA, which I guess I can say that now.

**Remacle:** It's no longer classified....

**Sevin:** No.

**Remacle:** So what lead up to the decision to go and break off from TI and form Mostek?



**Sevin:** Well, I had a friend I worked with at TI, I was responsible for design and development of products, and he was responsible for making them. His name was Louie [??] Sharif and apparently he had a close relationship with a gentleman named Dick Patritz who along with another gentleman, Dick Hanschen had gotten in to the venture capital business who had been at TI and they knew us, and Louie was talking to Dick Patritz about starting another company, and he came to me with the idea and I warmed up to it, and we decided to go do it.

**Remacle:** Well, that was, you know, today spinning off from a big well known company and going and forming your own company with some venture capital money is pretty common. But at that point in time, it was not so common and ..... talk about it a little bit, like how hard a decision was that for you guys to make?

**Sevin:** I would guess it wasn't a hard decision at all in my case, I was always looking for opportunity and always looking for the opportunity to do something new. And this was very attractive to me, and Louie shared the same the sentiment, we didn't have any hesitation, I think, about going off and doing it.

**Remacle:** And you were going to base it on the MOS...

**Sevin:** Absolutely, that's what we were working on at TI. An anecdote: when I'd come to work in the morning at TI, I'd walk by one of the labs in which the discretionary wiring project was being carried out, and there was all kinds of high cost capital equipment, and I'd go by that and go back to my lab which was made up of equipment I scrounged, and that we built ourselves, in a lot of cases. So TI was interested, but they thought they had a better way, and it didn't turn out that way. And so we ...

**Remacle:** To recap, TI thought the better way, instead of MOS, was ...

**Sevin:** Discretionary wired bipolar transistors and integrated circuits. And that would take some time to explain, but it didn't work out.

**Remacle:** And MOS did.

**Sevin:** And they did..

**Remacle:** How long was it before you actually took the action and resigned from TI, and who else was involved? Can you talk about the process you guys went through to get the company formulated and funded and resigning from TI, and in what order did you do things?

**Sevin:** Well, Louie and I decided to resign in February of 1969, and of course the news shot through the company very quickly, and I had an immediate exit interview with Fred Bucy . Several of our co-workers had heard about it, we had probably not kept great security while we were thinking about doing this. We had a lot of people anxious to join us.

**Remacle:** Can you talk about your exit interview with Bucy?

**Sevin:** Well Fred wanted to know why in the heck I wanted to leave TI, and he couldn't understand why anybody would want to do that, and I said "well, I agree with you, it's been a wonderful place to work and I really appreciate the time I spent here". And he just said, "Now stop. You know, that sounds like telling your wife honey, I love you, but I want a divorce." And I said, "Yeah, that's right." So that ended that interview.

**Remacle:** And you said that you had a "not eligible for rehire" put on your TI personnel file...

**Sevin:** Yeah. Everybody that went to work for Mostek in the early days got that. So it took a little bit of guts to step out and do that, and there were several people that joined us in June of 1969.

**Remacle:** So from February to June ...

**Sevin:** We were busy writing business plans and negotiating for the money we were going to need.

**Remacle:** How much money did you ultimately get to get Mostek off the ground?

**Sevin:** I think it was about three million, something like that.

**Remacle:** Couldn't start a semiconductor company today for that.

**Sevin:** You couldn't start a cookie company!

**Remacle:** Big difference, certainly. And then, when did some of the others join you officially, because that was another wave through TI, wasn't it?

**Sevin:** Yeah, it was. It created another disturbance. It was June 13 when several of the people that were wanting to join us had been – I forget one event that TI wanted to move the whole MOS operation to Houston. And they were being urged to build in Houston, and they didn't want to go, and we weren't quite ready to start our company yet. It was about June the first or thereabout when we got the money and we could go hire people and start operations. And so we immediately hired six guys.

**Remacle:** Who were the six?

**Sevin:** Berry Cash, Bob Palmer, Bob Proebsting, Vern McKinny, and Vin Prothro. Yeah, they all had wanted posters on them.

