Narrator: Pat Hamilton (PH)
Interviewer: Elyse Johansen (EJ)
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94 minutes, 16 seconds = 1 hours and 34 minutes

0:00	**EJ**: All right, so this is February 24 2012 I'm Elyse Johansen a graduate student from PSU. I'm interviewing PH Hamilton, a fellow with TriQuint and we're at the Hillsboro location. This is the only location (inaudible).
TriQuint locations	**PH**: Not correct. I have a location in Texas, a location in Florida and then we have an assembly group of another company way down in Costa Rica and then obviously we do a lot of contract work overseas for the rest of it but… Yeah, another facility that is made for gallium arsenide we have in Texas its uh a combination of our early days when we grew, we ended up purchasing the TI facility, TI had a gallium arsenide facility so we purchased them and then in the early, 2001 or 99, somewhere around there, we merged with a company called saw tech out in Florida then uh… and the businesses were very sympathetic with one another so it made good business sense. Part of watching this whole thing grow has been part of the acquisitions and how that happens and how we manage to integrate it all and how that all works. **EJ**: Ok, um… and I think I'm supposed to ask your permission to record this: is this okay with you? **PH**: Oh, absolutely. **EJ**: Ok, great… Um… but this is your only location in Hillsboro or Oregon? **PH**: Uh, not quite true either. We have a military … over near in Bend, it's a much smaller … and its one we purchased back about five years or so.
Narrator's name, birth, etc.	**EJ**: Ok, so… Um… Lets go back over the basics. Your full name, birth date and birth place. **PH**: Ok, so… Full name is Patrick John Hamilton. Birth date is November 12, 1955. Um, I was born in a little tiny town called Cottonwood Idaho. Actually, I was born there because I was in a place that had a hospital. My family actually lived in Nez Perce Idaho but pretty much grew up in Redding California from pretty much when I was four years old till I was eighteen. **EJ**: Ok, um… and… so, what, how did that transition go from Idaho from Redding California?
Narrator's parents	**PH**: So, my dad was an orthopedic surgeon and uh, well he was at that time a general practitioner. He wanted to become an orthopedic surgeon. So he moved back, after I was born to Rochester Minnesota to do an internship at the Mayo Clinic and that was late '55 early '56. Um, the summer of 1960 he'd been looking after he was done with work to join a practice and he's always been an outdoorsy guy and found Redding and he loved it and he was also from Boise Idaho, both he and my mom so Redding was close enough to Idaho but also had all the fun outside stuff. He ended up dying in a mountain climbing accident back in

the early 60's. So, when I hit eighteen it was time to go see the world and join the service.

EJ: Oh, yeah so um, I think we're going to talk about that pretty soon here. Um, what, or maybe a good question to ask is: when did you first become interested in technology?

Early experience of technology

PH: Oh, before I can even remember. Oh, my brothers and sisters would hide their toys from me because I would take them all apart. Dad, I remember what I was three, Dad had a heating pad that had gone bad and I asked, I wanted to have it. I asked let me have it so I can take the controller apart and he said no you cant have that because it had an AC plug on the other end and he knew I could shock myself so I followed him all the way out to the garbage can and he says you leave that there and of course I didn't, I took it out I went back into the house, into the closet with a screw driver and a flash light and I had that thing taken apart and then I heard the door open and there was dad standing and I got my but whooped for that. But every time… I loved to take stuff apart and put stuff back together. I've always been, it just fascinated me.

EJ: Was that maybe your earliest memory of doing something like that?

PH: That's roughly the earliest, yeah – that I can remember. About three years old or so, taking stuff apart.

EJ: Wow, okay, um… So were there any sorts of particular types of technology that excited you as a kid?

PH: I think electricity excited me because I didn't understand it as a kid. All the mechanical stuff was easy to take apart and understand but electricity you could read about and so forth and so electrical motors I could understand because you could play with magnetism and stuff but electronics what I'm doing today, just couldn't understand it so I kind of figured out I was going to be a mechanical engineer along the way. And uh, during my high school years – do you want me to just lead on and keep telling you how I got here?

EJ: Oh yeah – sure, please.

PH: Okay. During my HS years after my dad had passed away my little brother came up her to OSU to get his college education and when my mom couldn't take me being around for too much she would throw me on a bus and I'd come up here and visit my brother and it was during one of these visits when he was - he had actually gone from OSU to being a HS teacher for a couple of years to Tektronics. While he was at Tektronics, I'd go in with him to work and on the weekends to play around with the gear and stuff but he also had a self help packet on understanding solid state electronics that was part of a Tektronics self improvement program and it was interesting because in less than thirty minutes of reading that self help, self learning book, I went from not understanding

solid state physics, solid state electronics to "oh my god" I understand it now.
EJ: Wow
PH: And the doors opened and I've never looked back.
EJ: And wait, so… how… when was the time period?
PH: So, I was fifteen or so, fourteen or fifteen.
EJ: And going from no knowledge to suddenly understanding it.
PH: So, in less than thirty minutes of a self-help, uh… training course that Tektronics had for their people to learn
EJ: Wow
PH: And it outlined to me the fundamentals that nobody else was… everybody else was teaching out of a book – if you will – but not talking to the laymen. This was the first book that talked to the laymen. This was how solid state electronics work and it was like "oh my gosh."
EJ: So do you think… Would it have been something that someone without natural ability could have understood, not necessarily would have clicked like it did with you but…

Early technology work

PH: So, I understood tubes – okay? And around the same time I got a job as a minimum wage, as a TV repair man, because back in those days most TVs had tubes and anybody could run a tube checker and all that. It was fun, it was a family friend that hired me in. But when it came to transistors and stuff, didn't understand that at all. So I had a working idea of how a transistor amplified but I didn't understand at the fundamental physics level – how does an electron move around and make all this happen, okay?
EJ: Yeah.
PH: And that one document in thirty minutes totally turned me around, I fully understood it at that point. So, it was great.
EJ: Was that a really exciting moment?
PH: Oh, big moment. It was, it was the door – I knew I should never bother going down the electronics path because I knew I'd never understand it. Now its wide open and its simple.
EJ: Yeah, wow.
PH: A little too simple for the time if you will (chuckles) but that has been the interesting part about working for this company is um… you have a model… like I've always come into this as a lawman, if you will, okay? And I've always been surrounded by geniuses and when I have an issue I'll go to them and say "this is my model, this is how it works" and they'll go "Pat, you know that's cool but that doesn't take into consideration any of these other intricacies that you need to worry about." So I go, "Oh, kind of like with ping pong balls and stuff" and they'll go "yeah, yeah that's it." And so I've got all these guys from high energy physics to uh full doctorates in solid state materials that I can go to and bounce ideas off of and keep building this more and more complex

model of how this stuff really does work and now I've done it for so long that everyone keeps coming to me…"
EJ: (chuckles) That's awesome. Um, lets see… And so do you think that what led you to pursue a career in technology was because of your brother and because of these early interests that you were naturally… (inaudible).
PH: Yeah, I think so. I ultimately ended up joining the air force and chose a technology that had the longest schooling and was highly classified that I wouldn't have to do homework. I hate homework. So, I chose a field in cryptographic repair, which is uh, the code machines, repairing those. Took a year of schooling and then did five years in Washington DC and Andrews Air Force base repairing these machines and all kinds of different fancy places. The last two years I was in the service I realized I was working on technologies that were fifteen to twenty five years old and I'm going to go out and hit the market space with you know "Oh, I know how to fix machines that have big transistors but I don't have any IC experience." A friend of a friend got my into a place called "Electrorim" which is an electronics test and measurement rental house. Okay? And so, electronic test equipment goes out and when it comes back it needs to be checked and repaired or hand calibrated and put on the shelf. So, all kinds of different electronic gear. And I went to the guy and basically said to the guy "I'm a god's gift to electronics as a technician but I need to get my feet wet with what's new and you guys have nothing but new because that's all that your customers want so here is the deal I'll put myself on mid-shift at the Air Force and I'll come work for you at minimum wage with flexible hours and basically "you don't like me, get rid of me at any time. You want to keep me? I'm not ever going to ask or a raise I'm just going to stay a year and a half to two years and get my feet wet with this stuff." Worked out great. So, um I got out of the service, they offered me a job in San Diego and I really though about it. It was a modestly good paying job at the time but I also looked at the housing prices and realized I was going to be behind the curve to ever get into a house in San Diego with where that job was. Then I also had a job lined up in Alaska with an old high school friend to go fishing for the summer – commercial salmon fishing. And uh, so I said "yeah, I may take the job but I'm going to keep looking. I got the summer off, I need to go do stuff. I'll keep interviewing and if you find someone that's as good or better than me, hire them, you know? So, I got up to Redding and visited with family a bit. My friend called me from Alaska saying that the deal had fallen through, saying there was no fishing and I went "oh, dang…". Because I thought I was going to have this big wad of money I was going to be able to put as a down payment on a house. Get a good start. So, I'm sitting in my mom's

Technology training in military

house trying to figure out what to do for the next couple weeks and all of a sudden my brother calls up, the same one that had been up here. He says, "get your butt up here, I got you an interview at Tektronics, you know?" This was summer of 1980.

