Interview of Charles (Charlie) Bass

Interviewed by:
James L. Pelkey

Recorded August 16, 1994
Palo Alto, CA

CHM Reference number: X5671.2010

James Pelkey: Thank you for your time.

Charlie Bass: Well, you asked me about ALOHAnet. I go back even further. In '68 I was working on a masters thesis, and I had read a set of monographs from Rand Corporation, written by Paul Baranthat exposed me, for the first time, to packet switching. Which - I didn't quite get it, but it was remarkable. What I was really more interested in is encryption and security work at Rand, but I had just read this as a part of a series.

Pelkey: Were you at Berkeley?

Bass: I was actually, no. I was finishing a master's thesis at the University of Miami, working for Control DataCorporation, and about to head off to Hawaii to start my PhD. I went to University of Hawaii. I had been to Hawaii a lot and liked it. It was fascinating, the idea of going to school there. Norm Abramson, when he was awarded the Aloha project, he was looking for people to implement the system. He came across my application to graduate school and started recruiting me to come to graduate school there, which was a turn around, because I always try to sell myself to other people and suddenly, somebody actually wanted me.

Pelkey: It must have been nice.

Bass: Oh, it was terrific. So Norm was the reason I went to Hawaii, and I got there, and the program was pretty unstructured. They were suddenly handed this big contract and lots of money, based on his ideas and Franklin Pose's ideas -- they had some talented faculty. But it wasn't clear how they going to implement all of this, Norm's basic ideas on how you do a packet switched radio broadcast network. So I settled in there and my job was to write the timesharing system that was the receiver and catcher of local traffic. I had done some operating system programming -- started working on the project and my connection with the Aloha phenomenon was really viewing it as a transmission channel in and out of the operating system I was working on. I didn't have much communications background before that. It was mostly operating systems programming. But in that milieu -- that was the real strength of this group, Norm's background, Frank Pose, Wes Peterson, Ned Weldon, were all, really, first rate communications types. It was a rich and fertile environment and, as a part of the ARPA community, it exposed me and the program to all the basic research going on. In fact, the first year I was there we sponsored a principal investigators event.

Pelkey: What was it like?

Bass: Oh, it was incredible. I mean --

Pelkey: So you think you're going to Hawaii and your not sure what the program's going to be like and then walk in and have that happen.

Bass: Right, it was just an amazing, wonderful period. We had these researchers from the best centers of research all over the country, and, in our way, feeling a part of that, you know, sort of that you're connected to these people, and meeting them first hand. As a graduate student, my job was to get coffee and make sure that the handouts were stapled or something, but just to meet these folks and observe them in action, and to observe Larry Roberts holding reign over them was wonderful.

Pelkey: Oh, yeah. He was the king.

Bass: Right, and John Davidson arrived in Hawaii the same time I did. He was fresh out of undergraduate and had very little true computer background at the time, but it was clear in the first two weeks that I knew him that he was like a sponge. He was limited only by his exposure. Anything he came in contact with, he just soaked it up.

Pelkey: He was a remarkable soaker.

Bass: I already had learned the lesson that success was more a function of what you're responsible for than what you do. So I realized that, one of best things I could do was to get John Davidson working on my problems. So we went about implementing this system. The operating system worked and I was able to derive a thesis out of it for my dissertation, which is really a study of 'How do you create what looks like a monolithic program within a multi-tasking environment, which in itself is a complex multi-tasking environment?' So it's kind of a recursive -- How do you do disk allocation, and caching and the I/O in the context of a big IBM system that has no sense of anything other that a simple task. So it was an interesting intellectual pursuit.

Pelkey: It was right on the edge of what could be done.

Bass: Not with a timesharing system 360 environment we had. So, again, the exposure to communications was more because that's what everybody else was doing, because that's what was the unifying theme of the project. I didn't fully appreciate why this was so innovative and so important, not realizing the fact that it had never been done before. And the channel efficiencies didn't look very good, but boy, they sure were cheap. You could -- the output of those was just so simple that it was remarkable when you got what you got. Another notable event was well into this, I was in the third or fourth year, I guess, and Bob Metcalfe came from Harvard, I believe, where he was doing his dissertation, and he had, he was doing a dissertation on broadcast networks, and -- shows his early cunning ways -- had convinced his principal investigator that he should come to Hawaii and study the Aloha project as a visitor. An example of a broadcast network. So I met Bob in Hawaii --

Pelkey: '72?

Bass: Eh, this would have been a little earlier. It would have been, probably, '70 or '71 -- maybe '71, but I left in late '72, so it couldn't -- I really can't place it in time. It was in the last year or so of when I was in Hawaii. I remember sitting on the balcony of John Davidson's apartment with Bob, just drinking beer and talking about graduate students. That, in turn, connected to Xerox PARC.

Pelkey: He wasn't at PARC yet, but --

Bass: No, he was finishing his PhD.

Pelkey: Because he came back over after he joined PARC. Do you agree?

Bass: I don't know, but he had not joined PARC. I know he was still finishing his dissertation. I left in September of '72 to take a position at Berkeley on the faculty, which was one of my life long coups at a time when there was a glut of PhDs looking for faculty jobs. And I think that I got that position on the reputation of Norm Abramson and Wes Peterson and the people who were in Hawaii. There's another fellow – Lichtenberger Roy Lichtenberger-- who had been at Berkeley on a project called NCC-5000 or something like that. Maybe UCC-5000Mel Curtal had built this huge complex computing structure, multi-processing structure, and tried to make it -- started with some research money -- tried to make it a commercial venture. It started down the tubes and they found a way to transition the whole project to Hawaii under the auspices of ALOHA. The point is that gave me even more connection to Berkeley. So all those contacts were there. Well, I got to Berkeley and there was -- my role there was to teach operating systems and run the introductory programming curriculum, which I did for three years. I was happy, thinking of a life in academia, realizing that I probably would never get tenure at Berkeley, but it was a good jumping off point. And in mid '75 -- actually, probably in the spring -- I was contacted through a mutual friend to meet with Ralph Ungermann, who was starting a company named ZilogThey needed someone to be head of their software group. I wasn't really very interested in leaving the university, but, on a lark, talked to them. This whole idea of the microprocessor was fascinating, and they offered me more money than I thought I'd ever see, which I think was $30,000. So I said, again, not much to lose, I can always go back to the university, plus these were kind of interesting people. So I went off with them and proceeded to hire mostly my students from Berkeley to build the Ziloggroup. One of the notable exceptions was Judy Estrin I hired her out of Stanford, and the connection there was, her father and another fellow, who hired me at Berkeley, were good friends. Marty Graham was the head of the

department that hired me at Berkeley and Judy's father -- I forget his first name -- but Judy was looking at conventional companies. I think I -- she found out about us because I was teaching -- I continued to teach at Stanford -- operating systems or a compiler course, I think. Anyway, she was also, obviously, going to be a special person with the combination of her technical ability and presence and her ambition and her genes, and it was just remarkable. John Davidsonin the meantime, had ended up at BBN. He finished in Hawaii a year or so after I did, did some TCP/IP work or some early implementation of the ARPA protocols. And whenever I'd go to Boston I'd see John, which wasn't often. On one of those occasions, he and I were sitting in his house talking about stuff. At the time I was with Zilog, talking to him about what we were trying to do by computer, not an imbedded kind of processor. What we were really doing was building operating systems and languages and beginning to work on communications, and just the power of the microprocessor was beginning to be --

Pelkey: New to the scene.

Bass: Correct. We were just trying to appreciate that. And John and I start talking -- I think I was already realizing that I didn't know how long I was going to last at Zilog because the Exxon thing was beginning to weigh on all of us, but --

Pelkey: This is when, '78?

Bass: Right. It was probably a little earlier than that. It was late '77, or maybe '78. So John says something to the effect: "You know, you could take one of these processors and you could build a local network." Well, I knew what a local network was because, as I had observed, the evolution of ARPA to Ethernet -- excuse me -- from ALOHAnet to Ethernet that Bob had done, I had used PARC as a place to take my students at Berkeley, and I stayed in touch with Bob and Liddle and Alan Kayand all those folks, and just watched that milieu of the coming into being of Ethernetand intuitively I was beginning to understand networking, because of this chain of events. And then John and I started talking about networking that night at his house. You know, you could really build an Ethernet, which in those days was -- it was the Xerox implementation. It was more a generic description than it was a specific description. I found it intriguing. I could see that it was feasible, and we were looking for ways to begin to connect the Zilog development systems. So it occurred to me, well, that might be what we should do, is build a network for these development systems and build a more interesting distributed computing environment. I got back and told Joe Kennedy, who was running engineering, to see if we could get John to come to California and help us with a networking strategy. We had started, already, a distributed computing research program in the summer, which Dave Folger headed up. I mean our ambition was boundless. That's was the Zilog --

Pelkey: Story.

Bass: Syndrome. We had some of that. We had development activity in almost every corner of computer science.

Pelkey: I have some funny quotes of the Zilog days.

Bass: Oh, my God. So we had -- I mean, we had operating systems going on; we had languages going on; and we had communications; and we decided to start this distributed computing project. And we needed an interconnect strategy, and we decided that we would try do it on a Z80 based LAN implementation.

Pelkey: Now, was Ariel around at this point?

Bass: Ariel was -- kind of came through the culture and never really amounted to much. Bruce Hunt always overstated what Ariel, in fact, was, and I don't remember clearly that it had any real impact.