**Remacle:** So, did they have exit interviews also?

**Sevin:** They did, yeah.

**Remacle:** Equally acrimonious as yours?

**Sevin:** Oh, well I didn't call that very acrimonious actually. Fred didn't, he didn't threaten us until these other guys left. But nothing ever came of it.

**Remacle:** Mostek was the first spinout from TI that stayed in Texas and essentially competed in their own territory.

**Sevin:** That's right. Well, Texas Instruments is a global industry, it's just nothing more than a headquarters town.

**Remacle:** But it has a big footprint?

**Sevin:** More or less.

**Remacle:** I think that would be a fair assessment. So, what were the responses of your families? I mean you all had families at this time, wives, children, parents.

**Sevin:** Nothing but support.

**Remacle:** They were all with you?

**Sevin:** Well, the children were kind of young to understand what was going on, but my wife supported it. And even though I explained to her we could have been living in rags and hovels if it didn't succeed.

**Remacle:** But she thought it was worth the risk.

**Sevin:** Oh yeah. Wither thou goest, right?

**Remacle:** And you had how many children at the time?

**Sevin:** I had four.

**Remacle:** So, that's a big bet, it makes the risk even larger in that context. So, if you had to summarize the cause that you left or the reason that you all decided to leave TI, it was ...

**Sevin:** Opportunity, first and foremost, and the fact that there were frustrations if this had been in any other sector of the technology at the time, it wouldn't have been worth – the reward wouldn't have been commensurate with the risk.

**Remacle:** And the opportunity you saw was, I'm guessing from the name of the company, was MOS?

**Sevin:** MOS Technology, that's how it was going to be made and by God that's how it was going to succeed.

**Remacle:** And your investors agreed with that, they also shared that [view] ...

**Sevin:** Yeah, they also had industry experience and agreed with that, and they put us together with – most of the money came from the Sprague Electric Company. They put us together with Sprague.

**Remacle:** And what was in it for Sprague?

**Sevin:** New technology. They – Johnny Sprague was Bob Sprague's son who was the Vice President of Research and Development for Sprague, and he had the same forward-looking views that I had about the technology, and we fit pretty well. We even made out a logo to look like this, and they were a large minority shareholder in the company.

**Remacle:** As a minority shareholder, how much input did they provide to you?

**Sevin:** Quite a bit.

**Remacle:** Good input, bad input?

**Sevin:** Oh, real good input. One of the greatest inputs we had was the ion implantation technology. One of the people who joined us, whose name I mentioned before, Bob Palmer, was after we had signed up with Sprague and a series of contracts and investment documents and cooperation agreements and all this sort of thing, which let us go in to the Sprague Research and Development Labs which were fairly well known at the time and fairly important to the industry. We had access to the labs...we were like kids in a candy store. There were all kinds of things they were doing. One thing they were doing lead to our use of the ion implantation technology to control threshold voltages.

**Remacle:** When people think about Mostek, there usually are two things, MOS memories and ion implantation. So, you went in to it with the expectation that you were going to build the company around MOS technologies or technology?

**Sevin:** Not necessarily around memories, but it's just something we figured out we could do.

**Remacle:** Talk about how did you figure out that memories were a really good application for MOS.

**Sevin:** Well, if you've ever seen a core memory, you'll probably see right away that the miniaturization of that technology was going to be one heck of a lot harder than miniaturization of semiconductor technology, so it's as simple as that. And the demand for memory was becoming insatiable; it was becoming very large at the time.

**Remacle:** What was driving that demand?

**Sevin:** The computer industry was...

**Remacle:** ...was taking off.

**Sevin:** The semiconductorization of the computer industry was doing it.

**Remacle:** So it was kind of a closed loop process.

**Sevin:** Yeah, it was the dog chasing its tail maybe.

**Remacle:** And can you talk a little bit about what it was like to start up a company? What were the early days in the offices and up and down the hallways of a startup at that time?

**Sevin:** The hallway is where you had your meetings, I guess.

**Remacle:** How many people did you open your [Mostek's] doors with, roughly?

**Sevin:** About a dozen I would guess. That's about it.

**Remacle:** Can you talk about the growth path of that particular startup [Mostek] in terms of head count, revenue, customers?

**Sevin:** We started in the middle of '69. We had virtually, well, no revenue in '69 and maybe a few hundred thousand dollars in 1970, and in '71, something like a million and a half I would think.