EJ: and that was out of the blue?

PH: Um yeah it was. I wasn't expecting it. I'd talking to him a bit saying "I don't know what to do" and my brother said… at that time Tektronics was almost 24,000 people and they were having some cash flow issues. They'd shut down hiring completely and they were trying to shrink their business, or head counts, to get their costs under control. So, there was no hiring. And uh, he knew that he wasn't going to be able to get, you know… that there wasn't even somebody to connect me to. So, but then he'd run through the middle level management area of Tektronics, 3rd floor building 50 and ran into a guy who became my boss, actually became the first CEO of this company named Al Patz. And uh, so he calls me and he says "get your butt up here I've got an interview for you." So I came up and quickly put together a resume. Came in and interviewed and they were looking for anybody that had good electronic technician talent and I was basically the cream of the crop as best as I could tell. They uh… I interviewed for a full day. And they took me into all the tech labs areas and you know by this point I'm just, I've seen so much technology go by me that I'm glazed and its like "I cant handle this, I cant do this." You know?

EJ: (chuckles).

PH: And I turn to the guy who I'm going to replace and his forte was high vacuum systems but he knew enough about the other systems to repair them a bit. And he read through my resume and we talked all along "Boy this is almost overwhelming" and he says, "Oh, give it a week, you'll kick ass at it, don't worry."

EJ: (chuckles).

PH: So, um… turns out the guy that I interviewed with, the man who was hiring me did not know electronics at all so my resume read extremely deep. You know, gave all my military experience and all kinds of stuff. So at the end of the day he comes back to me and says, "Pat, I got to tell you. I don't know electronics so I went to my boss and he knows electronics and here's the funny thing, this career field you were in the air force, this electronic communication and cryptographic repair, he was in that, same field and this guy you put as a reference, he was in Danang with him so my boss wants to meet you now." And that was Al Patz. He was the controller of Tek labs at the time. My brother had a great reputation at Tektronics. It took a VP signature to get me in because there was a hiring freeze and for the next two and a half to three years, well for six months I did technician stuff, fixing stuff and so forth but I kept getting more and more scientists

Hired on at Tektronics

coming to me and saying "I need circuitry that does this." And… "Oh that's easy, we'll build this, you know… So after about six months they said, "you're not a technician, you're an engineer." So they blessed me "nomini patri" you're an engineer…
EJ: (chuckles).
PH: And uh, it was a great title but it allowed them to freeze my pay for a while but it took the ceiling away, made things totally open
EJ: Oh, okay.
PH: And so uh, so from there for the next two and a half years I worked in Tek labs. Anything that was um, broken, needed modifying, needed uh, creation. So Tek labs included uh the analysis lab so I worked on OJ, scanning OJ systems and SEMs. Depositions… I learned basically an entire microcosm of the semi conductor industry including the very far out leading stuff people were playing with.
EJ: So, was it overwhelming at first? When you first started working here?
PH: Um, only the interview was overwhelming. After that it was, "boy this is getting easier and easier every step," you know? And yeah, I was pretty much the go-to guy inside of a year so it was fun.
EJ: So you feel like it was less overwhelming because things were just clicking for you or because you had resources, people you could go to or both?
PH: It was both, both. Everyone at Tektronics was very willing to tell me, you know. They send me down "Pat, you got a problem down in the x-ray lab, go down and see what you can do." So I'd go down and you know I worked on Geiger counters but here's an entire rack of energy and photon multiplier stuff, ask them what's the problem and we get into a little bit of it, you know. He would spend a half hour telling me exactly what everything does and I'd understand it and I'd dig it and I'd ask my questions and I could fix just about anything as long as they took the time to explain to me what it was, what was considered correct operation or what are they observing that makes them say its incorrect. So it really didn't matter what it was. If I could get a screw driver into it I could fix it, you know? So it went that way for scanning electron microscopes, OJ systems, um just about everything. And so in a short period of time what I hadn't been exposed to. What I knew very well was electronics itself, okay? The (inaudible) and how they run. I had no idea how you built the electronics that went into them so it was that part that was a little overwhelming to start with but it was deeply challenging and extremely fun to go learn it all. The first six months that I was there as a technician, you know its an hourly job and my boss kept beating me over the head that I had

to leave after eight hours because they had to pay me over time because that's how the labor laws work. So I was very happy when they called me an engineer because I could stay as long as I wanted and play.

EJ: Yeah, because you're so fascinated by everything?

PH: Yep, yep. I was in there on a Sunday once and I remember this little guy comes walking by and on the inside of the old Tektronics there was inventory stock of all kinds of electronic components you could ever imagine all the way around the building. And this guy in a little sweater walks in, pulls stuff out and sticks them in his pocket and I've only been there a couple of months, you know? And uh, he works his way down and its like "What is this old man pilfering?" And I walk over and I say "Can I help you?" "No, I know what I'm doing." "Well, who are you?" He says "Well I'm Howard Vollum, I own the company." "Whoa, excuse me! I have keys to these cabinets, too - do you need anything?" He just smiled but he was that down to earth kind of person and everybody in that company was that type of person, so...

Atmosphere at Tektronics related to inherent Northwestern attitudes

EJ: Why do you think it had that sort of atmosphere? Like...

PH: One of the reasons I really loved this place was in '77 I came back on leave and came up to visit my brother and stayed a good thirty days up here. A friend of his had had a car that had run into some problems. It was an MG, okay? And I had an MG of my own so I knew how to fix it. And uh, so I was fooling around town picking up parts and stuff and everyone was great and cool and I go to this one little part shop on the east side under ross island bridge and its a (inaudible) dealer and I go in and buy everything I need except he doesn't have a gasket for the thermostat housing and its close to the end of the day and I said "Oh just give me a sheet of gasket material and I'll tap one out myself" And he says "Ah, I'll come and close the shop, come on back." So he closes the shop, now we go out back and he takes my thermostat housing and ball ping and he taps me out a perfect gasket. Meanwhile I'm looking at his MG racecars and everything and we're just talking having a great time. He hands me the gasket and I said "Well what do I owe you?" And he says "Oh, nothing, just take it. Have fun." And I was like dang, I love these people. And its really the people here especially after having spent five, six years in Washing DC and its really ugly. You look at somebody and smile and they think you're about to rob them. This was back in the '70s, you know. It was really, you really had a hard time connecting with people on the east coast. When you did, they were long-term relationships but if just had a casual discussion like we're doing right now they, some of the time the animosity was palatable. Everybody was dog-e-dog. Everything was conflict to be better. This was where I

wanted to be. The Northwest was um, so San Diego can be a little like that, okay? The pressure is less. Um, good people. Just too damned expensive, okay? The bay area is lot like the east coast as far as people went at that time. Very much dog-e-dog. Intel to a certain degree here is somewhat of a dog-e-dog, they actually set up systems up for confrontation. At least that's why I've heard. I've never seeked a job at Intel because I've heard enough that I know I don't want to work there. And the other piece of that is... here, I've been here forever. I have a job title that is normally given to people with full doctorates. And I don't even have... All I've got is a high school diploma, okay? And yet, I have... people recognize what I can bring to the table and they don't give a crap about you know the sheep skin and the rest of it. When I was young and thought I was going to rule the world, I was going to be a CEO of my own company, multimillionaire, knew that from the time I was seventeen, eighteen years old till I hit twenty three, twenty four years old and realized, well there's still a lot of luck involved in this. And then, working in this company, management is not my forte, I don't have the patience for it. So, This company has given me huge opportunities to continue to grow and in doing that I am able to reciprocate and give a huge amount back.

Differing dynamics between Intel and TriQuint

EJ: Yeah. Why do you think that the um, dynamics are so different between Intel and TriQuint?

