Interviewee(s): John Hamilton (JH)	Interviewer(s): Mark Mulhern (MM)
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REGION	East Lothian
COUNTY	Haddingtonshire
TOWN/VILLAGE	Haddington

Running time: 00.00

MM: Ok, this is Mark Mulhern speaking to John Hamilton, in Haddington, on Friday the 6th December 2019. Good afternoon, John.

JH: Hello, Mark.

MM: For the purpose of the recording can you tell me where you were born?

JH: I was actually, born in Edinburgh…

MM: Right.

JH: …because the Vert, which was the local maternity hospital, was shut for maintenance, renovation…

MM: Right.

JH: …for a matter of weeks…

MM: right.

JH: …either side of my birth. So, my only fly in the ointment and not being a true Haddingtonian is I went up to Edinburgh.

MM: Right.

JH: For my birth.

MM: Was that in the Eastern General or-?

JH: I think it was.

MM: Yea.

JH: My mother told me that, yes.

MM: Yea, you wouldn't remember yourself, of course, no.

JH: I can't remember [*laughs*].

MM: And what other places have you lived, other than Haddington, through your life?

JH: None, Haddington.

MM: None.

JH: I'm in my fourth house, if you include my parent's house

MM: Right.

JH: …stayed in the same house with ma parents…

MM: Grand.

JH: …they're still there.

MM: Right.

JH: And I'm in my third house, in Haddington.

MM: Gosh, right. You quite like the place, then?

JH: No reason to move away, is the simple answer to that one?

MM: Yea, yea. Now, you've spoken previously to Janis so a lot of the information that we might have talked about today's already on record, such as your schooling days and your time in education, so the focus of today's interview'll be your working life, generally. But just before we embark upon that, after school, did you go to college or university at all.

JH: I was in the generation where you either, it was very polarized back then, you either went for an apprenticeship or you went for a degree.

MM: Yep.

JH: There was no in-between in those days.

MM: Yes.

JH: So, I took the apprenticeship route, although I was, I don't wasn't to blow my own trumpet, in most of the top classes, degree done nothing for me,

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JH: is what Ah can remember, working class family, parents, with hindsight, never really gave it any thought as to why I'm not pursuing the degree course, it was an apprenticeship.

MM: Yea, yea. And was that quite easy to arrange, do you recall, gaining an apprenticeship?

JH: I can remember the careers adviser, just hesitating there, think he had a different name, but the careers adviser at school, he, actually, instigated any connections with interviews. 'What do you think you would like to do?'

MM: Yea.

JH: An I didn't really have an idea what Ah wanted to do.

MM: Right.

JH: Ah had a n inclination, my dad was a lorry driver all his life, I wouldn't have said 'No' to being a lorry driver. And the police, Ah've always had a fascination with the police.

MM: Right.

JH: However, Ah'm blind as a bat, and back then it was a, if you needed any eye correction, just don't pass go.

MM: Yes.

JH: So, I knew I could never apply for the police.

MM: Yea, yep. And so, did you have to attend interviews or was it really quite straightforward, can you remember?

JH: Well, it's worth, on record, stating that Ah'm very unusual in that I had, I was interviewed when I was still fifteen years old.

MM: Right.

JH: My birthday's the end of September…

MM: Right.

JH: …and of course the school year finishes the end of June.

MM: Yea.

JH: …I can't remember precisely where the interviews were, Ah'll have to assume, June, July-ish.

MM: Yep.

JH: Because I started on the 11th of August 1980…

MM: Right.

JH: …as an apprentice in Ferranti…

MM: Yes.

JH: …which was a big employer in Edinburgh, at the time.

MM: Yea.

JH: And my interview route was three choices, it was the SSEB then, the Scottish…

MM: Oh, the electricity board.

JH: …the South of Scotland Electricity Board.

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JH: It was the railways, the British Rail, Scotrail back then.

MM: Right.

JH: Or Ferranti.

MM: Yea.

JH: No, sorry, I'll correct that, it was SSEB, Royal Mail or Ferranti.

MM: Right.

JH: Ah', correct me, an there's a reason for that.

MM: Yea.