Pelkey: But you were doing something with Ariel?

Bass: Yeah, it was in this period, but I can't remember much about it except Bruce championed it. We didn't use it and, afterwards he was miffed. So John comes out and we start this implementation, and John was just, at this point, an expert protocol person, and we had some good hardware expertise. Joe Kennedy was able to master all of this stuff pretty quickly. So we start this implementation of a network, and probably less than six months after John arrives, Ralph blows out of Zilog over a brouhaha with Exxon where Exxon wanted to fold us into their office products intergalactic strategy and we didn't want anything to do with it. Ralph was the champion of the dissenting team. Federico [Faggin] sided with Exxon. Exxon came out and did this classic management interview to try to figure out what we were talking about and why weren't enthusiastic about going along with them. We told them we wouldn't have anything to do with it and everyone voted for Ralph and if they did anything to disrupt our strategy, we would all follow Ralph. Well, they smiled nicely and Monday morning canned Ralph.

Pelkey: Now, this is early '79.

Bass: Right.

Pelkey: Or is it the end of '78?

Bass: It's end of '78, because I remember going to Ralph's apartment -- he had recently moved out of his house and back to his apartment before Christmas -- we would have these amazing meetings with Federico and Exxon -- they would tell us that they didn't want us to be conspiring with one another and then we'd all immediately go meet at Ralph's place and plot, and drink, and laugh and cry.

Pelkey: Have a beer and --

Bass: Yeah, it was a bizarre time. So I think it was in that -- right at year-end, December or January that Ralph got thrown out. It didn't take much to figure out that many of us were tainted by our allegiance to Ralph and telling Exxon before this that we didn't want to have anything to do with them. And then Federico tells us that. Then we all go and say: "Well at least, Federico, we kind of trust you, so at a minimum, don't bring in any Exxon flunky." And he said: "Oh, no, I'd never do that." And two weeks later, he announced that Manny was joining. And we all looked at Manny's resume and said: "This is a joke. This guy has never seen a processor or a computer," and there are some great stories. I don't want to have too much fun with Manny.

Pelkey: He certainly had shock too.

Bass: Oh, yeah. I do have to tell you one story.

Pelkey: Please.

Bass: You've probably heard others, but one of my favorites is that we had this long narrow building where the engineering team was, and Manny was very quickly developing a reputation for not getting it. So when he would come in the building, and I was at the far end of this long hallway -- whenever he would just walk in the building I would hear down the hall this echo of “Babalú!” And it would come from one office to the next.

Pelkey: No wonder he never wanted to go there.

Bass: So I knew that Manny was in the building…

Pelkey: Oh, that's wonderful.

Bass: ...whenever I heard that. So anyway -- I actually liked Manny as a person, as a human being. I think he's a good guy, but he was miscast. So, this last six months, when Ralph left, I just started counting

the days. I had a vesting coming up in June for my initial option, so I was just hanging on with my fingernails, trying to get that last chunk vested, not knowing what it would be worth if anything, but still not wanting to leave.

Pelkey: Yeah, for six months.

Bass: Right.

Pelkey: Now, the big event is in May / June, right?

Bass: Well, we'd been working on this network, and Manny brings in Bill Carrico to be his planning guy. Boy, that was something Zilog needed, at least to focus our efforts and figure out what business we were in. And Bill was smart, young, and really took this seriously. So Bill headed the planning process and I, as part of the management team worked with him carefully and, in parallel, Ralph and I are meeting weekly trying to figure out what the hell we're going to do. He was out of a job and I knew I was going to be down the road, and we had -- we figured we had another one in us, so the question was: 'What was it?' So I would -- every week we would talk about a different idea. We met at different places, coffee shops, his house, restaurants, and things, and we just talked. And Ralph's pretty good at cutting through ideas to the substance. I was good at bringing them up, and he was good at tearing them down, which was a good process for both of us to think hard about what would be worth basing a career on. And one week I brought up this idea that John Davidson had a year and a half ago about: "What about it we take this implementation of this network that we're doing now at Zilog and strip it out from the system it's imbedded in and sell it separately as a network?" And the rationale would be that people were beginning to have multiple computing devices that they wanted to talk to, mostly from ASCII terminals sitting on their desks, and they were trying to figure out how to switch between those multiple devices. And we could begin to hypothesize: "Well, they probably would also like to share some information on computers It was really, at first, a switching kind of --

Pelkey: I see that going on as a consequence of there having been 100 minicomputer companies. So you had all this applications software that was machine specific and some companies where they end up having two or three different minicomputers in their office-

Bass: Right, and you would sometimes see two or three different terminals on someone's desk, because they were a party to the marketing database, and part of the accounting database, or something. So Ralph and I started talking about this and it started feeling right. It started feeling like this was an idea.

Pelkey: Now, were you interacting with PARC at this point?

Bass: I had always stayed just kind of close, Bob and I.

Pelkey: Well, you know Ethernet was up and alive at PARC.

Bass: Oh, yeah. I was there -- I can't say regularly -- but often. In fact, again, one of the good things we did at Zilog was stay connected to --

Pelkey: You used to kind of socialize together?

Bass: Yes, right. I knew all those people. We had this forum at Zilog where we would invite people in to talk, and field trips there. It was a very fertile cross-fertilization of all these people. And we knew the beginnings of the Apple people, so, yes, I was well aware exactly what was going on at PARC with Ethernet, and we were patterning our -- what was to be called ZNet -- but we were patterning that implementation on what we knew about Ethernet. We had people from Xerox going back and forth. So on one hand, I'm having these meetings with Ralph about taking this as a separate kind of product application market idea and then, in my day job, I'm working with Bill Carrico about 'How do we turn all this technology into real business in real markets?' And I can remember Bill saying, one day: "Well, why don't we just take this network and sell it?" And I just kept quiet. I mean I just bit my tongue.

Pelkey: Bit my tongue.

Bass: I did not say a word. I didn't want to encourage him. I didn't want to discourage him. I didn't want to ever have to be back in court saying that I had talked him out of it. I just thought: "Oh, my God. This guy hasn't done this before, but he's too smart."

Pelkey: And this is before the formal planning meetings.

Bass: This is kind of tied up in that. This is in brainstorming.

Pelkey: Because there's a whole group of you. I want to make sure I have some facts straight about that meeting, because the number of companies that came out of that little group of people meeting there is unique.

Bass: Yeah, I'm sure. I've never thought about the significance of --

Pelkey: There's Ungermann-Bass and Bridge, the guy who did OmniNet.

Bass: Right.

Pelkey: He was in there. The Excelan guy.

Bass: Right. They're all part of that. The way I think of those planning meetings is kind of trying to figure out how it was going to make money, and what business it was in. And we certainly spent a lot of time talking about all the possibilities. I'm sure it was very stimulating to everybody that was a part of it. We did these off-sites. But I must confess that emotionally and psychologically, I was detached. I mean, I was just trying to be a good soldier.

Pelkey: You want to get the June vesting out of the way and be gone.

Bass: Yeah, right.

Pelkey: And, in the meantime, not create a complicated situation for yourself.

Bass: Right. It's -- you've seen this many times where you're talking to somebody that -- they're trying to make a career decision and they tell you: "I need to make this before I go into this meeting, because once I go in, I'm going to be a part of this next generation." And I didn't want to be a part of the next generation. I just wanted out of there, but at the time I want to draw my salary and get my vesting done. So, as Ralph and I refined our ideas, his question to me was: "Who do we need to do this?" Well, I named two people, Davidson and Kennedy. Joe could do anything and John can do this. And so I approached them. Joe was a skeptic, but he didn't want to stay at Zilog. He was totally -- was finished with Zilog. And John -- this was all just all happening so fast. John had just gotten his wife -- pregnant wife -- to Zilog and now she was pregnant again and we're talking about a start-up and she didn't have any idea what that meant -- whether or not she could go ahead and have the baby or not -- but we had good rapport. There was fun time. So we start -- there was one other engineer…

Pelkey: Judy's recollection is that it was you and John and six engineers.

Bass: No. It was -- well it was me and John and Joe, and the third engineer I can remember in the door was... I'm trying to remember. I think he was our first hire. Then we brought across Dave Arnold.

Pelkey: So as soon as your stock vested --

Bass: Oh, yeah, I was out of there the day it vested, I think. It might have been June 30. I might have --

Pelkey: Then you incorporated in July.

Bass: We incorporated, started working out of Ralph's house in Los Altos.

Pelkey: And then John and Joe joined you after that.

Bass: Right. They, in effect, joined us within two weeks after I left. We made some -- we cut some deal with them on salary and stock.

Pelkey: And the money, it's Ralph's money and your money?

Bass: It's my money and Ralph's money. We each put in $125,000, which is all the money I had, and it was all that I think Ralph wanted to invest. He had come out of Zilog with a buy-out from Exxon, which is what happened in the meantime. I guess it was one of the reasons I had to hold on, because Exxon started a repurchase deal with employees. They would set a price and if you sold they'd tell you what they'd pay for it. So I began to calculate what that was going to be worth and how I could do it, so $125,000 was --

Pelkey: A lot of money.

Bass: -- everything I had. I mean, that was everything I made at Zilog, and Ralph and I did matching funds and we cut these deals with Joe and John of either no or minimal salary in exchange for some founder stock, and we were off and running. In the meantime -- and I don't want to continue on the Zilog thread because I don't know much -- but in effect, we left Judy holding the bag. She was the one person left that really understood what we were doing.