PH: I think it's because they came from two totally different places. Tektronics came from Jack Murdoch and Howard Vollum who were Portland people. So you had the personality of the people... and with those guys, they were actually um, facilitated people taking equipment home, taking parts home, build it up. Anything you do to improve or um, expand your knowledge base is good for the company was the general thought. Intel, pretty much the exact opposite.

EJ: really?

PH: Yeah, that was my impression. You need to... Someone else can talk to the Intel guys but that's still my impression today is... it's not the work environment that I want and Intel of course came out of the bay area as their starting point. I think they brought a lot of their management philosophies from there. I think this company is starting to diverge from the Tektronics but its still at its core because of the people and the choices that are made. Our CEO is very much, while he never worked at Tektronics, eschews in me and gives me the same feeling I had from upper management in Tektronics which was "we're here, this is a great company, lets get this done," and whatever it takes, there is no animosity. In the old days it would not be uncommon for someone to come in from Intel and say "I know this technical stuff and I'm not sharing with you because this makes me special," right? Whereas here its the exact

opposite, "I know this technical stuff and here, please understand it because then I get to learn more stuff," right?
EJ: So is that more within the company like brainstorming and working together whereas at Intel you feel like its a little bit less that way or do you mean going outside of the company...
PH: I think its within the company. Yeah, its strictly within the company and what you share and how you share it and what's allowed to be shared. I mean at Intel, to a certain degree, they don't allow intellectual property or IP to be shared much in a broad sense with all the people because its very valuable to them and if too many people know how to do it and then take work with the competition then they lose the initiative. So they very much compartmentalize people. You get somebody who has worked with his nose in one corner his entire career. Here it is damn near the exact opposite, you know? And uh, you have big picture... There are people who work in their niches because they enjoy it and those are the people I'll go ask special questions...
EJ: and they're happy...
PH: And they're happy to me, in fact more than happy because it never feels... in personal opinion, it never feels so good as when you're a teacher and you see the student get the idea. It feels awesome. I've passed on something of myself, you know? And that's how its always been for me up here, so...
EJ: And so you feel like um, TriQuint and Tektronics have always had that sort of sharing, open dynamic?
PH: Um, for the most part. And uh certainly at the beginning TriQuint was very open. We did go through some merger activity in '91 where we ended up with two other companies and TriQuint all forming up as one. It provided the financial impetus that got us out as a public company but it also brought in middle and upper management that had some conflicts and it took a while for that to settle in and for everybody to be comfortable with "lets go do this," okay? Um, and its been... it was interesting to watch both on my part because I had to change to work with them, they had to change to work with me, you know?
EJ: Are you allowed to talk about that conflict or is it um... or is it more like different sorts of structure trying...
PH: Well, for example, um, when we grew the company, um, we grew the company from nothing. It started with like five or seven people in the gallium arsenide lab and I was a maintenance engineer for that lab. When they took it out as TriQuint... before I joined it has been a separate entity for about three or four months, we were up to maybe fifteen, twenty people when I joined. For almost a decade, we hammered away at making money and almost broke even. We actually did break even right after the companies merged, okay? Um, but we were always just behind the wake. Um,

but I mean it was nothing for me to come in and work, oh... I'd work, start in the morning, I'd work all the way to the next afternoon, okay? Go home, get two hours of sleep come back in and do it again. But I was young and could do that. I don't do that anymore. And that was "by god, we're going to do this," you know? The reward of making, of wanting to build something... since I was never going to be a CEO, what I could do was work my ass off and make this company what it is as far as my part of what I could do. So, while I can look back and think I... I believe I played a fairly significant role in the success of the company um, but so have several of my peers, you know? Um, so the question was "confrontation." So we built all this from nothing - this is how you do it "onsie-twosie." I was hired to basically figure out how do you do it en masse, like ten to twenty "x" to what they were doing "onsie-twosie." Well now we do it by a thousand to ten-thousand "x" but at that point we took what we had and we did special tooling and so on and so forth, did inspections and stuff so we kind of knew how to do it, we'd spent eight years doing it. Well, turns out that the new management that they decided that they needed a new VP of operations because we'd kind of plateaued and we just can't get out costs down anymore. And they brought in the VP that I work with now and uh, he came in and his first step was to utterly change how we were doing things from a systemic... he called all the inspections out, okay? That we thought were absolutely imperative to get quality material out and his reasoning, I've come to see later exactly why he did it. Having never done any of this stuff myself before, I didn't know how it could be done. What he came in and enforced was his lessons he learned in high volume manufacturing from a different place and what he did was exactly the right call. It took me years to see it and it took a few years for what he'd done to come through and show that's the only way its going to work, "yeah, its obvious this is how you got to do it." So yeah its those kinds of frictions where you have professional differences but... I went through some middle level management for a while. I worked directly for a VP for a while for a big old digital business and you can have all kinds of pure discussion and everything else as far as agreements and disagreements, whatever but once we walked out of that meeting room it was consensus - we're doing this, okay? So that the people who work for you don't get mixed messages, they get "this is what we're doing, this is the direction." If you don't do that you're not doing your people the justice they need. So, if you have conflicts you need to take care of them, okay? But once the conflicts are decided, maybe not resolved, you still have to take that direction and go. And that's what it was with this VP when it came in. Its not like, "oh, crazy, its all going to break," well, he was right and we were wrong, you

Major change at TriQuint – conflict and challenges due to merger and change in management

know? And there are times when new people come in and we say "you really don't want to do that" and they go do it anyway and then they're wrong and we're right but you know, you got to learn and if you don't make mistakes or if you don't make changes, you never figure out how to get better. And so, my mantra is always, "change is good." Now its painful, I hate it sometimes but the mantra has to be "change is good." So...

EJ: Yeah... I feel like I need to check this just to make sure everything is working. Okay, now we're back. Um, so you feel like you didn't really ever have to deal with passive aggression or anything like that like when there was a conflict you usually faced it...

PH: Um... There was, I think the biggest conflict we had was in the merger. The new management had came in… first, I loved my old management. When I lost them that hurt. The new management that came in looked at the labor force cost and said, "boy, this is great" because they came out of the bay area. So they're looking at the cost of labor up here. What they weren't aware of is that every one of us said "yes, I'm willing to let my pay be compressed, I'm not going to ask for raises while we build this company," okay? So, most of us were thirty percent less than market as far as our salary by the time this all happened. And uh, upper management didn't do a very good job of addressing it so there was a few of us that got a little vocal about it and the bottom line was um, that I think in the end they went out and did some surveys and found "yep, we are not doing them justice," and they took care of it. It did take a while but because they were new, because we felt like we were being undervalued, certainly we were being underpaid, and it didn't feel like it was going to change, yeah there was pieces of animosity but it took a few years - it straightened out. I'm much kinder now that I'm older, I can look back at it with less gnashing of teeth, you know?

EJ: Yeah. Um, so about how long from the merger and the shake up do you think things got smoothed out?

PH: Oh, I think uh, I think it was still a little rough for three to five years and then things started coming up on keel. Um, during that time frame the technology that I previously, uh that... the company right now focuses almost completely on RF solutions, okay? Back then the... what we first started with was digital solutions for the fiber optic community and that was where we made all our money. Um, I won't say all our money - it was where we made our big profits, it was our biggest revenue strain up until the mid '80s, or I'm sorry - mid to late '90s. Um when we got a new VP in on our wireless side, he managed to penetrate the sell market and then the and then the wireless side took off. Meanwhile I'm back on the digital side trying to make the successful but the problem is that