JH: A peer of mine, Alan McKinnon, came through school with me, we both went for the same interviews.

MM: Right.

JH: He got the Royal Mail job, I got the Ferranti job, that's why I can remember that detail and he's till with Royal Mail and I'm still with, effectively, the same company.

MM: Gosh.

JH: It's changed names…

MM: Yes, sure.

JH: …and what have you. And I can't remember the interviews at the time, I got offered two positions.

MM: Yes.

JH: The Ferranti one, I didn't get the Royal Mail one…

MM: Right.

JH: …because my friend did.

MM: Yep.

JH: But I had a cousin, one year above me, who also took the apprenticeship…

MM: Right.

JH: …I went for the apprenticeship as an electronic technician apprentice.

MM: Right.

JH: In Ferranti.

MM: And what site of Ferranti was the-?

JH: Well, the training base was Robertson Avenue…

MM: Right.

JH: …it's now housing…

MM: Yes.

JH: … and you had your first year as an apprentice in the training centre, where you got the basics of electronics.

MM: Right.

JH: And I was fifteen years old when Ah started work…

MM: Crikey.

JH: …which was another point on my record. So, my parents had unusual circumstance of still getting family allowance when I started work. Not many people can say that.

MM: No indeed [*laughter*]. And how-?

JH: It was only a matter of weeks…

MM: Yes, sure.

JH: …but they did get family allowance for a few weeks when Ah started working.

MM: Was that an exciting time or was it daunting? Can you recall?

JH: Ah can't recall so it must have been, is it ambivalent, is the word?

Running time: 06.00

JH: All Ah can remember, with Ferranti, I would get the bus, because at fifteen years old you can neither drive a motorbike, you've got to remember.
MM: Surely, surely.

JH: So, Ah could only get the bus.

MM: Yep.

JH: I didn't know anybody who also went to Robertson Avenue, then. You didn't have social media then where ye could…

MM: Yes.

JH: …'is there anybody else from Haddington going up to' the other, effectively, the other side of Edinburgh. Remember there was no bypass then…

MM: No.

JH: …so you had the A1 went through Macmerry, went through Tranent, went through Musselburgh, which Ah can remember, vividly, and we'll come on to that, a little anecdote there for later on. So, I can remember getting the bus an Ah can remember getting the weekly ticket, where, if you paid for the week you got one day free.

MM: Right.

JH: An I seem to recall it was about ten pounds for the bus…

MM: Gosh.

JH: …for the week ticket, because my take-home pay back then was about twenty-four pound an Ah can remember something like ten pound digs went to my parents, ten pound went to the bus, it could be slightly less than that for the bus, actually, it could have been six pound and then there was about ten pound for me to spend at my own leisure…

MM: Right.

JH: …out of that twenty-four pound a week.

MM: So, your transport costs were a fair chunk o your wages, then?

JH: Yea, a fair chink then yea. An Ah reckon-?

MM: And can you, what was the journey, then? How many buses would you have to take to get to-?

JH: The bus from here to, it was Saint Andrew Square at the time.

MM: Yep.

JH: I would literary run down to Princes Street.

MM: Right.

JH: An Ah can always remember one of the buses was a number 44.

MM: Yep.

JH: There were two buses, two if not three, an I would run down to Princes Street, so I maximized my chance of getting one of these buses…

MM: Right.

JH: …jump on that bus…

MM: Yea.

JH: …an then into Robertson Avenue.

MM: Right.

Running time: 08.00

JH: An on the theme of transport, I can remember almost running out of the work at night and running down to the bottom of Dalry Road…

MM: Yes.

JH: …just along from the Heart's ground.

MM: Yea.

JH: Running along, again to maximise my chances to get on the bus first to get home as soon as I could. Thought nothing of the bus journey, it was just something you had to do.

MM: And how long would that take?

JH: I can't remember…

MM: Right.

JH: …how long that took. However, it did eventually get someone who we found, from Haddington, can Ah name names?

MM: Yes, sure, absolutely.

JH: John Smith who actually turned out worked for Ferranti. He worked at Robertson Avenue, he was a mature man, relative to me being fifteen years old, and he gave me a lift in so Ah would pay him petrol money, circa six pound a week, was it a pound a day, maybe, five pound a week?