Pelkey: A different perspective that you're helping me understand is that Ariel was a project that was going on internal to Zilog, and it was doing interesting things that weren't really networking. But separate from this, there was this other notion that was going on with John and you, so that when ZNet got formulated out of this planning process, it was really the trajectory created through work that you and John were doing, as opposed to the Ariel project.

Bass: I think -- I'm trying to remember. I became so frustrated with Bruce that I kind of cut him out. As I recall, we were trying to figure out how we were going to do this, and Bruce came in and said: "I know how to do it." He was someone who had -- I think he worked at Xerox or something. SLAC. And he could speak the language and look like he knew how to do it well. He played a role in the early planning, but very quickly it was out of his hands, because he became superfluous to the process as it was drawn into the culture. And Ariel was kind of an artifact of something. But the evolution of their ZNet on one hand and Ungermann-Bass on the other goes back to sitting in Boston with John Davidson and him saying: "I think we could build a network, here, out of Z80." I was trying to convince John, at the time, that a Z80 was a real processor, and he was trying to show me: "Well, here's the test. If it is, then it ought to be able to do this." So --

Pelkey: You were unique in that in July -- it's the same that – June, Metcalfe and in July, Sytek as well, that there were conversations that were going on amongst even the three of you. You and Bob were meeting and having lunch and whatever, and you were talking about this stuff.

Bass: Yeah, Bob and I, at this point, were playing racquetball together. This started before I left Zilog. He and I -- Bob is a superb racket sportsman. He played competitive league college tennis. He played tennis very well. Well I was a racquetball person, and he had never played racquetball. So I said: "Aha." I had tried tennis with him. That didn't work very well. I tried even paddle tennis -- well, we got into that later. So I take him out on the racquetball court and the first game I ripped him. The second game, it was tough. It was right on the edge. I think I might have won by a point or something. The third game, he beat me and for the rest of the time we played racquetball, it was a dogfight. I mean, he was such a natural athlete with respect to racket sports. So he and I are playing weekly, and I'm telling him about what I'm doing, and he's telling me about what he's doing. So I tell Ralph, you know: "Bob's the center of the universe for

Ethernet, so let's talk to him, because he's thinking about -- " Well, Ungermann-Bass, that name was bad enough. There was no way you were going to have an Ungermann-Metcalfe-Bass, you know. There was just too much ego. Bob wanted to do his, and we did ours.

Pelkey: Now, there were also conversations with Pliner?

Bass: It started with -- what was the guy's name – [José] Picasso and his partner, but they had started something that, in fact, still exists, kind of a network resources (unintelligible), and they were building some kind of networking product, and we decided we had to check it out. Well, it turns out that they had a consulting contract with Pliner. Pliner was blowing out of Ford Aerospace, taking a lot of his contacts with him, to start doing consulting business in communications. I think through -- we heard that Picasso had this product. We went to him. I think he told us about Pliner, so we went over and met with Pliner, and Pliner looked like a consultant. He looked like somebody who was going to -- a systems integrator would be a better word -- who was going to do bits and pieces with products or integrate products and build networks. He could speak the language, understood some of the technical background of networking. They had done something at Ford that he pointed to and his name was on the papers.

Pelkey: What about MITRE? Because they got their technology from MITRE.

Bass: Right. Yeah, broadband. So, I mean, there's a lot of stuff going on here, but we viewed Sytek -- what Bob was doing was trying to get LAN like interfaces into DEC minicomputers, mostly. He was thinking about building some protocols and some hardware which, in the day, were ways of taking asynch traffic and RS-232 Asynch stuff and feeding into a minicomputer operating system. But, in fact, he was thinking about doing it with Ethernet-like topologies and technologies which, even then, was laying down the framework of the whole network interface business, but at the time, I think Bob will tell you he was just being opportunistic. He wanted to do consulting and special projects. He got a GE project and some consulting.

Pelkey: Strangely, he got the Pasant contract which paid for the development of the transceiver.

Bass: Yeah, right, that's right.

Pelkey: You guys had been there. This was Folger. Folger was running this --

Bass: And Bob had this hardware engineer, Ron Crane, who was one of the few people who knew how to build both CSMA/CD logic as well as transceiver logic. And we were all talking to this one guy who was the only guy in the world, Tat Lam, who could build transceivers. I mean, the whole Ethernet or networking phenomenon would have collapsed if Tat Lam had ever been hit by a bus or his wife would have shot him, long ago, because he was building transceivers for Xerox and for Ungermann-Bass and for 3Com, which were the only suppliers, and eventually for DEC, which was just a funny situation.

Pelkey: Oh, yeah. But none of you wanted those capacitors and resistors and all those little wires hanging out.

Bass: No. Everybody was scared to death. You'd open up this box and say: "Wait a minute, any guy who knows how to build this -- "

Pelkey: Krause told me a funny story yesterday about how they put epoxy into the box to hold things there, and they called it The Brick. And he said it had two advantages. It keeps things from moving around, and the second thing is that it had some weight to it, so they could justify $500 for this thing.

Bass: And Tat Lam, he was just a classic character. You'd go to him, and he was always worried that people were going to design him out, but he would also never do anything to turn it into a real business. He had 14 undocumented workers in the back room, and he probably had an 80% gross margin.

Pelkey: Here, his whole system, all this happening, had a single point of failure at that point.

Bass: That's right. Tat Lam (laughing). So, I guess that the -- on one hand, we viewed Bob kind of benignly, because Bob didn't talk about really being in the product business as much as he kind of went off doing consulting projects, and the same with Sytek: they looked like distribution opportunities for us. The parting of the ways with Sytek was over a bid to Lincoln Labs that BBN was bidding on, and Sytek was bidding. And we were --

Tape Side Ends

Bass: But we were interested in finding anybody that could sell something, so we found out that this contract was out, and BBN contacted us and those ties were back through John Davidson, and [Bob] Bressler -- Bressler was still there.

Pelkey: And this is in the fall of '79? You guys were looking for money?

Bass: Yeah.

Pelkey: There's another Sytek story with IBM.

Bass: Oh, yeah, so we're cooperating with both BBN and Sytek, giving them everything we could to allow them to bid our product and win this contract. And we were feeling like we were in the catbird seat -- that we had both of these guys bidding our product, and we're pumping them with information. Well, on the day it was known who won, we got a call from BBN. They said: "Well, bad news. We lost to Sytek." And we said: "Oh, too bad," and we hung up the phone and cheered --

Pelkey: Only to learn --

Bass: Only to learn that Sytek had bid their own product. Well, from that day forward they were the enemy, and they were the company to hate. Now, I think we overdid it some and all this got blown out of proportion, but it probably helped motivate us.

Pelkey: Certain motivating goals are always very helpful.

Bass: We could turn them into bad guys. So that put a wedge between Sytek and Ungermann-Bass. With 3Com, it was a much more protracted process. There it was -- Bob started building these cards, I think, for DEC machines originally and -- I was reading the notes -- It was TI that clearly got our attention, to build something for a PC, and I believe the other company they were talking to was 3Com, or that 3Com was the only other company that looked like it could do this. And the question at the time was: the PC didn't make any sense to attach a PC to a network. People were still trying to figure out if it made any sense to buy a PC. Then you have to go do another leap -- a conceptual leap to figure out what you're going to do on a network. And we got into a very competitive situation with TI proposing how you would, in fact, build an Ethernet card and that goes on another long trajectory --

Pelkey: I want to come back to that because -- So, towards the end of '79, you have your guys with you, you're working someplace. You and Ralph had funded this operation, and you're out trying to get venture capital. If I understand correctly, you're being told you need a marketing and sales person, and then you get introduced to Jim Jordan?

Bass: Rick Pierce.

Pelkey: Who has the experience at Datapoint and the Arcnet, and he's who the venture capitalists say you need, and he joins you and you raise your venture capital. I guess Jim joins you 30 days or so before the close in March.

xxxxx

Bass: Yeah, right. We had -- the lead was (unintelligible) Investment and the other investors were Stu Greenfield at Oak and Jim Schwartz, who, at the time, was working for --

Pelkey: Adler?

Bass: Adler. Adler. Jim was working for Adler. Ralph had done an excellent job of getting Adler to the point of being ready to close, that, at such time, the marketing and sales person was on the team, they were ready to invest. We had been working this process from day one. We talked to every venture capitalist that would let us in the door. We had some great sessions -- great stories of Don Valentine being polite but, 'No thanks.' You know, 'Market, market, market.' Well, there's no market. And with Arthur Rock sitting there telling us later that Intel is a competitive investment. "Well, that's interesting." Maybe something we don't know. The best one, however, is Brook Byers really wanted to do this investment. We had really impressed him. He was ready to do this investment. He said: "Only thing you gotta do is you gotta meet Gene Kleiner. That's just going to be perfunctory, and you gotta meet Tom Perkins," and I prepared Tom and it's going to work. So we said: "Ok, we'll do this." So the first one was Kleiner, well for me -- we're still at Ralph's house and, to try to -- I mean we had the living room, we had the kitchen, we had the den. We had to figure out where we were going to have this meeting with Gene Kleiner. So we got the sofa and we had a white board in the living room and tried to make it look like a conference room, or something. And everyone was prepped and ready to give this presentation. Nobody knew exactly who Kleiner was, but everybody knew that he was important, and that he was some patriarchal venture capitalist. So in walks Brook and Kleiner and they sit on Ralph's couch, which was a little crowded, it was a little worn, and a little comfortable, and we're each going through our pitch, and I think it was John who was giving his pitch and we hear this [snoring]. And Kleiner was about to get whiplash sitting there on Ralph's couch snoring through John's presentation. And John's trying to figure out: "Well, do I finish or do I lower my voice so that he can sleep, or do I raise my voice?" You know, the classic dilemma. So we walked -- that meeting is over and we're thinking: "Well, we're dead." And Brook is saying: "Oh, no, no, not a problem. That's Gene. Don't worry." So now we've got to get ready for Tom Perkins. So we did a little bit of investigation and find out that --

Pelkey: That he's not a sleeper.