**Remacle:** When did you turn profitable?

**Sevin:** With that million and a half.

**Remacle:** That helped a lot.

**Sevin:** We realized that. We stayed profitable until 1976, no 1974 when there was a series of events, a downturn and some internal problems we had. We had fires in our, a fire in our manufacturing facility which nearly wiped us out, but...

**Remacle:** I can't imagine. Tell me, who were the officers of the company at that point?

**Sevin:** Well, I was the President and Chief Executive. Berry Cash was Vice President of Marketing. We had Vin Prothro who was the Chief Financial Officer, and Bob Palmer was Vice President of Manufacturing. And the two most important, well, two of the most important guys we had at the time were design engineers, were Bob Proebsting and Vern McKinny.

**Remacle:** And they had all come out of TI?

**Sevin:** They'd come out of TI. Vern McKinny had come out of American Microsystems and I hired him when I was at TI.

**Remacle:** A drag along.

**Sevin:** I guess.

**Remacle:** So what was the response to customers to a start up?

**Sevin:** "Who are you?"

**Remacle:** How did you get over that?

**Sevin:** I think with the notoriety we gained from the ion implantation process.

**Remacle:** Why don't you spend a little bit more time on the ion implantation process? What was the breakthrough? What does solving the threshold problem mean technically? What was the technical breakthrough?

**Sevin:** The transistor and a vacuum tube were similar in that they had electrodes for passing current and an electrode for the control of that passage of current. And the amount of voltage you have to provide to that control electrode determines how much current you can pass through that three terminal device. A Field-Effect Transistor, a MOSFET, had a thing called a threshold voltage where below which no current would flow through the device, and above that current would begin to flow and the higher voltage you applied to that electrode the more current you got. The threshold voltage at that time was controlled by the physics of a silicon semiconductor and it was one number. You either could produce four volts there to turn it on or you couldn't. That was the choice, and that was one of the major problems. We knew that there were some chemical ways that resembled alchemy to move that threshold voltage certain amounts during the process and could modulate the voltage to lower levels, which we wanted it lower than four volts.

**Remacle:** And the reason you wanted lower than four volts was because of heat dissipation, or?

**Sevin:** Well, yeah, that's partly it

**Remacle:** So let's go back to the topic at hand which was solving the threshold problem with ion implantation or of implantation. How did Bob Palmer...

**Sevin:** Well, Bob Palmer was invited to tour the candy store in North Adams, Massachusetts, the Sprague R&D facility, and we knew that we had to come up with some way to achieve a threshold voltage of one volt or less because the popular power supply used with most bipolar integrated circuits was five volts and if you've got a four volt threshold you can't do much with five volts to switch current through a five volt power supply, so we knew we had to do this. And Bob called me one Saturday evening, which is an event I'll never forget, and his words were, "Hey L.J. do you know what these guys are doing up here," and then he described how they had taken reams of data of MOS Field-Effect Transistor threshold voltage versus ionic dose was introduced into the silicon by a scanning process much like the old television tubes. And the flow of ions into the silicon was simply a matter of collecting it over time, and it was a process that could modify the threshold voltage by almost any number you wanted because all you had to do was leave it on long enough to achieve the threshold voltage you wanted to achieve. We called it "dial-a-threshold".

**Remacle:** So the Sprague people had been doing their experiments and work for a different area?

**Sevin:** They were doing that for a different application and that was to replace the diffusion process with an implantation process in the manufacture of integrated circuits. So we got hold of that data and tried it out a few times, and the process consisted of Palmer partly processing wafers in Worcester, Massachusetts at the Sprague manufacturing facility and then getting in a car with a carrier with a dozen or so silicon wafers in it and driving to North Adams which was about almost 200 miles and...

**Remacle:** I hope that he didn't go over any bad bumps.

**Sevin:** No, he didn't have that problem. And anyway, implanting them on the Sprague equipment and bringing it back to Worcester to continue the process. It worked, and a bonus of the implantation process is that it seemed to improve the stability of the parameters of the threshold voltage and isolation voltage necessary too

**Remacle:** And the impact of that on your ability to produce MOS memories?

**Sevin:** Immediate. We were, within six months of that, which was late in '69, we were sampling people with products, with small memories, shift registers and various other things, I guess.