MM: Yea.

JH: He picked me up so that, so I didn't get the bus for the whole duration of that first year.

MM: Right.

JH: What the ratio was to John's lift, I can't remember. What I can remember is because I turned sixteen, you could drive a moped back then.

MM: Right.

JH: There were a few occasions I took my moped into Robertson Avenue but that was on few occasions.

MM: Yea.

JH: That was pretty much a big drive.

MM: It's a fair old distance, right enough.

JH: And it's a different route I would come in.

MM: Right.

JH: I'd come in via the Cameron Toll route, then.

MM: Right.

JH: I must have driven along, through Craigmillar.

MM: And what was the reason for that route? Was it just less busy?

JH: There was no bypass then.

MM: Of course.

JH: And save you driving up to Princes Street and then out to Dalry, Ah came in via Cameron Toll because Ah would always come in the top of Robertson Avenue, Ah still remember that.

MM: Got ye, got ye.

 JH: Whereas in the bus you would come in at the bottom of Robertson Avenue.

MM: Yea, yea, right.

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MM: So, you started your apprenticeship as an electrical…

JH: Apprentice…

MM: …electronic or electric.

JH: …electronic technician.

MM: Electronic technician. Now, for the purpose of the recording and for me, could you explain what that its exactly? An electronic technician?

JH: Back then, talking technical now, you had very few mass market micro-processor or 'chips'.

MM: Right.

JH: The chips, or the integrated circuits, was abbreviated to chips back then.

MM: Right.

JH: With these plastic blobs that had many legs sticking out them, chip, IC, integrated circuit, whatever you want to call it. Back then they only really supplied like a definite role, you could get early microprocessors, but there was a lot of discreet component, like transistors, resistors, capacitors, inductors. A lot of that technology is now integrated into an integrated chip.

MM: Right.

JH: But back then there was very much discreet components and you got taught basics of electronic circuits and shown how to build circuit on, it was called, they called it a breadboard.

MM: Right.

JH: I've no idea why they called it that, which was basically a PCB [Printed Circuit Board], which is your core of any mother board, board that's in a bit of electronics, and it had nothing but rows and rows of holes, you would join the circuit up by breaking the electrical contact on these strips of holes and wiring each leg of a transistor to a resistor, to a capacitor, to a chip.

MM: Right.

JH: So, you got taught the basics of electronics.

MM: Yes.

JH: The function of each of these components and you got taught how to actually wire them and solder them. Ah can remember

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JH: you soldered to death and how to make the wiring, if you could imagine the wiring loom in a car.

MM: Yea.

JH: You needed to make that look meat rather than just purely functional.

MM: Yes.

JH: Ah always remember bringing it home to show ma mum and dad, and it was a work of art back then, now it's all replaced by all circuits and basically on chips…

MM: Right.

JH: …and very few discreet components now, if you opened something up.

MM: Yea.

JH: And you also went to college one day a week. And it was Telford College than.

MM: Which site, which-?

JH: Which was at…

MM: At Crewe Toll?

JH: …coincidentally, was at Crewe Toll.

MM: And was that, that was one full day a week?

JH: That was one day a week an Ah had ma motorbike license…

MM: Ah, grand.

JH: …well, provisional license by then, Ah would drive into the college with my motorbike…

MM: Grand, grand.

JH: …one day a week.

MM: Yea. And did you enjoy the balance of going to work and then college as part of your new life?

JH: Yea, Ah liked that, that split, yes. So, that was for the first year.

MM: Right.

JH: Then because it was a four-year apprenticeship…

MM: Four years, right.

JH: …your second and third year was split into what they called 'postings'.

MM: Right.

JH: You got a six-month posting to the various departments within Ferranti back then.

MM: Right.

JH: And it was to give you a taste of the different aspects of an engineering company. As you could imagine there's an HR [Human Resources] department, there's a software department, there's a hardware department, there's a repair department. So, you got six-month postings to give you a flavour of engineering. So that was for year two and three, it was split into four separate postings.

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What tended to happen was, for your final year you would be aligned to the department that was a combination of what you preferred to do as a career, moving on, and how the business felt you would be best aligned to, after your four-year apprenticeship.