Bass: That he's not a sleeper and, in fact, the one thing Perkins nails people on is marketing and sales, and having their act together. And we did NOT know how we were going to sell this idea. I mean, we had an idea for a product, but we didn't know how to get it in the hands of customers. We knew -- we believed there was a justifiable reason that people would buy it, but we didn't know how to get to them and sell it to them. We didn't know if it was direct; there were no distribution channels that seemed appropriate. We knew if you could afford it, direct, rather, and the distribution channels didn't seem in place, so we tell Brook: “you know, Brook, this is going to be -- we hear that Perkins likes the answers and we don't have the answers.” And Brooks says: "No problem. I've told Tom where this is. He understands. You just have to get through this meeting." Well, we go there, and within 10 minutes he just nailed us. He said: "Well, how are you going to sell this?" Well, we start coming up with these rather glib, ill thought out answers, and he just punctured it like a balloon. It was one of the worst meetings of our lives. I mean, within 30 minutes we knew that there was no way in hell. Brook came back and said: "I can still do this. I can still get this done." And I don't know the full story, but the lore that came to us through that is that was the investment that got Brook his full partnership -- that he put it on the line, that he had worked and he wanted to do this, and if he couldn't make investments like this, maybe there wasn't a place for him at Kleiner Perkins, and they said: "Well, we'll make you a general partner." At this time he was an associate. And they came in second round. He did the second round. So anyway, we had been talking to these people in the venture community forever and Brownstein was the first guy -- he was the lead, and he's also the reason the company is named Ungermann-Bass. We had used it as a placeholder thinking it was so bad we would HAVE to change it. I mean there was no way you could ever --

Pelkey: No one could be confused about that.

Bass: Right, I mean there's no possibility anybody would be upset about changing that name or expecting us to ever use it. So Ralph and I -- we were constantly testing each other for names. We did

contests -- we did everything imaginable. We got down to -- it was time to send out the book. It was supposed to be the last round of business plans to the real people, and so we decided we were going to go out to dinner and we would not come home without a name. So we went out to some Mexican restaurant and ate and drank until late in the evening, talked through every name we could possibly come up with, and came up with the name Resource One, which we put on the business plan, sent to all the venture people, as well as Neal, who had already committed to the deal. A week or so later, we were out to dinner with Neal at this fancy private club in New York and talking about the strategy -- how we were going to finance the company -- and we were about to finish the meal and Neal said: "Oh, and about that name, Resource One, it sucks. Keep Ungermann-Bass." Well, when your lead investor says anything -- I mean, if he had said: "Do back flips," we would have been jumping out the window.

Pelkey: Now, in July of '80, you introduced your 4 megabit Ethernet board, the XNS compatible, Z80 based product, which was an eight-port terminal server. Did you call it a terminal server then?

Bass: No, We called it an NIU, Network Interface Unit. It was about the size of a laser printer today.

Pelkey: And so then Jim's got to learn how to sell this thing, so he's off doing his thing getting beat silly by the techies.

Bass: Right, but the --

Pelkey: He's talking synchronous and he's talking -- a world that you guys -- for a while, the conversations must have --

Bass: Well, Jim was pretty good. What Jim did -- he was a smart guy. We'd go on these sales calls and he would let me talk, and he did this about a dozen times, and then he knew how to do it himself. Then, he didn't need me anymore. So he really just kept his mouth shut until he figured it out, and he was good at figuring it out. But the first thing we had him do was turn down a sale. We had found a hospital -- a Staten Island hospital -- that wanted to install a network. I don't know how in the world we found them. But there was a consultant there who was advising them on how to do this, and I think we had been -- probably through a press release or something, a trade journal. Somebody contacted us and we went there. So I made a couple of calls to this place and what became clear was they were not going to be able to pull it off. The technology was too complicated for them. This was not a plug-and-play kind of product. And we were looking for beta sites. We were looking for early customers who would really be successful and test the product, give us good feedback and ride on some references. And it became clear that this was not going to work. So I can remember, one of the first things -- first assignments Jim Jordan had was to go to this hospital and tell the director of the hospital that we were not going to sell them the network of their dreams. To his credit, he knew the importance of happy and successful customers.

Pelkey: And then, in September, the number of competitors and press picks up. You were aware that it was going to be coming out.

Bass: Well, in -- it would have been in very late '79, I think, I hear about the fact that the IEEE is going to start a standards activity in networks, 802.3. And there's this fellow listed from Techtronics, Maris Graube, who was going to be the chairman. So I picked up the phone and called him and said: "I understand there's going to be -- you're going to head this standards activity, and this is something we'd like to be a part of." Well, he certainly hadn't heard of us. No one had, but when I started asking him who was going to be there, it became clear that also he had never heard of anybody who I knew, and I said things like: "Well, what about Bob Metcalfe," and he said: "Bob Who?" And I said: "Well, this is somebody you probably want to talk to. And what about Yogen Dalal or David Liddle?" His background was, like everybody else in the computer industry, SDLC and RS-232. So I remember the first 802 committee --

Pelkey: Jack Tar.

Bass: At the Jack Tar Hotel, right. And what an event it was. The first thing was to figure out what was the charter of this group and what were they trying to do and how do you? -- You always know you're at

the early stages when people spend more time on definitions than they do on the topic. Everybody's trying to define a local network, and it was arguing, you know: how fast is it and how big is it? And we were spending all this time in definitions.

Pelkey: Here were all these Proway guys --

Bass: Right, you had this background of people from factory automation -- Foxborough and Techtronics kinds of folks --

Pelkey: RBOCs were there.

Bass: Oh, and we had the Datapoint folks who clearly knew what a network was, but had their own interpretation. And then you had the Xerox folks there. And I think -- I'm trying to remember the timing, but Metcalfe, who again was the catalyst here on the side, was working this deal between Intel, Xerox and DEC, getting them in the room, and we start hearing this. I mean, we knew that that was going on, and that was going to influence this. So the question became: "How close would the 802 spec be to the DEC Xerox Intel spec?" And that was really -- the committee started fragmenting along the lines of the basic technologies, and then refinements, and then -- The obvious downfall of that whole activity was the proliferation of alternatives and the number of directions it took. But, at the same time, it was the forum. It was where people were thrashing out the detailed issues of the implementation. In the meantime, the Xerox led spec was on a fast track. Those folks were all committed to making that happen, and IEEE folks realized that they had to accept it. They could not go against that spec. They made some -- they made one -- they made a couple of minor refinements, one of which made it incompatible, but by and large, adopted the spec. So in the -- at one of those meetings -- I went to the first one officially, and then -- I can't remember who started going. John and other people went -- but after one of those meetings, I met with David Liddle in San Francisco at a restaurant, and started telling him in detail what we were doing, and convinced him that we could supply the terminal server for the Xerox protocol. They had this roll out plan of Star -- the focal point of it was the Star product -- but it had a full networking configuration. And they needed a way of getting asynch stuff in and out. So I think it was -- I think, more than anything, it needed to be in the product line, and they really didn't want to invest money. It was a pretty simple decision. It was important to have, but not something they wanted to invest in. They couldn't make a business case out of it. And that immediately tied us in to the legitimacy of being able to supply a spec product. I mean, I don't think anything helped Ungermann-Bass in the early days as much as being able to say: "We're supplying the terminal server to Xerox." And it meant that our engineers and their engineers were talking daily on being compatible with all the nuances of the Xerox network, which was, in turn, compatible with the official Ethernet spec.

Pelkey: I want to ask you a delicate question. I only say delicate because I know there's a great deal of emotion about this among some people, but Judy Estrin joins Ungermann-Bass in of '81, five months before leaving to go to Bridge. Her view is that she was asked to go do -- to negotiate, if you will, the OEM joint venture with Xerox, so she had a lot to do with getting that accomplished. Is that your view?

Bass: Oh, absolutely true. I mean it was a classic. I had the bear in the tent. Somebody had to skin it.

Pelkey: She was working for Jim, though.

Bass: Yes, she was.

Pelkey: But she's the one who went out and did it.

Bass: Oh, yeah, and she did a great job. Judy knew that whole community -- personal friends -- ideal person to do it. It was --

Pelkey: And that contract -- getting that done, professionally, as you say -- that Xerox buying your server also meant that your Ethernet met their standard, and that meant a great deal to you guys.

Bass: Absolutely.

Pelkey: When did the notion of general purpose LANs come about? Had that developed yet within your positioning?

Bass: Not in our positioning. It developed in our dreams. In the early days we dreamed dreams about hooking all these new computer and networking environments together. We saw that possibility, but we didn't --

Pelkey: How would you describe your role at that point?