uh... so, for example in 1986 I'm testing our chips at 1.2 gigahertz and I have to built my own test equipment because there is nothing that runs that fast digitally and it goes into the fiberoptic community. Uh, so you guys think of a penny and now three gigahertz and you say "oh, whatever,' okay? Well that's now twenty some odd years, thirty years ago, running past even a few competitors. I mean the PC that I had on my desk when I was testing these parts at 1.2 gigahertz, all we had were 20 megahertz um so uh, what one-one-hundreth the speed basically, okay? To give you an idea and that was state of the art so for the longest time, you know, we had one, two and ten gigahertz digital work but ultimately silicon... we kept looking over our shoulder at a lot of different technology that showed promise but never seemed to get a grip, take our market space away. We were looking over our shoulder at things like Sigi, which is silicon germanium and a couple other high speed semi conductor technologies. Seamoss (sp?) just kept the same march they'd been doing forever where they were doubling their speed every year and a half or so. And soon enough they were out ahead of us in their capability and uh, there was no more digital market and that happened the space of oh, sixteen months or so. Went from not even in our radar screen to "its time to shut this down." Given that my product line at that time - when I had a design win I'd be delivering that product for three or four years so back to basically "no, I have no new design wins and all I've got are a few products I have to parse out for the next two, three years and now I've got to shut it all down. So, there was that. We had a group of sixty or eighty people we ended up having to lay-off. Um, some moved into the wireless side, other actually... um the management here managed to actually structure a finance of a new company that was in here called Heniai (sp?), not here but here in Beaverton/Hillsboro area, who was doing fiberoptic communication products and um, we gave them cash and they hired some of our digital designers and that worked fairly well for a couple of years but ultimately they were not successful so some of those people now have come back and work with me again and that's great. Personally, they told me, I had a VP come in and sit in my office and says, "Pat, once this program is done, you're out of here, we don't need you anymore." Well he didn't know me, he didn't know what my capabilities were and I went around and asked some other people and they said, "I don't know why he's thinking that but okay, whatever." And I'll give him huge credit because he came in and sit down in the same chair three months later as I was finishing up the last project and he said "forget what I said, we're keeping you. I'll figure out a place for you." So that was very nice but it was a gut-wrenching ride. This was the 2001 downturn when things went nuts, the bubble burst.

Lay-offs, impact of economic downturn

So, I had a son just about ready to head into college and everything was just being yanked out from underneath me but luckily it didn't happen and now I basically... Christmas party a few years back I said "Thank you for not firing me," and he said "thank you for not leaving."
EJ: (chuckles).
PH: We both were happy about it.
EJ: Um, was this also... so this was pretty close to the time when the big chunk of people had to be laid off and I was the last phase of those people and there was a few of us left to finish off a few programs and we were going to get laid off as well. So... Um...
EJ: So, do you feel, so um... So did you have to kind of stick your heals in and work extra hard or like...
PH: Well, the one project that was there I worked my ass off, okay?
EJ: right.
PH: Because if I made it really successful I would have some reason to stick around for maybe a little longer. Um, what I didn't do was... the VP who said this, now because keep in mind, my... the VP I had worked for and everyone else that had worked around me were either gone or laid off or on their way out he door. But there are people I've worked with in the company who work with this VP and uh, I went to them and I said, you know, "Does he understand what kind of talent I bring?" And... So, what I think basically happened was the word got back to him through grass roots that "No, he's a unique talent that you probably want to keep around" which is... I did my best to deal with it in a subtle manner, rather than just blatantly going toe-to-toe because toe-to-toe doesn't work with a lot of people. Um, but I had to rely on the same friends or the same people that helped me learn all this stuff um, to help me out. And I think that ultimately, that plus um him seeing what I was doing and how I was doing helped immensely in keeping my job. So…
EJ: Um, has the way that you interacted with people when there's a conflict in your job changed over time, like you said that you didn't go toe-to-toe...
PH: Oh, I've grown immensely. So, my boss who first hired me, actually I think someone else from your group has interviewed him, he was the man who hired me in... he was the VP of production in the early days. Uh, he and I would go toe-to-toe, yelling across tables in our younger years. Um, we both realized not only did it not get us where we wanted to go but it was damaging to the people around us, nobody got anything done. And I had another VP that I started working for and if I was in a meeting and say someone from marketing... marketing people can always get you upset, I don't know why. There is a favorite saying

around here: "all you got to do is..." So, when you here a marketeer say, "All you got to do is... what you saw was the next six months of your life filled with work because "its so simple that anyone can do it... you just got to do the engineering, that's all." So...

EJ: (chuckles).

Pat's approach to conflict changed over time

PH: When I get into arguments, what I found was he who got mad first lost, okay? Didn't matter who was technically correct. It was whoever lost their capability to debate at an intellectual level and got emotional, lost it through the emotion, lost the case and it doesn't matter how strong your case was, you could come back and revisit it once you got cool. So, yes, all of that taught me was the best way for me anyway and for this company I think we still try to do it that way is, you may me hot under the collar but go cool down first, then come back and lets have a discussion. And we will probably not agree but lets come to a consensus. We'll figure out how we go forward from here and if we can't that's what management is for and we'll take it up the ladder and let them decide. So, it has changed over the years. When we were smaller and we were... everybody had to be the cowboy. There were so many jobs to do, everyone had to do everything which meant there was a lot of toes stepped on, a lot of bickering and so on and so forth and conflict. Um...

EJ: So, that was mostly early on?

PH: Early on, I'd say its been relatively smooth for me since I'd say '98, '97 to now. '86 to '91 was just a scramble to make it alive. '91 to '97, '98 was growth but with a lot of animosity and push and everything else. And it was '97, '98 that we built this facility so we were on our way at that point. Um, by 2000, um we were in the stock market bubble and the prices just went through the roof and everybody just came in with a big smile on their face every day because there were... every other person was a millionaire walking down the hallway on paper and then it was all gone in less than six months. And uh, so people managed to cash out at the high end, others didn't manage to cash out well, others got in trouble with the IRS um, all in all, I went into this thinking, you know if we make this company successful and the stock options work, I'll pay for my sons education and then I was "Oh my god I'm rich" to "Well, at least I think I have my son's education paid for." And its still growing. I mean, one thing is that we are very conservative so the stock market tends to beat us up because we don't put out the uh "raw-raw" stuff, we try to just get a very deep even direction on what we're doing and why we're doing it.

EJ: Have you always had that philosophy?

PH: I would say so. There was... when the stock market had the big bubble and we were riding it, I'd say we got a little too jubilant once of twice um, but reality... its a different set of management

Rob Quincy

now too. The board of directions is pretty much the same but Rob Quincy as CEO has done a heck of a job in my opinion keeping this company growing and I mean he's the only CEO I know who calls everybody on their birthday, okay?
EJ: wow!
PH: Know everybody by name, um I trust his technical knowledge and I trust his personal and I fully trust his business sense. I don't know how we could have done better so I'm really happy.
EJ: How long has he been here?
PH: When did he get here... Somewhere in the 2000, 2003 range, 2004 range, maybe a little later. For me the past seven, eight years have been a blur just because its been so fun for me so its hard for me to say when did things happen but what they ultimately did was give me a job working on yield improvement on these new products so every day I have a different thing I have to go figure out and a new toy to take apart and uh, new numbers to get and new people to teach and if I've done my job right then they get to do what I did and learn and pass it around so its always this growing knowledge thing and its gotten now to where I spend more of my time in meetings and reviews and saying "ah, lets do it this way or not that way," and if I'm at my desk I have maybe fifteen, twenty minutes between people coming by to ask questions, you know? I feel kind of like the old guru up on top of the hill nowadays.

Social environment at TriQuint

EJ: (chuckles) So its very social... you feel like its very social environment because you have people coming by all the time, meetings, and...
PH: Its very personal interaction. I know there are some people here that say "I hate going to meetings, all I do is waste my time sitting there," you know? Well its like then don't go to them. I personally, I know I'm ADD so I don't bring a lap top my meetings because if I do I'm in my lap top, might as well be back at my desk. I'll bring a piece of paper so I can take notes, you know? Everybody has their own little things to do. There are people that are superb at multitasking that'll be sitting there doing their email, totally participating in the conversation and you know, having a third conversation on the side on how to handle something else. I envy those people.