MM: Yep.

JH: So, in the second year they also aligned you to the closest geographic Ferranti site to your home…

MM: Did they, right.
JH: …back then. Now, Ferranti had, off the top of ma head, probably about ten different locations all over Edinburgh and Ah have to say, various sizes of sites. Some huge sites too, you had, for instance, Tantallon Castle, out at North Berwick…

MM: Right.

JH: …was the radar testing facilty.

MM: Ah, ok.

JH: Now, because of the geographic alignment for the second-year postings, I got sent to Dalkeith.

MM: Right.

JH: Which was the Forest Furnishings…

MM: Yes.

JH: …latterly. It got demolished and it's now the Sainsbury's mini supermarket, so I was there for two years, two postings.

MM: Right.

JH: Ah got two postings. Sorry, Ah was there for a year and a half. Ah was there for a year and a half. The first posting was the laser scanning department and they produced laser, Ah have to say that the Dalkeith was more a commercial Ferranti, it done petrol pumps and it done scanning facilities for, typically, companies that produced rolls of something like rolls of paper, rolls of carpet, rolls of polythene and these were scanners that detected defects in the rolls at very high speed.

MM: Ah, right, the thickness or-?

JH: if you can imagine a roll of, well just any defect.

MM: Right.

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JH: You could imagine you manufactured rolls of paper…

MM: Yes, yea.

JH: …for instance, they're getting manufactured and rolled up as fast as they can, a human cannot detect any defects because the speeds so they laser scanned it,

MM: Yep.

JH: …for any defects, and that laser scanner stopped the machine, if there was a defect and then they performed the remedial action, sort of, cut that section out or whatever they did. So, the first deployment was to that department.   So, that got me into real work, Ah suppose you could call it, rather than just a year apprenticeship.

MM: Yea, yep.

JH: Like at kindergarten you could say...

MM: Yes.

JH: …the equivalent. The second posting was the planning department, where, interestingly, I met the only, the first person ever in my life that had the same surname as me but it was his first name.

MM: Really [*laughter*]?

JH: Hamilton Dunnet, Ah'll never forget that name.

MM: That's quite a name.

JH: Yea, it's quite name, quite a mouthful. Planning department and it was in that planning department that I remember I passed my car test. Because, Ah had, Ah can always remember and Ah don't know why Ah remember this, asking the boss at the time, if we got time off to sit my driving test to which he agreed and I passed.

MM: Excellent.

JH: An Ah remember I sat my test in my dad's Austin Maxi.

MM: Right.

JH: And Ah think it's worth mentioning this, while we're talking about work, the Austin Maxi, Haddington back then, you've got to remember compared to today, had no traffic lights, no roundabouts, no pedestrian crossings, it was all white markings on the road and stop or give way signs.

MM: Right.

JH: So, comparatively speaking, I had a very easy driving test.

MM: So, you sat your test in Haddington.

JH: In Haddington, in ma dad's Austin Maxi.

MM: Right.

JH: An I remember ma dad saying

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JH: 'If you pass, just take the car into work, we'll see ye at night' An Ah can still remember Ah used to got to Dalkeith via Pencaitland Road, up to Cousland, then across, single track roads, actually.

MM: Yea.

JH: Ah can still remember to this day, driving along Pencaitland Road, to my work, in this Austin Maxi, thinking to myself 'Oh, Ah feel very vulnerable, here, Ah'm driving, Ah've got responsibility for a car and Ah'm driving on a road, Ah'm only-', Ah'd ah been seventeen then.

MM: Yea.

JH: Still remember that. My third posting…

MM: Yea.

JH: …was the service repair department, where they serviced and repaired the petrol pumps that were manufactured at this Dalkeith site, which Ah quite enjoyed. Ah liked being technical, Ah liked trying to understand how something works.

MM: Right.

JH: So, if it goes wrong Ah can better repair it…

MM: Yep.

JH: …and understand how it should work. So, if it's not working, here's why it's not working, so fix it.

MM: Yea.

JH: I can always remember, he was a little bit of a dictator, how he was perceived, the boss was perceived as a little bit o a dictator. But the rest o the guys in the department were on a bonus system.