**Remacle:** And what were customer responses?

**Sevin:** Mostly ecstatic.

**Remacle:** And they were ecstatic because?

**Sevin:** We could take MOS circuits and interface them to bipolar circuits quite easily.

**Remacle:** What was Mostek's impact overall in the Texas semiconductor arena? In other words, did it help speed up other companies spinning out of TI or even making a decision to make this their headquarters?

**Sevin:** We made it easy for people to move from TI to Mostek, I guess. I don't know that it had an immediate effect on the rate of spinoffs out of TI. I don't think it did. It's the kind of company people remain loyal to for long periods of time.

**Remacle:** What about being able to attract other than TI people to Mostek, to a start-up in Texas? How difficult was that?

**Sevin:** No too bad. We early on started college recruiting and we had happy hunting grounds in Austin, College Station and, one of the happiest was Champaign-Urbana.

**Remacle:** And why was that?

**Sevin:** Illinois is a great engineering school, great program.



**Remacle:** My question was more what made those students be particularly interested in coming to work for a startup in Texas?

**Sevin:** Well, we were in Texas, but we were also in the Midwest. We were in the bottom part of the Midwest, right? We'd convince them of that. Dallas is a pretty attractive place compared to Champaign.

**Remacle:** That's a good point, certainly.

**Sevin:** Well, of course they could go on and go to work for anyone else, but we had our share of successes in recruiting college students to go to work for Mostek, and...

**Remacle:** What did your competitors-- when did they start to take notice of you and start to pay attention to you?

**Sevin:** Oh, I'd say about 1972.

**Remacle:** So a couple of years...

**Sevin:** We took the company public in '72. In that year we had something like \$12 million in revenue, and we thought trees were going to grow to the sky.

**Remacle:** How big did Mostek ultimately get revenue-wise?

**Sevin:** When we sold the company to United Technologies the last quarter we reported was a quarter of a billion. No, no. It was half of that, it was \$125 million a quarter. At that rate would have scared the heck out of a billion that year.

**Remacle:** And how much did you sell it for?

**Sevin:** Something like \$350 million.

**Remacle:** So you all felt like you'd made a—that your energy putting together this new company had paid off?

**Sevin:** Oh, yes.

**Remacle:** So if you had to summarize Mostek's largest contributions to the semiconductor industry you would summarize them as?

**Sevin:** I guess you'd have to lead off with the ion implantation. For a brief period of a couple of years we were the world's largest producer of semiconductor memory.

**Remacle:** So MOS memory and ion implantation?

**Sevin:** And we standardized the memory industry, which turned out to be-- could be viewed as a big mistake because standardizing means you standardized your tracks to a certain gauge and anyone can run this locomotive on it, and the Japanese loved it.

**Remacle:** What did you do to standardize the memory industry specifically?

**Sevin:** Well, the pinouts on the products.

**Remacle:** What was it that Mostek did to standardize the memory industry?

**Sevin:** Oh, I see what you mean, we started talking about the battle over the 16 pin and 18 pin device.

**Remacle:** Yes, that's what I wanted you to talk about.

**Sevin:** Well, that was a big deal at the time, but after a few years, 16 pins couldn't do it anymore, it couldn't handle any more traffic. Sixteen pins didn't last but about two generations of memory products.

**Remacle:** And by the time you sold to United Technologies, other than the money, what made you all willing to sell? Were you just ready to move onto something else, kind of tired of running a day to day business, or?

**Sevin:** The sale to United Technologies was pretty much forced on us and that's a long complicated story. Maybe you can let Berry tell you that, because I have a hard time fishing things up. Sprague was, as I said, a large minority shareholder. They owned something like-- in the late '70s they owned something like 40 percent of the company, no about a third of the company, and they sold themselves to a company called General Cable. And the minority interest they had in Mostek was covered under a voting agreement between myself and the Sprague Electric Company that basically prohibited them from selling us, but that expired. It was a ten year voting agreement and it expired in 1980, 1979, I'm sorry, and General Cable decided they wanted to sell the Mostek interest and a company called Gould, the battery company, was interested in buying it. They had just failed in trying to take over Fairchild, and I guess it didn't take much intelligence to figure out where they were coming next. And so I got a call from the CEO of Gould congratulating me on joining them. I said, "What the hell you talking about?" Sprague had, Sprague, it was General Cable had agreed to sell their interest in Mostek to Gould, and I still had agreement coverage for several months to go out and find a better offer. That's what we did and we got a better offer out of United Technologies, so we really didn't have a choice.