Timeline of Pat's time at Tektronics and Triquint and his changing roles and challenges in those roles

EJ: Me too!
PH: I know I'm not one of them so...
EJ: Um, so could we go back through and get a little more structure to the story like when did you first start at Tektronics and then like when did you first start at TriQuint and how did your roles change?
PH: So I first came to Tektronics in July of 1980 and that was after six years of military service. Um, and I worked there for roughly

six months before the promoted me into engineer and um, when I hired in I told them, you know, "I realize you got to teach me a lot to do this job, I will give you at least two years or more as pay-back. I'm not going to come in and..." One of the standard things that happens in the bay area was people would flitter from job-to-job to pump up their salaries and stuff. So, I says "I'll give you at least two and a half, three yours, okay?" Well, I gave them that and three years into it in '83, Al Patz, my boss's boss, he and I were talking at a picnic one time and he said "I'm getting really tired of being a controller," and I said "I'm getting really tired of being a maintenance man so, wherever you go, keep me in mind." So, he took the gallium arsenide group out and at that point there were two technologies out of Tek labs that were headed out to the outside that were fully funded my Tektronics so they realized that they were not going to use it as their own technology but it definitely had marketable aspects to it so they weren't funding it. One was Planar systems and there became TriQuint the gallium arsenide crew and they both courted me because I had worked for both of them plus a dozen other fads and labs that ultimately didn't go anywhere. But uh, there was... First, I liked everyone that went to TriQuint and there was one guy specifically that went to Planar that I didn't like and the other part of it was Planar what they wanted me for was to be a maintenance man forever. And when TriQuint became TriQuint I said, "I want to become a processing engineer," what my forte is I can built you all the equipment you need to turn these engineering concepts into production concepts and I can do that very well. So I did that and so that was the equipment side of things I can do so after that I brought up processors on this equipment, which was fun. It was a kick in the butt. The first time I was in charge of wafering, we had this nice furnace stuff, you know. Prior to that they had a very special way you know and it was like, "well these guys are being way too delicate about it." So, I set everything up and I put these new wafers on there and wafers costs hundreds of dollars a piece you know. The boss comes by and that was Gordon and he goes "Well, Pat you got to push the button sooner or later." So I push the button, they went into the oven half and hour later and they start coming out and I look and there's orange and I see that wafers kind of crinkle and fall and crack and its like "oh, god." And he says, "Oh, looks like you got some work to do, Pat." And he was right, I had a lot of work to do but it was fun. So then we built that, got things going and they said well you know, "we need someone to write the code for the testers" for the systems we that test what we call a PCM process control monitors that are on the wafers which are little sub circuit pieces that tell you how you're doing and I'd taken four-tran coding (sp?) at Tektronics and uh, I'd been taking

classes at Tektronics for that two to three years at night, trying to get my double E degree but I was only managing twelve credits a semester and as it was, it was... I was just not getting anywhere. I'd been doing it for two to three years and still considered fresh by their credit count and then TriQuint came along and my time demand went through the roof but during all the time I'd taken four-tran and some other stuff. And I said, "Well I know four-tran so let me program that up for you." So, I became the PC and test engineer and then the designers started to actually produce parts they thought were products and I'm going "how do we test that?" and I said "oh that's easy, we'll do it this way and he says "oh, you already (inaudible)." So, test engineering, that name basically ended up with application support so I became a product engineer which is the person that goes out and does the... not only does the testing but also goes out and makes sure its working right on the lines so did a lot of that. Uh, did a lot of conceptual stuff as far as how do we go after newer products and parts. And then uh, for a while did actual design engineering. Um, it got to where one of the pieces of the business we did was in phase lock loops (sp?) and nobody really knew them well so I went a taught myself phase lock loops and I became the PLL guide here for a while and clocked data recovery became my forte as well, I wrote my own little code and stuff. It was... each step was more complex, more fun, you know, patents and a few other things along the way. Some of the stuff got adopted and some didn't. It was all fun, all neat. They needed somebody to manage the test group ultimately. Um, I did that. That's where I found out I wasn't a very good manager. Um, and then became an individual contributor basically. Most of the (inaudible)... most testing... testing stuff is roughly what I'm really good at. If you've got something that needs a screen of some kind or I can generally figure out a really good way to make sure we're meeting the needs of whatever you stated. Whether its to get defects out or to guarantee performance or both or whatever. I know how to layer that up and make it happen. Um, on top of that I had the task of always improving the yields, okay? And so, I've spent the last seven, eight years doing that. Helping the teams take products that got launched with big "oh, geez, they shouldn't have done that" kind of stuff, you know? And to where you put a lot of money in and what we would call wrapping a dollar bill around each part because it costs you more to make it than what you're selling it for, okay? And you got to turn those things around relatively quickly. So, I spent time doing that and then putting in... working with my management to help get the systems put in place to get all the early engineering work done so that you don't have bad launches. And I also through all the years, because I I love to take things apart and understand and test, there's little

idiosyncrasies that happen with any electronic device in fringe corners or areas of operation that become really critical in certain designs. So one of the things we have are transient characteristics where the transistor is supposed to do one thing but based on how much charge is around it, it does something else, right? I become fairly known as the expert around here on that stuff. So, I'm trying to get out of that, by the way - pass that one to somebody else. But for a long time it was... when people were doing linear circuit design and they were trying to get very precise linear control, I would take them through what's going on and why are you seeing what you're seeing and even today when somebody does a design that they don't know has a sensitivity to it they'll come to me and say "I'm seeing something weird, does that make sense to you?" And I'll go, "Oh, yeah that's... this is why... and here's some papers that (inaudible)" and so forth. Um, so I've kind of become the repository of all the things you need to do to make money in this business, which is kind of cool.

Pat's role in the success of TriQuint

EJ: (chuckles) yeah. Um, do you feel like you've been pretty significant... influential in helping grow the company in that you kind of put yourself in all these different roles...

PH: When we were smaller I certainly was a major person in the early days. The bigger we get the less I have affect on things from the standpoint of longer-term things and the growth of the company. That's how it needs to be. This company is still growing, still learning how to become and be a really big company. And this isn't the thirty persons that we started with and so by definition if I've done my job right, I'm not a key person, okay? Now there are certain areas where I am still key and they're still trying to figure out, "how the hell are we going to replace him when he retires," you know? But I do look back... I guess a better way to state this is that while I know I'm not the reason, I know I'm one of the main reasons that this company is here and that this company employs this many people in the area. This is what I wanted to do from the time we started was make it a successful big company. The CEO part, that can wait till I come around on my next life, I'll try to get it better next time.

Pat's objectives and aspirations when he first came to Tektronics/Tri Quint

EJ: (chuckles) So, so when you first came, I guess what were your aspirations and objectives when you first started, I guess when you first really started working with technology which would have been in the air force...?

PH: Um, TV repair and all the rest of that so my only... it was just flat fun. I just enjoyed it. I got as much joy in doing that as I did in going out to snow board or skiiing or going scuba diving or whatever. It is a fundamental joy of investigating something new, fundamentally new every day. So...

EJ; So, you always wanted to do something you loved, and that was challenging...
PH: Had to be passionate, new, okay? You want to see me waste away give me a job that is turning out the same tiddly-wink every day, over and over again. I will die on the spot. I need to learn as I go. I'll do the best job I can. You don't like me, tell me, we can change. Um, for me, I've got to learn something new every day.
EJ: Yeah, so that was kind of what brought you to take on new roles pretty often was because you were willing to try something new.
PH: I've never had a fear of trying something new.
EJ: Right.
PH: And nobody else... in some cases, most cases, people didn't have a broad enough understanding to attack it. So, there have been times when I've gone in and done something and a year later we finally find someone on the outside we hire and bring in who could do it ten times better than me. That's awesome, okay? That's great. Actually what's really cool is I get to help him understand our nuances and he gives me that whole middle piece of information that allows me to become even more knowledgeable in that area. So, its win-win for me.
EJ: Um, have you had any major mentors or... on the other hand have you been a mentor to...
PH: I try to be a mentor to everyone. Um, major mentors is Gordon Roeper, he was a major mentor for me. Um there was a gentleman who retired from here, Wes McKennan, major mentor. And just about every other major engineer that's been here, its... even the technicians for that matter, you know? There's some very brilliant technicians that are here and prefer to stay in the technician realm, okay? But know hell of a lot more about stuff than I do. So, I have no problem going and talking to... I don't care if its an operator, if I need to understand it, I want somebody who's done it or is hands on and is doing it to explain it to me. I don't go to the person who has the PhD, I go to the person who has the knowledge. And so, I'm always being mentored and I'm always mentoring and that's what makes this job so wonderful.

Some of Pat's mentors: Gordon Roeper and Wes McKennan

EJ: Right. So, the two individuals that you mentioned, why do you think those particularly... why do those two stand out in your mind?
PH: Well, Gordon because um, he was my boss for one. He knew IC processing and I didn't. I knew how to fix the machines. I didn't know the chemistry, I didn't understand some of the physics and all the rest of that. Wes, Wes McKennan because he understood the nuances even deeper in some of the physics stuff. He was from Reed College and very much a materials guy but he thoroughly enjoyed measuring stuff and getting his hands dirty on everything.

He brought up some of the early... he's from Tektronics as well... he brought up the original laser trim stuff so when you build electronics it may not be as accurate as you want it so you go in and you measure it, then you use a laser and cut and adjust it by cutting the little elements, measure it again. He wrote all that back in the '70s and brought it up at Tektronics. He's like me, he just wanted a very broad knowledge and worked in just about every aspect of the company when it came to processes and understanding the transistors and stuff.