MM: Right.

JH: Of course, Ah came along, full of enthusiasm, an Ah'm fixing things left, right and centre here an Ah actually got pulled to the side by one of the workers, and he was very polite about saying 'John, could you maybe slow down a bit, because you're making us look bad?' *[Laughter]*. Still remember that. So, that was the service department.

MM: Right.

JH: And then I drove there on ma, by this time, I'd migrated from my moped onto a Honda XL185, which was a trail bike, which means it can be taken off road. Ah remember I would race with my friends up the Lammermuir Hills

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JH: on this motorbike, give it a clean, Sunday night, and it was ready, it took me into work for many months to my work in Dalkeith. And then, so, that was my three postings in Dalkeith, I then got moved to Silverknowes…

MM: Yep.

JH: …which is the west of Edinburgh and there I joined the, what's called the repair and overhaul department and they repaired and overhauled navigations systems…

MM: Right;

JH: …for the RAF aircraft that were on the go at the time.

MM: Right.

JH: So, you had the Tornado, Jaguar, the Harrier, they also produced navigation systems for, typically, oil pipelines. If you needed to plot your pipeline this device went in a helicopter and the helicopter flew and it landed just off from the pipeline and that's how they mapped all the oil pipelines.

MM: Right, right.

JH: So, I got involved with, because it was the repair and overhaul we were fixing the individual electronic modules that made this navigation system, so I got stuck in about how to fix these, which Ah quite enjoyed, actually, again going back to like getting ma hands dirty and know how things worked.

MM: That sounds like it would be quite involved, quite complicated bits of kit.

JH: Oh, very complicated bits of kit, yes.

MM: Yea, it's quite challenging to repair or-?

JH: Yes, yea, an I, I'll come onto some of the detail later. So, that was my last posting as an apprentice, my four year apprentice. I then got offered a fulltime job in this repair and overhaul department.

MM: Right.

JH: An a little funny anecdote

JH: about the name of the department, it was repair and overhaul and Ah remember we were out one time up in Edinburgh. It was quite a regular occurrence to go out, up town, after Friday work. I remember we got talking tae, it was probably girls at the time, or something like that an so, 'What do you do'?, 'Work in repair and overhaul.', 'You repair overalls?' [*laughter*]. 'It's not, don't repair overalls,' so Ah always found that quite amusing.

MM: You've raised something Ah was gonna ask you about, you know, Ferranti, as you've described, it's a large organisation, a large number of folk working there. Was there any sort of, was there a, within Ferranti as an organisation, was there a social life, was there sporting events or social, going out to the pub, as you say, stuff like that? Was that a regular part of what happened?

JH: There were hundreds of people there, Ah can't remember what the precise figure, Silverknowes was a relatively large site.

MM: Yea.

JH: Not as big as the Crewe Toll site, which still exists today and it is the only site that's left from the old Ferranti's. It was quite a large site, so a lot of the socializing was very regular Friday evenings, going up town. You've got to remember, back then we would have all been late teens, early twenties, a lot of them, you know, had no ties. You know, no ties to partners, families, certainly didn't exist then. The majority of us, ye did jist head out, a lot of socializing was just that. And Ferranti, being, probably <u>the</u> main employer in Edinburgh, at the time, did have its own social group, we did have football matches, which I can remember attending. They had the Ferranti bowling club which still

JH: exists today although Ah think it's been renamed, is it the Murrayfield Bowling Club?

MM: Right.

JH: That was the old Ferranti Bowling Club.

MM: Was it?

JH: In fact, some people still call it the Ferranti Bowling Club.

MM: Yea.

JH: I'm sure it's been, I'm sure it's Murrayfield Bowling Club.

MM: Right.

JH: It's still there today, indoor bowling Ah have to say rather than outdoor bowling.

MM: Right, ok.

JH: So, yes, there were social groups there. What else did we, have we got anything else going? Because there was so many of us worked in this area, as we called it, it was the production area, Area 4a it was called.

MM: Right.

JH: This was the, each building had its own number...

MM: Yea.

JH: ...and because ours was an open area, where we manufactured and repaired these navigation, the complete navigation systems, it was called an area, so it was, we were Area 4a.