Bass: The product was, first of all, a very elegant switch and, secondarily, a way to begin to share resources. Now, it wasn't clear what the resources were. You would argue that it should be possible to put a disk up here or it should be possible to put a printer out here or -- you could come up with scenarios but there were no -- there was no software that would, in fact, make that happen. And what really happened was the disk manufacturers themselves started building the software to make that work. They realized that the way they could sell disks was to make them a shared resource on a network. So Novell emerges as the winner, but there were probably a dozen companies trying that, and many of them, from a storage background, saying: "We'll provide the software to make this possible." Now the key breakthrough, though, was the emergence of the PC. I mean, we started this business when PCs were, by and large, toys. There was Apple, and that's it.

Pelkey: Commodores.

Bass: Commodores and Atari's and IMSI's and Tandy's using Z80s, but in the -- so this was a terminal oriented product.

Pelkey: You were really a data PBX product at that point.

Bass: Yes, right.

Pelkey: You guys were selling against the data PBX.

Bass: That's exactly right.

Pelkey: And at a great disadvantage, in terms of cost.

Bass: Right. We would argue topologies and flexibilities and what have you, and they would argue that it worked.

Pelkey: Right. And there's Micom, which is a big, successful company at this point. They were on a roll.

Bass: Right, in fact, that's when I met Roger Evans, it was in those days. We were looking at ways -- they had used Z80s, so we knew each other from the Zilog days, and we were sizing each other up, looking for ways to cooperate --

Pelkey: So there were conversations between you?

Bass: Oh, yeah. I remember meeting with Roger, and there was actually a president

Pelkey: Bill Hart.

Bass: Yeah, that Roger had hired. It was very cordial.

Pelkey: And the conversations covered were what? I mean, you were competitors at that point.

Bass: Well, but, as you know, the wonderful thing about this business, you can sit down with your arch enemy and explore common interests, and I think we were trying to see how these technologies might converge, how we might do something together. It didn't get anywhere, but we certainly had the conversations.

Pelkey: Now, Fujitsu did your first chip. When did that relationship start?

Bass: Well, it actually started when I was a programmer for Fujitsu in Japan in 1966. I met a young fellow there who was my age, Ken KatashibaHe and I stayed in contact for all those years, and, in the days when we started Ungermann-Bass, it turns out that Ken was then the principal liaison between Fujitsu and Amdahl, and had direct access to Dr. Ikeda, who ran the semiconductor division. So we got the idea that we need to control -- we were always trying to think about what our core competencies were, what technologies we really wanted to control, and we were not thrilled with the Intel architecture. We didn't know when it was coming out. We didn't know how Intel was going to control that, and we spent a lot of time -- we had a hardware engineer who knew how to take designs into silicon, and with Ralph's background at Intel, we were pretty bullish on our ability to build silicon that would be advantageous to our architecture and be a strategic advantage to the company. So the first go around, in fact, was -- we were approached by Kleiner Perkins, who was then an investor, and they had this company that had a silicon compiler.

Pelkey: Silicon Compilers?

Bass: Right. They came and they wanted to test their technology on something hard. So we said: "Well, we've got something hard for you. We'd like to have an Ethernet chip." So John Doerr, the lead investor, and they come in and they started running equations and talking to Alan Goodrich, who was our hardware designer. And we learned a lot about their tools and learned a lot about what it's going to take to build one of these. They go off and start working a deal with Seek to build the part, and they come back, and we had some fundamental differences on the design, the concept of the design. It had to do with FIFOs and caching and engineering stuff, but it was losing some of the architectural advantages and characteristics that we wanted to see, and we could see that it wasn't going to be much better than Intel and we weren't going to be able to use it as much, and so we said: "No, we don't like this. This isn't good." Well they went quiet, we didn't hear much, and then one day we hear through the rumor mills that they are working a deal with 3Comto build this chip, and in fact, there was a press release -- a collaboration between Seek and 3Com and Silicon Compilers. Well, we hit the roof. We called, probably Fires instead of Doerr, and said: "Wait a minute. You can't do that. We gave you everything we know, and now we're hearing that one of our chief competitors is getting the PR and the advantage of working on this deal." So we had this summit meeting. We're all called before Solomon. Tom Perkins decides he's going to make peace in his house -- I can remember having this big summit meeting and -- and he listens to all sides, and I can remember on the way up, Ralph and I are talking: "Well, what do we want. I think we've got 'em. They can't do this." And I thought of -- -- I tried to think of the most outrageous thing we could ask for, and I said: "Well, what do we need? We need cash. It's pretty clear. Let's ask for a lot. Let's ask for $500,000. That'll get 'em." So we're sitting there in the meeting, and there's a representative from Silicon Compilers and a representative from Seek, I think, and John Doerr and Perkins, and Ralph and I are sitting there feeling very self-righteous and telling our whole story, and saying: "You can't do this." So Perkins says: "Well, what do you want?" And Ralph says: "$500,000," and Doerr just goes white. I thought he was going to faint. I thought he was going to be in cardiac arrest right there. And they said: "Well, could you excuse us for a moment?" So Ralph and I walk out in the lobby saying: "Well, that was pretty ballsy."

Pelkey: Right, right, right. We did it.

Bass: Yeah, at least we asked for it. So they call us back in, and Perkins says: "OK. We'll pay you $500,000." And we said: "Fine. No problem. We'll drop all claims." And I think what they did -- Doerr didn't say a word. I mean, he just -- in fact, it was probably two years before we ever spoke again, but I think what they did is they took it out of the Silicon Compilers investment, and then changed the royalty arrangement to help them make it back up. But anyway, we had spent so much energy in this, we're

thinking: "There's an opportunity here, building chips." So I said: "Look, I'm going to call Ken Katashiba at Fujitsu. Those guys, they know how to build chips. They don't know anything about what this culture is all about or what this market opportunity is about, so let's --" So I got Ken to go with me to -- I think it was called NCC at the time, in Chicago, where Xerox was making its Ethernet announcements. And it was cold. And it was not -- I think it was November in Chicago and -- the Zilog people were all there announcing ZNet.

Pelkey: Yes.

Bass: And I'm dragging Ken around by the buttonhole introducing him to the Zilog people and showing him what Xerox is doing, and I said: "Now Ken. This is going to be something, and you guys can do something here if you'll help us build this chip." Well, Ken bought it, and he had the clout, or rather the access, to Ikeda, to bankroll the whole thing. So we cut a sweet deal with Fujitsu, where they, in effect, paid all of the up front engineering costs to build that part, and we had the part before Intel finally released their part.

Pelkey: Amazing. And it was a very functional part.

Bass: It was a great part. If Fujitsu could have marketed and supported that part, today that would be a multi-hundred million dollar business for them. And Ken says that today. I mean, you can go and ask him. He says: "We had it, and if we had know how to sell it, we'd be players."

Pelkey: So, you get the $500,000, plus you got Fujitsu paying everything up front.

Bass: And a very nice royalty stream, in principal, which they front-end loaded and gave us some advance royalties. It was a very nice deal.

Pelkey: Now, in the beginning of '81, Sytek comes out with their little two-port broadband terminal server.

Bass: Right.

Pelkey: Which starts to become a pain in the ass, because it's cheap.

Bass: Right. We had, from day one, even though --

Pelkey: And broadband was big. I mean, at this point it had Wang --

Bass: Wang is broadband.

Pelkey: Everybody's saying it's got to be able to handle everything. You've got to be able to put trucks down this pipe.

Bass: Right.

Pelkey: Video and voice --

Bass: Installed base.

Pelkey: So all that stuff is going on --

Bass: And we had always tried, and I think pretty successfully, at saying: "Look, we're interested in building networking products. We don't want to be an Ethernet company. We don't want to be -- we were, in fact, trying to distance ourselves from 3Comidentity with Ethernet. We wanted to say: "Well, sure, that's an important technology," but as we're looking at the 802 committee, it is split between baseband and broadband. We don't know how this is going to turn out. We didn't want to place a single bet. In fact, we only had a single product, but it really was important not to be married to a specific technology. So we

needed to find a way to cover broadband. I knew Greg Hopkins from, I think, maybe Asilomar or something. He was at MITRE and I was at -- I might have still been at Berkeley. He was a great guy, and he clearly understood broadband from his MITRE background, and so we recruited Greg to -- I mean, in fact, he was our east coast regional sales guy, but he also was the person who got the company into broadband.

Pelkey: And that was, what, the first half of '81? Because before you introduced your 10 megabit --

Bass: I don't remember. It was very early. It was -- once again, the danger was we were trying to do too many things.

Pelkey: And Ralph says "Get us into broadband," was the expression.

Bass: I can't comment on this timing.

Pelkey: It came from this attitude you were just describing, that you wanted to be more than Ethernet. You wanted to distance yourself. You didn't want to be known just as an Ethernet company. Broadband was looking like it might win.

Bass: Just want to -- I mean, Jordan certainly didn't want to be limited.

Pelkey: So now Hopkins reported to Jordan because of it being kind of a sales office?

Bass: Yeah, and also -- I think also because Jordan and I were beginning to become territorial with each other, and it was a power move as well, that this was a way for Jim to start having some R&D influence. He and I were beginning to grate on each other. So there was definitely some --

Pelkey: There must have been unbelievable differences over what products should be done. Jim's sales response attitude was much more tactical.

Bass: Yeah, it's hard to put it in perspective --

Pelkey: You introduced your Xerox terminal server in April, expecting to be shipping a lot in '81.

Bass: And we had been led down that path through this Xerox cooperation venture, so we knew we had a product that was -- I mean, the XNS was mostly a function of the Xerox contract. John could have implemented anything. In fact, he wanted to implement TCP/IP.