**Remacle:** It was “you're going to be sold to somebody so you had better get the best deal you can”?

**Sevin:** The offer out of Gould was so good that the lawyers were telling me that we'd have a hard time fighting our shareholders over this one, so the so called interest of the shareholders is what really caused us to sell it.

**Remacle:** Did you stay on for a transition period, or?

**Sevin:** I did. I stayed on about, let's see, September, about nine months. That's a great transition period.

**Remacle:** Did others on the executive team also stay on or transition?

**Sevin:** They stayed longer. I left first.

**Remacle:** And why did you leave first?

**Sevin:** Well, as I think I remember saying: “once that once you've been god, there's not so much fun in being a prophet”. I guess I was [god], in those days anyway, I was kind of full of myself I suppose, and sometime toward the end of 1980 I moved on.

**Remacle:** And you moved on to?

**Sevin:** Well, I wound up in a venture capital partnership with a gentleman named Ben Rosen.

**Remacle:** How did that come about?

**Sevin:** Well, Ben was a security analyst on Wall Street for a number of years and he wound up in 1980 being the Vice President of Research for Morgan Stanley, one of the small companies., Anyway, Ben was somewhat dissatisfied in his relationship with his employer and decided to leave them, and called me up and suggested that we do something together. And one of the things we might do together is getting together with Al Stein at Motorola and starting a new semiconductor company, which we spent some time looking at and concluded that it probably wasn't the thing to do.

**Remacle:** What was the main reason behind that conclusion? What lead you to conclude that starting a semiconductor company wouldn't be a good idea?

**Sevin:** Lots of competition, and I wasn't too thrilled with the idea of launching a dozen years later. How can I put this? It was not the bleeding edge any more, it was just not, and it didn't appear to be, but it turned out there were lots of niche market opportunities that were exploited subsequently. But I don't

guess we were just, weren't that interested and so we decided to try to just to go into the venture business to try to help others start their companies instead of starting them ourselves.

**Remacle:** So did you use your own money initially for venture backing, or did you go out and get other limited partners?

**Sevin:** We went out and got limited partners. We raised a fund, and Tommy Unterberg was the name I was trying to think of yesterday, Unterberg, Towbin was a boutique firm on Wall Street. Tommy Unterberg is the one who suggested we do it.

**Remacle:** So how much was your first fund?

**Sevin:** Twenty-five million.

**Remacle:** Which was pretty sizeable for that point in time.

**Sevin:** Probably, yes.

**Remacle:** So did you set up offices here in Dallas? Or, did you set them up in New York?

**Sevin:** We had offices in Dallas, New York and American Airlines. Our principle market was Silicon Valley, although we did some things here [Dallas] that succeeded.

**Remacle:** Let's talk about a couple of those that you invested here in Dallas or Texas that succeeded.

**Sevin:** The dynamic duo, Compaq and Lotus. I don't know if Lotus is still well remembered, but that was quite a success.

**Remacle:** Talk about that success a little bit. Again, we're recording for posterity here.

**Sevin:** In his career as an analyst Ben ran into a lot of people, and one of the young persons he knew was Mitch Kapor who had worked for a software company whose name I can't recall. It was a big deal at the time, but he was ready to spin off and do his own thing, and we were using a, we were both on Apple computers and we were using a program, a...

**Remacle:** Spreadsheet, financial?

**Sevin:** Spreadsheet program and I can't remember its name now. I thought about it last night and now I've lost it. Anyway, he had ideas that would improve the utility of that program and its ease of use which we recognized with the shortcomings of the program we were using.