MM: Right.

JH: It's just the number it was given. So, because I got a permanent job there, I ended up concentrating on the Jaguar aircraft navigation and it was actually a navigation attack system.

MM: Right.

JH: Better be careful what ah say now.

MM: Yea.

JH: The, and it was the first parallel computer, it had its own in-house parallel computer built, whereas the Tornado and the old Harrier navigation system had a serial computer.

MM: What's the difference between the two?

JH: Well, ah was just about to say, can't quite get ma head round how a serial computer would work, so ah'm be less than [?].

MM: Ok.

JH: Can't actually, don't actually, know how a serial computer works.

MM: Ok.

JH: But Ah can remember it was a serial computer.

MM: Right.

JH: Then they went on to, it was an in-house built parallel computer. Now it comes on a chip, back then it was many modules, now they would buy a processor off the shelf...

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MM: Right, Ah see.

JH: ...and add their interfaces round about that computer. Back then you had to make your own.

MM: So, it sounds like, is it the, this is a broader question really, but in, even at that stage, were you continually having to update your knowledge then, as technology developed or was it-?

JH: These systems, back then, I wonder how we can put this, they didn't evolve as fast as what you get today.

MM: Yes.

JH: You know, now with a modern phone., you expect a new model out every six months. These things were designed for years of use.

MM: Right.

JH: And so, it was quite slow. The only step changes you had in technology was if they won the contract to build the navigation system for a new aircraft.

MM: Right.

JH: They then brought in the leading-edge technology at that time for that aircraft.

MM: Yea.

JH: You've got to remember these aircraft had life spans of ten, fifteen years so…

MM: Sure.

JH: …you were obliged, contractually obliged to keep these going for ten, fifteen years plus, for years afterwards you were obliged to keep them repaired and overhauled, hence the department I worked in.

MM: Yea.

JH: So, I sort of concentrated on the Jaguar system which was a parallel computer…

MM: Yea.

JH: …that drove that an I ended up being the specialist on how to fix the computer. The computer was split into individual modules then, it wasn't just all on a chip…

MM: Right.

JH: …you've got to remember.

MM: Right.

JH: Lots of chips on the board but not the all-powering one master chip you get these days and I ended up concentrating on fixing a lot of the very tricky boards, using what's called a logic analyser.

MM: Right. Which is what?

JH: You would need tae, well I could tell ye roughly, but you need tae Google it really tae get the full description but

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JH: ye talk about 64-bit computers these days, 32-bit computers, probably most people have heard of that.

MM: Yes.

JH: Have no idea what it means…

MM: Correct.

JH: …and it's the width of typically the data bus that that computer can talk to.

MM: Right.

JH: So you can talk, it can send out 64-bit which is the current vogue for PC computers. It could talk to sixty-four, it can send out sixty-four discreet signals and they can do any-, each of these signals would control an onward system like, maybe, the brakes, the…

MM: Right.

JH: …indicators, the radio, the navigation. So, what a logic analyser can do is attach itself to each of these 64-bits plus all the internal buses, as they call it, and then it's hard to explain, but it's very technical and you're actually looking at the ones and nothings that the computers are driving in each bus and there's many buses in a computer.

MM: Yea.

JH: You don't just get the data, you get internal buses, address buses, trying to remember the others. Anyway, it looks at each individual bit, so you've got nothing but wires attached to this board.

MM: Yea.

JH: While you try figure out why it's not working. Typically, you're looking for bits that are not responding at all like, say, one bit controls the brakes.

MM: Yes.

JH: You would expect that to, that bit, computer bits either have a one or a zero value which is typically five volts for zero or whatever volts you decide.

MM: Ok.

JH: It's true status is hence the binary component. And you're looking for why that, is that binary bit actually toddling

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JH: from zero to one.

MM: Yea.

JH: The logic analyser…

MM: Right.

JH: …Ah'm gesturing here a square

MM: Yes.

JH: …symbol you would see, so then, if the logic analyser tells you that one bit out of sixty-four is not responding at all, then you've got to go backwards and go 'Well, why is it not responding? Is it because the electronics that drive that are faulty?