EJ: Okay, um let's see... We've talked about challenges a little bit but are there any major challenges that you can recall, I don't know, that stick out more than other things?

PH: Well, yeah... There's several that stick out. There was a product that we got... one of the biggest things that can cause you real issues in this is when you develop a product or you're developing a product and you do what I call "you got the customer pregnant." You gave them enough parts to where they knew that part was going to do their job and they are now satisfied that you are their person that was going to provide it. But you did that in such a way that you only have 20-30% yield, you carried that stuff. Its the worse thing you can do because then when everyone starts asking for demand you have done all the background to fix it And you don't know why you cherry picked that stuff or what made the bad stuff bad. So, we had a product that starter out like that right after I found out "No, you don't get to cancel the program Pat because its in that dire of a straight, its a lot of money and you got to fix it.

EJ: When was this?

PH: Um 2008, '09. (Phone rings) I think that's someone else's phone. Um, so was this '98, I'm sorry 2008. In 2008, roughly 2007, 2008, the part had been designed and the designers had done some neat, cool things that was very... you could optimize something right down here, okay? Over optimize it to the point where you've sub-optimized the big picture and that's what happened. They got in and tweaked this part so that very small amounts of parts that they'd build they could get it to meet all their little specs and stuff but it had to be with one specific vendor of wafers, raw wafers, and it had to be on the right day with the right electronics and the right this, then it would work, meet all the specs...

EJ: Oh...

PH: But a lot of the times it wouldn't happen. And so that subtlety stuff I was talking about, this had that problem in (inaudible) is why they threw me into the program so um, and the goal was obtuse, they had this thing called that's called EVM (inaudible) and the problem is its a number, percent number, really tough to take that back to some of the scalers that you use when you

normally measure how a device performs and say well this had bad EVM well what's bad about the part and what does that look like, okay? So, it took us a while to figure all that out. Took us a while to figure out how to get the part um, to work right, had to get both new vendors and wafers in, had to work on the design, had to work on the test, work more on the design, back and forth and back and forth to where now we know, we actually built a special process just around the part and now it yields dang decent and one of the guys who cut his teeth on that part is now manager of that general area and he and I spent many a time arguing over, excuse me, discussing and coming to consensus on how to handle all this. So, it was a very difficult task in that it wasn't until I had them break out the circuit into sub blocks that I could then put external stimuli into it and measure exactly what the sub pieces were doing because it was like six different pieces coming together to give you one number and you couldn't figure out what piece was causing what. "We got to break this apart guys..." I mean that's... One of the reasons I'm so good is I know how to trouble shoot stuff and you trouble shoot stuff by breaking it apart, right? So, you break it apart and I go in and I spend weeks doing these detailed measurements and by the time I look at the data its like, "whoa, that's obvious why it doesn't work now" but I took the first part of the data and "well, that's... (inaudible), I don't see an issue with that" and then I took apart the other data that was from the part that those signals would talk to and "it needs to be how stable to make this work?" Its like "oh my god," and I look back at the original bits and going "obviously its never going to work this way." So, we went in and figured it out, whatever we have to tweak and push and get things moving around. It was eighteen months of hell and fun and hell and uh, ultimately a success but the problem with doing things like that is in this industry you lose money if you don't get the yield right from the beginning then you spend a lot of time wrapping dollar bills around things rather than taking dollars back, okay? And that's where you make a lot of your profit is in the early (inaudible) of these if you've done it right and its also where you can lose a lot of your profit if you don't.

A challenging project Pat faced

EJ: Right, so you feel like you recovered from that?

PH: I think there were many lessons learned the way (inaudible) forward. Yes, we recovered from it, the product is still with us and we're still building it and we still have to watch it like, you know, the red headed step child but uh...

EJ: (laughs).

PH: Its uh, its done us very proper in the business space and we've used many of the things we've learned on (inaudible) technically and as a program how do you avoid these things across other designs for this general same space we're not getting what's more

successful of how we address that particular market space which is wireless internet, Wi-Link stuff.

EJ: Oh, okay. Um, lets see... So, earlier we were talking about the environment of working with the people here and you said that its pretty open and people are pretty personable. Um, do you spend much time together outside of work?

PH: You know, I'm a little weird that way. I have my outside friends and I have friends in here that I've known since the company started and I could pick up the phone and call them tomorrow and I know they'd be there for me, okay? And vice-versa. I have personal friends that are in the same category that I've known since I was twelve. Um, and I may not talk to them for two years. I like going out after this job and unwinding, having a few beers with some locals in the blue collar. I'm more comfortable, um... I've got an older brother who still gives me crap about spending time with, he says, "Oh, you like just being the big fish in the little fish bowl." Its like, "no," its not about me being a big fish, this is just where I'm comfortable, you know? So that's where I unwind but uh, my wife's used to it now, been married ever since I was eighteen.

Pat's social life in relation to work

EJ: Oh, wow.

PH: And uh, so she's used to me taking an hour between here and home to unwind with my friends at the bar. Um, and uh, so no I don't socialize much with them. Here at work I do socialization and we always eat together downstairs in the cafeteria and I've had friends say, "if you need anything let me know" and every now and then we'll get together and go out, you know? But for some reason I try to keep them somewhat separate. I don't know why, I just do.

EJ: Do you think that's more particular to you or um, so - meaning like that other people that work here tend to socialize outside of work as well or...

PH: There's... I like to ride motorcycles, okay? And I go riding with several of the people here but I don't do it on a regular basis, it's like once every year or two. I like to go out and do solo rides. However, that same group of people I ride with - they ride together all the time, they go out and they do dirt riding and other things. I'm just a street rider, I just want to go out and put distance down. Um, there are a couple friends that throw a big house party every year or two and I always get invited and I'll go to those. Um, but its not like we spend a lot of time together. Um, and socializing... I think everybody has, everybody does it different, you know? I'm just... for me, I'm almost compartmentalized when it comes to my friends and my social activities, so...

EJ: Um, how many children do you know?

PH: I have one.

EJ: Okay.

Pat's son

PH: One son. He went to OSU and got his masters in nuclear engineering so now he's uh... he just got a job back on the east coast working for the Knowles (sp?) Atomic propulsion lab, the outfit that takes care of the Navy's reactors. So, we're all proud of that. So, we'll be taking off on a vacation here to New Mexico for two reasons; one, to go visit all the nuclear museums down there and the second is for my wife and I to spot out, see if there's some place we might want to retire to down there.
EJ: Oh, so when would that happen?
PH: If I retire? It's probably going to be sixty-five, sixty-seven because I... or later... I mean, so Gordon Roeper, he's retired and he has a cubicle here and he's here half the week. Its that kind of environment and he doesn't get any more for it he just enjoys it. He helps me out on projects. You can't put him in a critical Path because he doesn't have to show up but he could certainly help out on the long-term - "what's going on with this picture?" Since he's seen it all. Now, I kind of like the idea of doing that myself and I'm going to drive my wife nuts if (inaudible - **EJ** laughing)... but one of the other things that... I love the Northwest, after about twenty years, I've been here now thirty-two, uh after about twenty, the dark winters started to really bother me so we're looking to probably have something down there for the Winter, taking a little break, and we'll probably downsize up here and still keep a place up here because I love this place. It's the best-kept secret of the nation... in many different places with military and other stuff, the weather here can't be beat and the people are awesome. Now if we could just keep it from growing any more that'd be great but that's what I said... that's what my brother said when I moved back up here in '80.
EJ: Have you, so have you lived in Beaverton/Hillsboro area ever since you starting working at Tektronics?
PH: Yep, so I moved into a little apartment at 26th and Cedar Hills Boulevard when I first got here and then listened to one of my friends who was one of the engineers here who said, "Pat, you got to build a house and get your own house, you're wasting your money on rent," you know? So, went out and looked for houses for two months, couldn't find anything I liked so I went ahead and designed and built my own place so that was cool.

Where Pat has lived since coming to Tektronics and TriQuint

EJ: How long did it take to get that together?
PH: Um, once the real estate agent realized that she wasn't going to sell me something that was already there, she hitched me up with a builder and it was within six to eight months I had the lot and the builder had taken my drawings of what I wanted and turned in the blueprints and then we were moved in so it didn't take long.
EJ: Oh, and you've been there ever since?