Pelkey: Xerox -- you had to be XNS compatible in order to --

Bass: It was the only thing they were running.

Pelkey: IBM introduces the PC, then in 1982, in February you introduce your five megabit broadband Ethernet, but problems delay shipment until September. And so you end up having to OEM to Xerox.

Bass: It didn't last long, but yes.

Pelkey: And in the meantime, there's a group now being built, under Hopkins back east, that is trying to do ten megabit broadband Ethernet?

Bass: Right.

Pelkey: Then, somewhere in '82, you get your Ethernet chip. So I gather at that point in time, you come out with a new NIU generation.

Bass: Yeah, we started just doing production of the first NIU.

Pelkey: And there's some discussions going on with Interlan. There were some meetings with Severino during this period?

Bass: Yeah.

Pelkey: Because he's really competing head to head with 3Com.

Bass: Right. Yeah, there were, once again, talks about merger of the two companies, and just, again, it was a matter of expectations and valuations. It's hard to put things together like that.

Pelkey: Now, this year is when you come in contact with IBM. Because that, I think, precipitates the Amdax -- because you close Amdax on January 1st of '83.

Bass: Ok.

Pelkey: So Token Ring is now coming into --

Bass: Did we close it in '83?

Pelkey: Yeah, January 1st of '83.

Bass: Well, I remember what the contract was, but I'm trying to remember -- I gave a talk in New York at a financial thing in '82, and after the talk, these folks came up and were asking questions, and this guy said -- I spent half my life, in those days, giving seminars and tutorials all over the place on the planet that would listen, because this was the early stage of evangelical kind of business. You had to go out and convince people the stuff worked, that it made sense -- that it was going to be around.

Pelkey: It was the right technology to jump on.

Bass: In fact, developing those presentations, I've still got notebooks full of 35 mm slides, and I would spend every talk going through the ISO reference model, what it meant, what was the importance, how this stuff fit into the technology, and in fact, one of the things I tried to do was develop the canonical set of slides that I could use for any talk; that no matter what the topic, I knew I had the slides. And I got it down to two or three slides. It didn't matter --

Pelkey: You had it in your vest pocket.

Bass: That's right. All I needed was a title and I could start a talk. And one of them was this ISO reference model that had every technology imaginable, that you could ever -- that you'd ever heard of, and I placed it on the chart, just to show people where it all met, which was hard. I mean, that was the thing that confused people, because people were always talking at cross-purposes. They didn't know the inter-relationship between these technologies and how and where they needed to be compatible and where they didn't, and so forth. So I was giving one of these tutorial things to some financial symposium, and afterwards this guys walks up and says: "Would you sign my tutorial notebook?" And I said: "Well, why?" And he said: "Well, because there's a woman that works with me and she's followed your company, and this would really mean a lot to her to have your signature." Well, that's the first time in my life someone had asked for my signature, other than on a check or a closing document, and I look at the guy's badge, and it says IBM. So I said: "Now wait. You got to tell me what's going on here. What do you mean you've been studying us." Well it turns out this was a group in Raleigh that had been the classical IBM task force that had been studying the industry, trying to figure out what all this stuff meant. Well, I knew about Token Ring and I knew what was going on in Zurich, and I knew what they were doing in the 802 committee, and I'm thinking: "What the hell is going on here. I got to find out what this means." So, the first chance I got I go to Raleigh. Cold call; had this persons name --

Pelkey: This is in '82.

Bass: Yeah. And start immediately into the Raleigh -- or the IBM vendor massage, signing, meeting contracts people, and what was interesting was they were willing to do it, I mean that there were people showing up and talking, and giving us all kinds of winks and nudges that something was going on. You know, it was like watching Monty Python story, that you guys, you know: "Stay tuned."

Pelkey: Keep it up.

Bass: Keep it up. You're doing the right things. Keep -- right, exactly. So, this looked like the Holy Grail.

Tape Side Ends

Bass: So somewhere in this process I finally am told that they're going to let an RFP for something related to networks, and that we were on the list. We were going to be the ones that get to bid. So, it turns out -- and what this was was a request to build a Token Ring bridge and, in the meantime, by the way, I'm having problems with Ralph and Jordan, and beginning to feel a bit disenfranchised in the company, so I really take this on as a mission and set about writing a proposal to bid on this project, and put my heart and soul into this, and went through all the machinations and lobbying and meetings and -- you know, trying to find out who's making decisions and what's it worth and what do they want to hear, how do you do it, and so forth and so on. And we won it. We won the contract.

Pelkey: Do you remember when?

Bass: Well, we won it almost exactly coincident with the acquisition of Amdex. So you place that in time, that's about when we won this contract.

Pelkey: Ok.

Bass: Amdex merged January of '81, so --

Pelkey: Legally, it merged on the first of the year.

Bass: So, it was right in that --

Pelkey: November / December.

Bass: Right, and because I can remember -- the Amdex deal was pretty much Ralph's ideas and I'm sure Jordan had --

Pelkey: Because this was IBM guys who were down at the --

Bass: Well, what happened is, as we get closer, and I start sniffing, we start realizing we might win this thing, the questions starts becoming: "How do we do it?" And it becomes a part of the rationale of going ahead with Amdex. It looked like these guys could do this. I went down on just the due diligence and figuring out what the hell we were buying, and realized this was one smart bunch of engineers, and no way in hell did we want to do what they're doing, which is some 50 megabit Token Ring, but that background makes it ideal for them to implement what we were being awarded by IBM. So we win the IBM contract, close on Amdex, which was really three companies. It was a modem manufacturer in Long Beach, it was this Token Ring outfit in Boca Raton, and it was a software group in south Florida --excuse me, southern California -- doing SDLC emulation stuff, which -- and it was almost the AST folks. The AST folks also came in and out of the circle as well. So we shut down southern California, under the leadership of Zack Kong, who still has a little software outfit down there. We shut them -- turned them loose. We turned the Long Island manufacturing group into our broadband manufacturing, and I took over the engineering group, fired Dan, who was the head of that group, and handed them the proposal we had given IBM, and said: "OK guys, this is the job. This is what we have to do."

Pelkey: Refocus.

Bass: Right. Well, then begins a long and complicated story, but we then suffered from the classic IBM -- one of the IBM syndromes of management turnover. We went through -- in 18 months, we went through three generations of management in Raleigh, and each time they would come in, they would reevaluate, they would re-spec, and affect the project dramatically. And on the third generation -- I'm trying to think who it was. The first generation was Murray Bolt. The second generation was Dan Warmenhoven, and the third generation at IBM -- I can't even remember who it was -- but they shut it down. They looked and, based on the cost projections, delivery times, they said: "Discontinue." At that point we had invested hundreds of thousands of dollars on their -- on their nickel, by the way, I mean it wasn't our loss -- in this technology, and while we had basic skills, otherwise we didn't have anything to show for it. I mean, and opportunity costs were really the big loss at this point.

Pelkey: So, around mid '84 you got closed down?

Bass: Yeah, right, which was really, then, my swan song with Ungermann-Bass. Then Jordan pulls a power coup, cuts Boca Raton out from under me, and

Pelkey: This was when he becomes EVP?

Bass: Actually, we both became EVP. Yeah, right, it was when he became EVP, Ralph made me one too to make me feel good, but, in fact, I was without portfolio, and I just told Ralph, “I’m done.”

Pelkey: Going back to '83. Somewhere along the line, the Z80's not making it. So you've got this whole issue of (unintelligible), 186 and 68000 and --

Bass: Right, and that was precipitated by the TI request to build a card. Now, that happened while the Boca Raton group was working for me, so that would have been in '83.

Pelkey: Right, because you announced the deal in August, the TI deal. My understanding is that it's in May -- prior to May, there's a big debate, as I understand it, with Jordan about the PC product. You wanted to do it 'gold plated,' Ralph wants not a fucking thing to do with it, and Jordan says he said: "We've got to have the goddamn thing."

Bass: I wanted to do a 186 product, and I came in at a certain cost that Jim didn't like, and I had the guys in Boca Raton doing all the specs on it.

Pelkey: And Ralph was just dead on this idea.

Bass: Yeah, he -- Ralph didn't believe.

Pelkey: So Ralph leaves the country, or something, in May. Jim remembers in May that you and he had a meeting with Texas Instruments, because Texas Instruments was out to sign a deal with 3Com, and you had a meeting with them in which you got the contract with TI to do this PC card version.

Bass: Right, at a cost that we didn't know how to meet. And that's what was Ralph's -- that was Ralph's ultimate problem. Jordan kept insisting on certain cost characteristics. I kept saying: "It doesn't make sense. You can't build a card for that," and he had Hopkins doing a counter-design saying that he could do it. He had Hopkins whispering in his ear that --

Pelkey: And this was going to be a broadband card?

Bass: No, this was a -- this was for TI. This was an Ethernet card. And in the midst of this, I'm trying to figure out: 'Can you even get a 186? What's it going to cost?' This was at a time when they were on allocation. So I go to Bill Davidow, got down on my hands and knees, and said: "Please sell us 186s."

And -- here's the Zilog overhang of Ralph and my life, you know, and Bill just played me like a flute. "Well, you don't know, how many do you really think you can sell?"

Pelkey: Give me some chips.