**Remacle:** So was Mitch the first entrepreneur that you guys funded?

**Sevin:** No, we funded two concurrently. About the same time was Compaq. Right after we opened up shop and we put out a little news release. I got a call from Houston, a young guy named Rod Canion who said he-- there's a lot of events missed here. The introduction of the IBM PC was also a concurrent event and Ben had been invited to it in his role as an analyst, and...

END OF TAPE 1

**Sevin:** Rod Canion and a few of his friends wanted to start a company to develop an add-on hard disc for the IBM PC which didn't have a hard disc. It operated off of floppies.

**Remacle:** It seems like a long time ago.

**Sevin:** Well, it was. It was 1982. Time flies. We talked to Rod and a few of his friends. He had some friends working with him and I told him he had to go back and dissolve that team and had to worry about rendering under Caesar. They worked for TI. They did eventually get sued.

**Remacle:** So they were still at TI when they approached you with their idea?

**Sevin:** Yeah. And they were writing business plans. I was telling them to go back and tear up the business plans, forget it and disband the team. If we want to do something like this and you're the right guy to lead it, well, we'd go with you and start the company but...

**Remacle:** Can't do that while you're at TI.

**Sevin:** Yeah. I must say I had some good lawyer briefing when we started Mostek and it all turned out to be right, what you could do and couldn't do.

**Remacle:** What were the key things that they told you you couldn't do?

**Sevin:** Render onto Caesar. Don't take anything with you, but what's in your mind. No equipment, people, and, of course, you have to beat the people off with a stick so you can't avoid hiring people out of there.

**Remacle:** But you can't solicit.

**Sevin:** You can't solicit. That's right. Anyhow...

**Remacle:** So, from the initial contact with Rod, how long did it take and what was involved in getting it to a fundable company?

**Sevin:** After a couple of meetings or so, we decided that, yeah, we'd probably do this. We liked the guys. I did a little background checking on Rod and it all turned up positive. We told him we'd back him. By that time, he had a partner with him, Jim, oh, goodness. I limited him to one guy and that was Jim Harris.

**Remacle:** So the startup team was the two of them?

**Sevin:** The two of them.

**Remacle:** How did it morph from being a compact disc external drive to...

**Sevin:** We went to, I think it was the first, what the heck's the name of that Las Vegas, COMDEX, right?

**Remacle:** COMDEX, yes.

**Sevin:** COMDEX, the computer dealer's exchange. We went to that to see what kind of new products were being bandied about and what the heck we would find to invest and it was at that COMDEX that I met Mitch Kapor. I was working things at the same time, but in a booth at COMDEX, way in the back somewhere, the main exhibition hall, was this product they were talking about. Some guy was demonstrating it, a doctor out of Indianapolis, a medical doctor had come up with this idea and we said, "Sorry, guys, we can't do that." So they went back to the drawing board and had the famous pie shop meeting and came up with the idea of a portable IBM, which we were ready to react to because we had a little bit of money in Osborne Computer. Hey, I remembered Osborne. I usually forget that one. <laughter> Yay.

**Remacle:** So Osborne had made you a little money so that you could...

**Sevin:** We lost money in Osborne, actually. Osborne didn't succeed.

**Remacle:** Did it crash and burn?

**Sevin:** It did. It did.

**Remacle:** How much money did Compaq start with? What was their first round?

**Sevin:** First round was a million and a half. No, wait, no, no. First round was, my goodness, more like three million.

**Remacle:** That still seems like a small amount of money.

**Sevin:** We invited a few friends to join us in the investment. One of them was Kleiner Perkins and they took a substantial-- I think a million and a half is what we put up. Compaq...

**Remacle:** The total...

**Sevin:** The total was three million and Compaq was probably valued at about four or five million.

**Remacle:** So talk a little bit about who else wanted in when you guys announced your fund? You mentioned Andy Grove.

**Sevin:** Andy Grove wanted-- I didn't want-- Ben wanted him, I didn't want him because, as I told him, I told both him and Ben that it's inevitable that we're going to invest in Intel spinoffs and Andy said, "Well, that doesn't worry me too much. Neither one of you guys can run anything anyway." <laughter> And I said, "Well, then, why in the heck do you want to invest?"