Pat's expectations vs. experiences working at Tektronics and TriQuint

PH: Yep.
EJ: Wow, okay. Um, I should just check... Um, did you expectations of what it would be like to work here... How did they compare to what you actually experienced? I know you were overwhelmed at first, or you thought it was going to be overwhelming....
PH: I thought it was going to be overwhelming but it wasn't when I first went to Tektronics. TriQuint has always been more challenging. Almost an endurance rather than just a (inaudible.) At Tektronics it was the amount, the breadth of new things I had to learn all at once. TriQuint has been a marathon - "you got to get this done" and its fundamentally new, nobody else knows what the road looks like. You can see exactly what's going to happen but its a long-ass haul. I mean, when I was a maintenance man the self-gratification was immediate. It wasn't working when you walked in, before you left you had it running. Boy you felt good about that. You get in these programs where you're developing a project or something and it can be a year at minimum, generally a little longer. In the early days when I was doing the digital stuff for the telecom industry it wasn't uncommon to have two-and-a-half year development cycles. You spend all that time working on all this stuff and you, you're working and you're working and you never stop to look behind you to see how far you came and take joy in that, right? And as soon as you got that one in the can then something else comes bubbling up and you got to do that one, so...
EJ: So you didn't quite expect it to be a "marathon" when you came?
PH: Yeah, I knew getting it started would be a marathon, I didn't... in fact to a certain degree I've managed to finagle my way so I don't do marathons. I do little pieces to help people to get things right, which fits me to a "T." The management loves me because you take Pat and its like putting in a super charged bunny for a little while and as long as I get them where it needs to go then they're okay. And when I get into a program like the one we just talked about - the one that went on eighteen months with problems - then the energizer bunny was a little ratty coming out the far end of that work effort but it was very satisfying when I was done with it.
EJ: Um, what do you think was like the big first project that you worked on here?
PH: The very first biggest project I worked on?
EJ: Yeah.
PH: Ah, oh... I worked on many big, big projects. I got to be careful. The first one that gave me a challenge was the one I started to mention when I was trying to be a process engineer and uh, so in furnaces and others basically, we don't even do this process this

way anymore. Back then we were scaling up what had been done in the lab. Well gallium arsenide doesn't like to go into a hot environment with air or oxygen, it oxidizes, it turns to white powder, the gallium comes out as a liquid, the arsenic turns into arsenic tri-oxide, into white powder and you don't want to have a wafer to (inaudible), right? So I figured out a way to get the wafers into this oven and out of this oven at 800 Celsius (?) without them oxidizing and doing it within confines or the constructs of how the silicon industry would normally do things, or their tool sets. Well the good news was I had Tektronics, this was when we were still back in the Tektronics building fifty-nine which also, I still had a plethora of the old Tektronics people to help me so over in the Tek area you had glass blowing capability that existed at Tektronics because of their CRTs so I ended up getting course work that helped me make a quarts canister that I could put the wafers in and seal it up, quartz plumbing coming into it and out of it so that it set the wafers on the, what was called a cantilever that would go into the oven, its an eight foot long set of poles. I would sit in there, glowing orange pot, take the lid off this canister, put your wafers in, put the lid back on, start the program and it would purge the gasses around the wafers and after it purged for a certain amount of time it would start putting them into the oven and then take them out and getting that whole thing figured out was a lot of fun and a real challenge because the very first time I ran out with standard silicon way of doing it I got garbage, literally, you know? White arsenic power, gallium liquids, it was a mess... I couldn't have done it worse.

EJ: So that was because you were trying to put this new idea into an older way of doing it?

PH: I was trying to take the old way they were doing it in the lab, where they were building just one or two wafers at at time was roughly the same thing that they would purge, they would... they'd build a long snout on the end of the furnace that was not heated, they'd put their wafers in there laying on this special toast and wire boat (?), two wafers at a time, plug it all up and fill it full of this purged gas for about an hour. Then they'd very carefully reach in with a glass rod and push that boat into the hot zone, seal it up, come back a half hour later and pull it back out into the same tube and let it cool down. Well, that's a very manual process, right? They were only doing two wafers at a time. I need this thing to twenty-five wafers at a time and I need untrained labor to be able to do it, right? So, silicon world does that all the time where they use this furnace, this kiln, but it didn't have... it has baffles and everything else that try to keep the um, environment, the atmosphere, normal atmosphere from contaminating the boat but its really a crude methodology in how they did it. And I needed

stuff that was really pure, I couldn't have that stuff (inaudible) anything, so... yeah, that's why I had to develop that type of thing so that was fun.

EJ: About what year was that?

PH: That was 1983, '84, it was the very first project they gave me as a process engineer.

EJ: Okay, and you mentioned earlier that they were pretty open with you bringing home technology and projects, working on them there and then coming back, yeah?

PH: Sure, Tektronics did that, we did that all the time, so um, yeah its... I tried to build little things at home and so forth but the reality was I enjoyed doing it at work better because I had more testing equipment and everything else so once I... once they made me an engineer I spent more time at work, fiddly-ass farting around. Once I put in my solid eight to ten hours they wanted then I'd stay and I'd play.

EJ: Yeah, um did you work on projects with your son? Is that how he got interested in technology?

Saturday Academy at TriQuint played a big role in Pat's son's interest in technology and science

PH: So, actually I'm giving this area huge credit. There is something called Saturday Academy and my son didn't quite know what he wanted to do, okay? I tried to get him into electronics but there was no getting him interested in electronics. He thought he was like me, he thought he was going to become a mechanical engineer, right? Well, Saturday Academy exposes you to a huge amount of different things, everything from when he was young they'd do constellations and so forth. His middle school years he did biotech engineering, found out he hated that, didn't want anything to do with that. One of them however was a class at Reed College doing radiation science work. So you go in and do one thing... say you're looking for trace amounts of gold or looking for gold impurities, they would radiate them in the reactor, bring them around to a counter and be able to tell you exactly how much was there, what isotope, and everything else and he just got enamored with it, fell in love with it. Of course it didn't hurt that dad had always been interested in nuclear engineering, too but no, that's where he started out in college and he never wavered from it. I kept saying, "are you sure?" You know? Somewhere along the line I wanted make sure he understood that he didn't have to live up to dad's expectations, he had to do what he wanted to do.

EJ: But he's always been interested in technology and science, is there where his...

PH: Sure, yeah - he's always been a nerd of one kind or another.

EJ: (laughs).

PH: I've got eight brothers and sisters and I think all but on of us are nerds or engineers of some kind.

EJ: (laughs) okay. Um, lets see, so has the physical environment of your office space always been, like, I guess your role has changed so often that your physical space has changed, as well, right?

Physical environment of the office space at TriQuint

PH: Well its gotten smaller because they keep stacking up papers around me so if you were to go into my office right now it would be literally two and a half feet high all the way around covered. But no, I haven't changed cubicles since '98, I think. So, we pretty much don't have... only VPs get offices with doors on them because they obviously have to have some quiet or private conversations from time to time. Almost everybody else is out in cubicles. And...

EJ: So, its very open?

PH: Open. I landed one of the better cubicles early on so I kept it so... They told me a little while ago, "we're thinking about moving you," and I said "over my dead body," so...

EJ: And so you said some of your favorite hobbies are motorcycles, right?

PH: Motorcycling.

EJ: And you like to spend time outdoors?

PH: I do. I like to go snow skiing from time to time and in the summer I just like to get out and be out. The winters are wet, I hate it. I'll go up to the mountain, makes for a good day.

Pat's hobbies

EJ: Are these hobbies that you've had since before you started working here or did you develop more hobbies are you started working here?

PH: I don't know that this place ever shaped my hobby interest, um... Motorcycling I picked up when I was in the military. My dad, a doctor, told me I could have a motorcycle over his dead body. I waited until I was out and on my own before I got one. Snow skiing is something my dad introduced me to when I was four or five so its something I've done all my life. And scuba diving was something I used to do a lot of but then I went to Hawaii and got spoiled so now I don't go scuba diving unless I go to the Tropics anymore.

EJ: That makes sense.

PH: Yeah.

EJ: So, some general questions about the surrounding community... How did it react to the growth of the tech industry and what are some of the major impacts you noticed on the surrounding community?