Bass: Right, and this was coincident with 20 companies in the personal computer business -- PC business -- all claiming 20 percent market share, and forecasting to Intel how many they needed to maintain their 20 percent market share. So, I mean, I needed 1,000, just to know that I had a program that was something we could build, and he's talking to Compaq and IBM and --

Pelkey: He's talking to a ton of them, and, like you say, everybody's got 20 percent market share.

Bass: And I needed 1,000, and I'll pay anything, Bill, as long as I can meet TI's cost, which I couldn't. Now, in parallel to all of this, we hear that there's a deal going down in Boca Raton with Sytek. Now, this goes back to -- this is in parallel with the bidding on the Token Ring bridge to Raleigh, we hear that the PC group is going -- wants a broadband network. So I start doing everything I can to get into that bidding. I went -- I mean, I just kind of showed up in Boca Raton with, maybe, the one name I had, and started scratching on the door saying, you know: "Can we get a shot at this?" Well they would not talk to us. People were polite, but they just very politely said: "No, thank you." And it turns out that we were in the crossfire of this politics between Boca Raton and Raleigh. Boca Raton hated Token Ring, didn't want to have anything to do with it, was trying to distance themselves from Raleigh, and the fact that we were in favor in Raleigh meant that the Boca Raton folks didn't want to have anything to do with us and wouldn't talk to us. I went so far as at a -- it's when Ben Rosen was still giving his conferences, I think it was, in fact, the year he may have handed off to Dyson -- I went to this conference, and there was Bill Etheridge. I walk up to Bill Etheridge and I say: "Bill, you don't know me, but I understand you have a program in Boca Raton looking for a network, and we'd certainly like to be a part of that." Well, it was like I farted or something. I mean, he just looked through me, and said: "You'll have to talk to --" I mean,

Pelkey: [laughing]

Bass: Because he knew who we were, and he knew that he wasn't about to do business with anybody that talked to Raleigh. So, meanwhile, we're following all of this because, at the Decathlon Club, the head of marketing for Sytek would stand in his jock on one side of the lockers and talk about how they were doing this deal with IBM. And, it was the funniest thing in the world. You could find out exactly what was going on by just going and playing racquetball at the Decathlon Club, and hear their day-to-day progress. And it was a good thing, because Bob and I were finding it increasingly difficult to talk to each other because we were becoming so competitive, he and I couldn't -- we could play racquetball but we couldn't carry on a decent conversation.

Pelkey: Now, did they also bid you at this one?

Bass: Who?

Pelkey: Sytek?

Bass: No.

Pelkey: This was just -- Sytek was going along on the side working on the PC LAN.

Bass: Right.

Pelkey: And you tried to get into it and it just wasn't going to happen.

Bass: Yeah, we just got stonewalled. We never got close to it. And it looked like a company maker. I mean, it looked like, when IBM blessed Sytek on that -- and Sytek just turned their whole company on that project, and it became their downfall. It was a poorly conceived product. It didn't sell.

Pelkey: Oh yeah, when they got that, they became the king of the world. They were the Lotus of --

Bass: And here I am trying to tell Ralph that: 'Hey, it's OK. We've got Raleigh," and he's thinking: "I want the PC."

Pelkey: Give me Boca.

Bass: Right. And it was a tough sell, it was a tough sell, that it was OK. We've got Raleigh.

Pelkey: One of the things that Jim feels became a problem in this period of time is Pyramid. UB invested $1.2 million in Pyramid which was when, '83?

Bass: Oh, yeah. That was ill-conceived.

Pelkey: Was Ralph chairman of that after the investment was made?

Bass: Yeah.

Pelkey: So he had no involvement beforehand, other than just bad judgment?

Bass: I think that's the way it -- Ralph's a very straight shooter, and, in a couple of cases he had made an investment and then something came into the (unintelligible), but he would very quickly clean himself up. There was no conflict of interest, once it became a corporate strategy, but I don't remember if he had a position before. Well, it was another classic case of a corporation trying to make strategic investments and just not being able to work --

Pelkey: It was really driven, again, from this culture of wanting to be more than Ethernet, which was becoming more and more the general purpose.

Bass: It was wanting to find enablers in the this business, and this is a tough business. We're always looking for things that increase either the application space or the facility or the utility, and the inhibitors were applications and operating systems and software. We could deliver the stuff on a very cost effective basis if people had something to do with it.

Pelkey: Now, it was '83 when you were doing your conversion of your 186 and 68000, there's not much discussion of TCP at this point. No one's around, it looks like a dog compared to XNS. You've got the contract with Xerox, still, I guess, so XNS was a superior product for LANs, so there wasn't much debate. But also in '82, toward the end of '82 is when Berkeley 4.2 comes out with TCP built in it.

Bass: Right, that was a huge decision.

Pelkey: And in the beginning of '83, Arpanet converts the whole network to TCP/IP. In '82, DOD standardizes on TCP/IP.

Bass: Right, but Berkeley UNIX being released with TCP built in was the --

Pelkey: And MIT, Clark comes out with a port to the PC sometime in '83. So all of this sort of stuff going on, and at this point in time, Xerox decides: "Wait a minute, we don't want to give any more of these protocols out."

Bass: Right.

Pelkey: And where you are, you've got to do more than terminal serving. You've got to put some functionality out there and all of a sudden Xerox gets cold feet. It seems that it must have been around the end of '82, or was it after you designed them into your 186 and 68000 boards?

Bass: I don't think there was any problem in using -- I'm trying to remember their position.

Pelkey: Because they closed out with laser printers and they said: "No, we're not giving these."

Bass: I think -- there was a good grandfathering relationship that they were not going to pull anything back from us.

Pelkey: But they weren't going to give you more.

Bass: No, we had to become more self-sufficient.

Pelkey: So in 1984 --

Bass: Well, the confusing factor here in that time frame was OSI. I mean -- and here's where I made a huge judgment mistake in gauging the potential importance of OSI.

Pelkey: So did others.

Bass: Because here I am going to Raleigh regularly, talking to Dan about the world of Argent networking, and he starts telling me these stories about Smith calling Akers, Roger Smith calling Akers and telling him: "You're going to do MAP, or we're tossing you out, because DEC's going to do MAP, and if you guys don't do MAP, you're not going to do business with General Motors." And I'm sitting there saying: "Holy shit! This is important. I should pay attention. This is going to happen." So I start telling Ralph we got to do MAP -- that IBM is going to do it, and General Motors is serious about this, Boeing is serious about this. This is really going to happen. So I had this young fellow working for me who was the liaison between Ungermann-Bass and IBM. His name was -- he was a great administrator, and kind of a product manager, and so I asked him -- I got him to do a business plan, to do a MAP business unit, and we did everything from budgets to site analysis. We were trying to figure out 'should it be in Austin or Raleigh, or where should it be?' We, at this point, we had such a distributed company already, it wasn't a problem making it more distributed. So we do this business plan and Ralph and Jordan, they're a little skeptical, but they're thinking -- they didn't really know what to make of it. I pretty much had Ralph convinced that it made sense. I wanted to do it organically, meaning we would finance it modestly until it started generating some revenues and we could grow the business. Well along the way, General Electric walks in one day and, in effect, says they're committed to MAP, and they're looking for a partnership. Well, dollar signs appear in Jordan and Ralph's eyes, and suddenly I don't have anything to do with it. I mean, they cut this deal with GE which was --

Pelkey: This is really, now, the tail end of the consequence of --

Bass: Of me. The tail end of me.

Pelkey: Yeah, the tail end of you.

Bass: And suddenly, they come up with this business plan that has GE putting in --

Pelkey: $6 million.

Bass: $6 million going to 12, and they're going to take over the world of MAP, which I still thought was a great idea, but I just thought: "I don't know, guys. It sounds like a -- I mean I'm hoping its going to be big. I thought it was going to be big." I wasn't ready to write that big a check, and I can remember the day that Joe Shoendorf walked in and, again, he'd been recruited, didn't know me, never met me, comes into the company, someone tells him that there is a Bass, you know there really is this person in the company that you never see. So he walks in and Joe's -- Joe is Joe, a great guy.

Pelkey: This is MAP?

Bass: This is '84, late '84 --

Pelkey: Because October the deal is announced.

Bass: So it's right about that time, and I'm just taking space. I mean, I'm beginning to think about how to become a venture capitalist or something.

Pelkey: And it's spring time when Jim --

Bass: Of '84, right. '84 was --

Pelkey: Spring.

Bass: Right. So I can remember Joe walking in full of vim and vinegar and talking about this deal. He'd been told by this -- I've still got a hang up on his name -- this young fellow that I had been using to do this business plan, becomes his first lieutenant, and this guy one day, walking across our small campus, tells him: "You want to go meet the guy that thought of this." So Joe comes over and Joe says: "Well --" and he's very direct, he's a great guy, a dear friend today, and he said: "What do you think's going to be my biggest problem?" And I said: "Meeting GE's expectations, and keeping up with them, because they can put in the next $ 6 million. Now, what do we put in?" And Joe, to this day, is renown for having 125% market share of MAP. He sold more than ever existed, and it didn't come back. It wasn't bricks, it was just -- it was an amazing story. But I really believe that -- I believed OSI made all the sense in the world, and I believed it would beat TCP/IP, and it was one of the biggest flaws in my crystal ball ever. And that's why I think it's one of the things that delayed TCP/IP and Ungermann-Bass.

Pelkey: Right.

Bass: We just didn't see it.

Pelkey: You had the XNS, which --

Bass: We had XNS, we believed OSI was the next big thing.