**Remacle:** Good question.

**Sevin:** But, anyway, he did and we did and it worked out well and everybody was happy.

**Remacle:** So you ended up with some pretty high powered partners, co-investors and limited partners?

**Sevin:** Yes. We realized that the center of the action, even then, was Silicon Valley.

**Remacle:** But you maintained no office in Silicon Valley?

**Sevin:** We did have an office. When we raised our second fund, we opened an office in Silicon Valley.

**Remacle:** So your first one was in '81? You raised your first one in '81?

**Sevin:** Yes, we did. Yes, we did. '81.

**Remacle:** And the second one?

**Sevin:** '83. We went through that 25 million rather quickly.

**Remacle:** What kind of a role did you generally play? Were you [a] mentor?

**Sevin:** Sort of, yeah.

**Remacle:** ...[Did you] step in and take.....interim positions sometimes?

**Sevin:** Sometimes we did that, but didn't have to do it with Compaq or Lotus. Board, we took board seats, one or both of us, depending on how important it was, would sit on a board.

**Remacle:** What was the decision process like in terms of "we're going to invest in this opportunity and we're not going to invest in that one"? What were the deciding factors? How did the two of you figure it out between the two of you?

**Sevin:** Well, the funniest one is if either one of us didn't like it, we didn't do it. Basically it's what it amounted to. Each partner had full veto power and so...

**Remacle:** How often did you have to invoke full veto power?

**Sevin:** Not very often. We were both good at convincing, at politicking the other. It worked out real well.

**Remacle:** So what were the key factors that would cause you to decide "we don't want to do this deal" or "we do want to do this deal"?

**Sevin:** Mostly the people. Number one, two, and three would be people, people, people, the background checks we could do and the kind of data we could get on them would tell us that this guy has a potential for success or a record of success and what some of the folks in Silicon Valley called a PFR, which I thought was funny.

**Remacle:** I don't know that term.

**Sevin:** Proven Failure Record.

**Remacle:** I'd not heard that term before. Why was a PFR important? I can guess, but let me hear it from you.



**Sevin:** Well, you can guess.

**Remacle:** Lessons learned.

**Sevin:** Provided you can actually learn the lesson.

**Remacle:** I've heard several VCs over the years say that they'd rather see somebody who's tried it and failed once because they figure they're (a) more humble and (b) they've learned some serious lessons.

**Sevin:** Well, one failure does not make a proven record.

**Remacle:** So as the years have passed, what has been the role of VCs, in general, in the development or evolution of the semiconductor industry, especially here in Texas? In other words, what would the industry be without VCs?

**Sevin:** Probably wouldn't be. There's got to be some way to raise capital. One of the weaknesses of Mostek was we were continuously undercapitalized. It was one of the other reasons that caused us to realize we were going to have to sell when someone showed up with a checkbook was that [was open].

**Remacle:** What caused you to be undercapitalized? Your revenues were pretty big.

**Sevin:** Revenues were big. We were always a little bit behind the eight ball as far as raising money.

**Remacle:** And the reason for that was? Why do you think you stayed behind the eight ball? Was it something inherent in the team? Was it just the way the markets worked? Was it because the capital costs were...

**Sevin:** Well, I like to think it was the environment changing on us.

**Remacle:** And what about the environment changing? What specifically?

**Sevin:** Well, the competitive environment, for one thing. The Japanese were coming on with their locomotive on our standard gauge railroad track and we could see that we could never compete with the access to capital that they had. That's a long story, too. I spent some time lobbying during my career in Washington trying to get something done about the equity, how they were treating the domestic industry versus the...

**Remacle:** What other governments do.

**Sevin:** What other governments, yeah.

**Remacle:** Standing back and looking, at what point did you get out of the day to day VC [business]? Are you an active investor today still?

**Sevin:** No, I'm not.

**Remacle:** At what point did you exit from being a formal VC?

**Sevin:** Around 1990.

**Remacle:** And that was for what reason? Just because you got tired of it?

**Sevin:** Well, sort of. We got successful and were happy and all that stuff and... ..chasing around, catching the red eye to Silicon Valley or back from Silicon Valley was getting old and so we just sort of faded into the background here. No, I'm not doing the investing any more.

**Remacle:** What do you do today?

**Sevin:** Manage my own money. That's a full-time job.

**Remacle:** What about your family? Your grandchildren and things like that?

**Sevin:** I have two grandchildren. One's 26 or so and one is three. My youngest daughter and her husband adopted a little boy.