Tech industry's relationship with surrounding community

PH: Its interesting because a lot of it... when there's been big downturns whether its Tektronics or the 2001 bust or whatever, having too much of the working labor force in high tech can create major problems out there. I have friends that haven't worked in three years that got laid off out of the high tech industry. Its difficult, its kind of like this is you know... in Oregon proper, if

you will, when the lumber industry started to die and all the loggers ended up "well, what the hell do I do with myself," there's a lot of high tech people that have had a hard time getting by because of the ups and downturns and because this is so heavy in high tech its not like you find a job first that pays well, has good benefits, its pretty hard to go out and find a job if the whole industry has taken a downtown and a lot of people take... "well, I'll go do logging or whatever," they'll end up tending to move or doing whatever they can to survive. It's been tough and I think society in general, its getting to be much more of a... in the old days, for example, back before, way before PCs and stuff, about the time of PCs, it used to be an engineer had three or four technicians, okay? And a portion of a secretary to get there job done because everything needed, you needed technicians to help you measure the stuff and get stuff made. You're busy creating in your mind and getting stuff created and stuff but you need somebody else to play and see how the stuff works, right? Well, a PC has changed all that. The designer not only... oh, by the way the guys that work for the engineer, some were very high end like blue collar lay out people that can do all the IC lay outs and high end blue collar technicians to do the measurements. You needed a huge stream of them. We managed to (inaudible) all of those guys into programs that go into a PC and has made it so that you don't have the super top-end technicians or need as anywhere near as many of them and so the chasm between high end blue collar and even entry level white collar seems to be growing and its really bothersome to me in that we haven't addressed it and there is another part of it that says to me that... well like Intel, they're notorious for, as I understand it, not hiring people that don't have degrees, right? Doesn't matter what you've done, or work, or I guess from my standpoint, I got lucky, okay? In that I hit the industry and a specific company that enabled all this, that allowed me to shine in what I can do best? But what happens to somebody that can shine now? I don't know that they have the same opportunity. So as far as what's going on out here in the local environment, I think its a microcosm of the rest of it. I think what makes it bearable is you can move a little further out and find still a good house for a good modest price whereas in the bay area you'd have to drive three or four hours to do that, okay? Um, but we are subject to the same strains that the bay area is now as far as pressures for hiring and ending up with so many people out of work.

Silicon Valley vs. the Silicon Forest

EJ: Yeah, that's another question, is comparing the Silicon Forest to the Silicon Valley and how exactly you'd define them differently?

PH: I think there is huge amounts of attitude difference. In general I think actually Silicon Valley is actually trying to get more towards the Silicon Forest concept, they're trying to get a little easier down there. We have a business office in San Jose and one in Santa Rosa, they're both hell bent to go do good stuff but I'd much rather live in Santa Rosa than San Jose. I guess Silicon Forest, what delineates it, for me its the cost of housing... even though its gone up dramatically, its nothing like the bay area. So a person who comes in as a new hire out of college, still saying there's a good chance of getting them into a house in a few years, okay? That's not necessarily true down in the bay area. The people up here are much friendlier. We talk about "ah, man that twenty minute drive was terrible." Go down to the bay area and listen to the drive those people have to do. There is however more of a revolving door down in the bay area where people tend to boost their income by just going... at least that's how it used to be done - two to three years for one company, then go to the next, go to the next. That's the standard problem in high tech if that company doesn't watch it is, people if they're pay gets stagnated for too long, will make it up by job hopping and of course goes with that is your IP, intellectual property, as well and you could file all kinds of patent infringements and stuff but that just bleeds money to lawyers. So, people... and the best kept secret of the Northwest - the summers up here, just absolutely gorgeous. I've had visitors come here and they go, in the summer, "I thought it always rained up here, this is absolutely delightful," its like, "shhh, don't tell anybody," you know? So, the amount of recreation that is around here within an hour in any direction is really nice. Its just, I couldn't imagine... I'd never, I mean I lived in Redding but I never wanted to work in the bay area. Redding was beautiful in that I could go any direction but south and be in wilderness area in less than forty-five minutes. The problem with Redding is there was no high tech there so it was either Portland or Seattle, San Diego, I had family that's been in LA and I can't stand the place - LA was never on my radar either, to have enough money to live well in LA, it wasn't clear how I could do that, you know? So, I think this is probably the best balance out of anywhere for me to live but yet, if I had the money San Diego sounds nice but that's about it.

EJ: So, there's, you feel like there's not much of a revolving door around here?

PH: Yeah, I don't think there's a revolving door at all. At some low levels like operator levels, some people come and go, go to Intel and then come here. Those are hourly jobs and not as big of an issue for intellectual property. Its when your high end technicians and your good engineers start moving around that you have to worry but one of the things that's unique about us is in gallium

arsenide we do things a lot different in far as how you manufacture silicon. There is some basic technologies that are the same but how you use them and what matters - completely different. So, its not uncommon for us to bring in an engineer from Intel and have to spend several months to get them up to speed to where they can be contributing. Now if they're really good they're up to speed in a couple weeks and then you got to wonder if they're going to take your job. Around here that's really not that much of an issue because there is enough room for everybody. We make space for them because they're good.

EJ: So, I think we probably should wrap it up, but...

PH: Okay.

Washington county's relationship with the high tech industry

EJ: I'll ask you maybe two last questions - do you feel like the county has been supportive of the high tech industry here?

PH: Yeah, I do, I do. They've given incentives for both Intel and us and other high tech companies to come in. There is an issue when you're in a high tech company like Tektronics used to be in the early days that makes it difficult - you have to home grow every one of your people. Now there is a general pool and that is nice. I'm sorry what was the question again?

EJ: Um, just that: have the community, the county, the government, locally, been supportive?

PH: I think, yeah, Hillsboro has been very supportive so has Washington County. Actually when we were at Tektronics, Beaverton was a little adversarial and they always kept trying to incorporate us just like they're trying to incorporate Nike now because they want the tax base. I tend to have a little irritation with Beaverton. I tend to look at Hillsboro as a well-managed, well-organized city. And Washington County I view as a very fair base. Metro and controlling the sprawl, its always been... since I've been riding motorcycle ever since I got here I'd always just take off and I'd be in the farm lands and foothills in a few minutes when I first got here. Now, I got to ride for a while before I can get to the "wild west." But the bottom line is I'm glad its growing, those are things that happen when things grow and I don't see it as urban sprawl. Its well organized and I think the only thing that... if I were to poke any holes anywhere I'd like to get the transit system working a little better. They're very heavy for east-west but pretty poor for north-south so its tough to use public transportation and get to a job without sacrificing... I ended up doing it for about three or four months and I had to reserve and hour and a half to two hours for what's normally a twenty minute commute so... that's the only real thing I'd like to see them... if they really wanted to help out better and ease some of the constraint better public transportation would help immensely.

Why did the Silicon Forest develop in Washington county?

EJ: Okay and so do you think that the development of the Silicon Forest in Washington County was kind of a coincidence in that the founder just happened to be locals and that it kind of grew from there or, I guess why do you think it developed here specifically?
PH: Well, Tektronics had all kinds of different talent, including IC processing, they had their own IC manufacturing, had their own glass blowing. They used to... the joke used to be "the trucks would bring dirty in one side and we would ship product out the other side," right? They'd make their own knobs, make their own transformers, was part of their brilliance in the '60s and part of the downfall in the '70s and '80s was they just got too expensive because they did everything themselves. Why was it here, it was here because of Howard Vollum and Jack Murdoch but I'm not sure why Intel came here. I know they needed... they were trying to limit how big of an entity they became within an city area of community. I think because Tektronics was here and had IC operations, modest IC operations, that they may have come here for that or that they also may have gotten a favorable tax thing. I don't know but they made a good choice coming here. I think those two were the impetus for the rest of it. The rest of it is you get that many people Tektronics had twenty thousand people at one point, Intel had a huge amount of people that they brought in and out of these facilities that have lived here what's not to love about this place, you know? So people keep coming... "lets go make a business... lets go up to Washington County because, or in Oregon Washington County, there's enough of a talented pool of people to do that. So once they hit critical mass somewhere back in the early '80s I think it just kept going.
EJ: Um, I think that's the rest of my questions. Is there anything that you want to add that we didn't talk about?
PH: No, I think you had me talk just about everything, I've enjoyed this conversation.
EJ: Cool! Yeah, me too. I really appreciate your time and your sharing your experiences...
PH: Oh well, thank you.
EJ: ... and knowledge.
PH: When Bill came to me and asked me to do this I thought "history? What am I an old far now?" He goes, "Well, Pat you do have a lot of good stories," and I said "okay."
EJ: Yeah, you're a good story-teller! Yeah... Um, before we part ways this is a release waiver for you to sign. Lets see...

1:34:16

--- End of recording ---