Pelkey: You said: "Not this TCP/IP stuff."

Bass: Kind of, yeah.

Pelkey: What about Murray.

Bass: Yeah, I did it to the extent that Murray got blown out of IBM over the Token Ring program, ended up at Codex.

Pelkey: He got thrown out? I didn't know that. Because he left right after the TI fiasco.

Bass: He was in big trouble.

Pelkey: TI got signed, and then ten days later they come back and tell them they'll be a year late.

Bass: Oh, yeah.

Pelkey: So I understand.

Bass: Well, I mean, it's a way -- it was either that or go run plasma panels in Kingston, or something. It was -- for all practical purposes he was gone. So, Murray, being a pretty smart guy, decided he'd go find

a job. And, yeah, he really liked us. We had done a great job for him, and he wanted to deliver Codex into the 20th century.

Pelkey: That's right.

Bass: And he came up with this great strategy of being an OEM of pretty much everything we made.

Pelkey: They got like 650,000 warrants for it.

Bass: I don't remember.

Pelkey: For a commitment to do $15 million in purchases.

Bass: Yeah, it was a rich deal.

Pelkey: And they bought some amount of that, but then --

Bass: They couldn't sell it.

Pelkey: Couldn't sell it.

Bass: I mean, it was the same reason Xerox couldn't sell it: wrong salesmen, wrong customers. They just couldn't transition their company into selling this technology. They had all the corporate support in the world; training, everything, but just didn't have the right set of people carrying the bag.

Pelkey: Now, beginning in March of '85, there's a press announcement that this product (unintelligible) 10 megabit broadband (unintelligible) and a four megabit --

Bass: Well, I'm out of there.

Pelkey: Then, at this point, Jordan leaves, and you come back in as a consultant or something.

Bass: Yeah, Joe is the one --

Pelkey: And you go on this management buying binge. If you look at the annual report, the president's letter is signed by eight names or something.

Bass: Oh, I see what you mean. Right. Yeah, I don't remember the product announcements. I became -- was preoccupied --

Pelkey: You had no responsibility for this at this point. But I presume the reason for the management changes was because these two projects didn't come through.

Bass: It was -- they didn't meet plan, bottom line. For the first time in the history of the company, they didn't meet plan. We're still held in some respect by the venture community for meeting a business plan.

Pelkey: Because in '84, you did get the $52 million and $6.3 net --

Bass: And our original plan, it said in '85, or something, we were going to do 60 something, and they started projecting 70 something. I think.

Pelkey: Well, in '85, you did 72.

Bass: Ok. I start disconnecting from the numbers.

Pelkey: And the net of 3.7, so you took a big hit in the net, back in '85.

Bass: Right, well Ralph started, and Ralph was criticized a lot for not putting decision making down in the organization, for being too involved in too many decisions and not having a strong management team. And, intellectually, he wanted to fix that. He really wanted to -- I mean, Shoendorf was groomed to be that person, to be his successor. There were a lot of people that came through the door, and for one reason or another, didn't make it.

Pelkey: And so, in '85, GM decides for INI. Now, this is after you got back in as a consultant, right?

Bass: I came back to join the board -- I actually resigned from the board for about -- I don't know what period --

Pelkey: Six months or so.

Bass: Yeah. And Shoendorf, when Jordan left, Joe starts talking to Ralph about me coming back, and, I remember the first opportunity was (unintelligible) --

Interruption in Interview

Bass: '85 for me was an incredible year. When I left Ungermann-Bass for all practical purposes, Dan Warmenhoven had been -- he'd been shunted aside during this period because the Token Ring program was continuing to be a problem, and there's another whole story of us trying to leap in and do a Token Ring chip for IBMs, but Dan found out that I was out of the company, he was in White Plains on a staff assignment, trying to figure out what he was going to do next. He had been one of the golden boys. He'd been on the fast track, and then when the Token Ring program got in trouble, they put him into a holding pattern. Well, Dan didn't have the patience to watch his career unfold. But he told, I think it was Michael Armstrong told Steve Schwartz that I was out of Ungermann-Bass, and they approached me and asked if I would consult as they put together a corporate strategy for how IBM participates in the world of telecommunications. And this was in the time of the IBM-AT&T head to head consideration, and so for one year, I wandered the halls of IBM participating on various task forces studying every branch of the industry, communications and telecommunications, as they tried to decide just what do they do? How do they do it?

Pelkey: And they had bought Rolm in '84.

Bass: Pardon me.

Pelkey: They had acquired Rolm in '84.

Bass: Right, they were sitting there with Rolm, and they were just trying to figure out 'what does all this mean?' I mean, they were considering everything, from going into the long distance business --

Pelkey: Oh, yeah they had that company that MCI --

Bass: They were in SBS, MCI --

Pelkey: Yeah, the video thing with Sears.

Bass: They had all these plays and were trying to figure out what it meant, and it was just incredible. I had a wonderful time. Now, as history will tell us, they decided not to take on AT&T in its core business. AT&T, at the time, pretty much decided the same thing. They executed much differently, but IBM's decision was not to go into what eventually became the whole MUX, routing, wide area network phenomenon. But it was a fascinating -

Pelkey: I can only imagine.

Bass: What really keyed it was this cabling announcement you mentioned, and that happened in --

Pelkey: '84.

Bass: '84. IBM came out with their cabling scheme, and it looked pretty good. I mean, compared to what we had all been doing --

Pelkey: Running yellow cables all around.

Bass: Yeah, right. This looked like pretty sophisticated stuff. Well, not long after this, and I can't remember if it was late '84 or early '85, AT&T comes out with their cabling scheme, and by comparison, you realize that, while IBM looked like a quantum step up compared to what we were all doing, yellow cable, AT&T says: "You want to know about wiring?" Boom! They put their cabling scheme down on the table and THAT was wiring. Its completeness, its robustness, it was just well thought out, and it was interesting that their networking strategy was a total failure, which was called -- They had this centralized networking scheme, which was totally non-standard.

Pelkey: StarLAN?

Bass: Yes, StarLAN. They had this StarLAN networking scheme, which was totally non-standard, but what stuck was that cabling scheme. I mean, it was everything. It was all the connectors, all the pushdown blocks, all the panels, all the -- everything that you would ever need in terms of tools, and it was so rich that, as the world started moving back to the closet, it was that cabling scheme that really held it together. So AT&T's contribution to this --

Pelkey: Was monumental.

Bass: Was monumental, in a completely different way than they wanted or anybody else expected. And while the type cabling that IBM gave the names of Type I, II, III, categories, and things like that, those have stuck, and you look at all the accoutrements of the industry, that has a direct AT&T derivative in their cabling.

Pelkey: Thanks for bringing that out. I appreciate that very much.

Bass: And it's what made it really possible. I mean, here we have a marriage today of AT&T's wiring, IBM's topology, and Ethernet's access method, which was really SynOptics' doing. And even though Ungermann-Bass had that coincident with SynOptics, and, I think, had better technology, because that's where SynOptics started, and they understood -- I mean, the day that I heard Ludwig say: "We want to control the wiring closet," was the day I said: "They know what they're doing. They have hit on something." And we were off doing all this weird distributed stuff, putting transceivers in ceilings and raceways and acoustic tiles, and they combined the IBM topology with AT&T wiring and Ethernet technology in the box because of costs and compatibility with all of the industry, and that's where we are today.

Pelkey: Yeah, it's amazing, isn't it? Yeah, sure. My guess is -- this is me reading the numbers -- is that all this management comes in '85. '85's down in terms of net, '86 is a break even year -- $85,000 pre-tax loss in '86, which looks to me to be just a function of all this management addition and all this infrastructure building in '85, no new products really coming out during this period of time. INI is starting to become a problem.

Bass: The company was losing its way. It was drifting.

Pelkey: And it kept drifting, and then in October of '87, the stock just hit, and DCA's been trying to buy everybody in the valley, and they come in and put it in play. And there was this relationship with Tandem.

Bass: Well, not substantial. We just went on the block, and Ralph hires Goldman Sachs and says: "Bring in the best deal. Find out what's possible." He, then, starts talking to everybody. He talked to Intel, he talked to HP, he talked to -- and that was the best deal. Now, I maintain there didn't have to be a deal. I mean, this being in play is partly a state of mind, and I think the company was -- did not need to be sold. It was not in trouble. It was simply being --

Pelkey: Hounded.

Bass: Hounded, right. Ralph was tired. Ralph was taking a beating on Wall Street, and he didn't like it.

Pelkey: You went to see Concord Data Systems when you were having your money problems.

Bass: Oh, sure.

Pelkey: Ken Miller.

Bass: Right, well I went to see Ken Miller, and he said: "Why the hell are you building these?" Before, when we were trying to figure out what to be. He was in it before anyone.

Pelkey: He believed Clancy.

Bass: He may have pre-dated Sytek, but no business acumen.

Pelkey: And Ungermann-Bass, were you involved with routers, doing something with TCP/IP?

Bass: Only peripherally. I observed John being -- I observed John being -- John loves a challenge, and it basically gave him a challenge.

Pelkey: My last questions is, you had the deal with TI in '83, and you signed and you announced at the end of August. But then 3Com does a deal with them in October. Do you recall that?

Bass: Well, I remember --

Interruption in Interview

Bass: Oh, I can't remember this.

Pelkey: This has been extremely helpful.

Bass: We were aced out, but I can't remember the specifics. I don't remember if it was costs or credibility or what.

END OF THE INTERVIEW