**Remacle:** That's pretty exciting.

**Sevin:** That little boy has flu right now and that's one of the reasons I was warning you not to get too close to me because I play with him a lot.

**Remacle:** Isn't that a wonderful opportunity? So what's been the most exciting, rewarding, satisfying period or project of your career? Can you pick out one period of time when you'd say, you know, I really loved that the most?

**Sevin:** There'd be several of those, I guess. The early days of Mostek and the Busicom project and single chip calculator and it really was, indeed, the world's first although we didn't design the-- we weren't the architects. We took the Japanese design and converted it to MOS large scale integrated circuit and it

worked. It was a big factor in our early success. Then, the cooperative project with Hewlett Packard and the scientific and early financial calculators.

**Remacle:** When you say cooperative, how did the “cooperative” work?

**Sevin:** Well, they designed it and we converted it to silicon. They had two suppliers, Mostek and AMI. We were more successful of the two. During the 1970s, the Vietnam War, Dave Packard left HP to go to - he was secretary of defense, wasn't he?

And when he came back from his stint in government in the mid-'70s, he decided that HP was going to make all those semiconductors for itself, so that ended that. But the actual development of the project through the introduction of the scientific calculators and all of that was very exciting. Berry will be able to cover that a lot better.

**Remacle:** Okay. What other high points?

**Sevin:** Compaq.

**Remacle:** Compaq.

**Sevin:** The most exciting meeting, one-day meeting I ever saw was introducing the Compaq people to the Lotus people and each trying their products out on the others'.

**Remacle:** And they worked.

**Sevin:** And they did, yeah.

**Remacle:** And so what made it so exciting? The fact that they worked?

**Sevin:** That they worked.

**Remacle:** And...the energy in the room?

**Sevin:** We knew it was going to change things.

**Remacle:** What were the biggest lessons you've learned over the course of your career? If you had some young engineer, MBA, sitting in front of you, you'd say, well, these are the three things that I learned the hard way. Let me share them with you.

**Sevin:** I guess maybe I didn't learn anything. <laughter>

**Remacle:** L.J., I don't believe that.

**Sevin:** I'm having a hard time with that.

**Remacle:** Okay. Let me ask you another question. If you could change or redo or rethink an event or activity or a decision you made during your career, which one would it be?

**Sevin:** I don't know. Everything happened as it did. In Mostek, I guess I would have liked to go back and change the fact that we got into the calculator business. Probably shouldn't have done that. We were rewarded by having to write off half our net worth.

**Remacle:** That was kind of a parallel to Intel's Microma.

**Sevin:** Sort of, yeah.

**Remacle:** Because they had to shut it down and write it off, too.

**Sevin:** If there's anything I've learned, it is do what you know best and be wary of new ventures that you know nothing about. Of course, if I'd followed that advice, I probably wouldn't have gone and started Mostek.

**Remacle:** I'm just going to ask you, do you consider yourself an entrepreneur?

**Sevin:** Yeah.

**Remacle:** What do you think characterizes an entrepreneur?

**Sevin:** The willingness to take risks. Pure and simple. Informed risks.

**Remacle:** Not crazy risks?

**Sevin:** Who knows what risks are crazy and...

**Remacle:** Is it just somebody's tolerance level? Your tolerance level for risk-taking is greater than mine perhaps or...?

**Sevin:** Probably.

**Remacle:** This is a serious question, what advice would you give a young scientist or engineer starting out their career about how can they nurture their potential to make a contribution to innovation, to innovative products?

**Sevin:** Well, as I said to you before, I figured out early on that I wanted to be at the leading edge of things, whatever field you'd be in. If you've got to work on yesterday's products, your tomorrow is not going to be as [exciting and interesting]...

**Remacle:** So seek out something that's challenging and interesting and leading edge stuff?

**Sevin:** And it will make a difference, yes.

**Remacle:** Okay. Is there anything I haven't asked you that I should have or that you would like to make sure we capture for posterity?

**Sevin:** No.

**Remacle:** All right. Well, thank you so much for your time.

END OF INTERVIEW