MM: Right.

JH: Or, as the case may be, because you've very fine circuit tracks, you know, conductor tracks?

MM: Yea.

JH: Are there maybe a bit of solder shortened it?

MM: Ah!

JH: To say, the zero volt line.

MM: Right.

JH: So then because the logic analyser could tell you that bit is not responding or it's permanently high or it's permanently high or it's permanently low, you could then say 'Right, well, there's that track, it's the thirty-second line of the sixty-four bit. Effectively, you could follow it back to basics, say, with a magnifying glass…

MM: Wow.

JH: …and 'Oh there's a short circuit, a wee sliver ae solder shortened it tae either the partner line which could be zero, you know.

MM: That's sounds like quite fun.

JH: Oh, actually it was very technical.

MM: And-.

JH: An I did quite like it [*laughs*].

MM: Yea, I can see that would be very gratifying.

JH: It was [?] back then.

MM: Was it, were you under much time pressure when you were doing this?

JH: No, no that much, nuh, nuh.

MM: You had to get the job right?

JH: Well, it's important because you, that's telling an aircraft where to fly to and whatever.

MM: Which is important.

JH: It's important that it's done right rather than, there was no time constraint in any of this.

MM: Yep.

JH: No bonuses that you had to get it fixed in, it's very technical.

MM: Yea, so that's you finished your apprenticeship, you've embarked upon your career in-.

JH: Electronic technician.

MM: Electronic technician. Did you find it gratifying, enjoyable?

JH: Yea, Ah enjoyed it, yea.

MM: Yea.

JH: Because you, each circuit board that came in, because I was in the repair department, each circuit board that came in, we had a phrase called 'a Christmas tree' it was full of surprises.

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MM: Right.

JH: So, you didn't know what the fault would be.

MM: Right.

JH: You obviously got to know the common faults, if you've got this circuit, if you've got this behaviour comin from that card, because the system doesn't do X and Y, but it does Z, you would, you got, like anything in life, that'll be that chip that's away or that component's faulty.

MM: Yes.

JH: Or this bit's broken off. But the ones that were not normal faults, you know, you had to get your thinking cap on and think 'What's causing this?' So, I concentrated on the Jaguar navigation system, mainly sort of on the computer side of it…

MM: Right.

JH: …rather than the navigation side of it.

MM: Right.

JH: Which was all done by spinning wheels, gyros, and accelerometers.

MM: Yea.

JH: It's all done by lasers, laser gyros now.

MM: Right.

JH: And then, what brought me into IT [Information Technology], I do IT support now.

MM: Right.

JH: What brought me into it was, because these were navigation systems, you had to emulate say, a one hour flight.

MM: Right.

JH: And you had parameters to meet and Ah had tae respond, because you obviously want it tae be accurate, like a Satnav [Satellite Navigation] now, which is done by this satellite, these navigation systems were what are called autonomous…

MM: Right.

JH: …because you could imagine in a theatre of war you just have to blow the satellites out the sky, everybody's Satnav's knackered.

MM: Yea.

JH: So, these were autonomous navigation systems so they, through the use of the simple gyroscopic effect, and accelerometers, if you told it where you were flying from, it could then calculate where it currently is, based on the mathematics of how fast have you accelerated, say tae five hundred miles and hour,…

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MM: Yea.

JH: …and you've turned left a few times, you've turned right, through the gyros and accelerometers and the maths that these computers are constantly computing, you can tell where you are now.

MM: Gosh.

JH: Totally autonomously.

MM: So, it's measuring, in a sense, where it's going?

JH: Yea,measure, acceler-, your simple physics is if you, is it, integrate acceleration…

MM: Right.

JH: …you get speed and if you integrate speed, you get distance you've travelled…

MM: Right, Yea, yea.

JH: …so you know where you've started from…

MM: You can refer back.

JH: …you can tell where you are now. Based on the gyro and accelerometer.

MM: So, the principle there is quite simple, I would imagine.

JH: Yes, it's back to basic physics, yes.

MM: But is the technology not quite delicate?

JH: Yea, oh, that has to be accurate and that's why these things are so expensive…

MM: Yea.

JH: …and there's no time pressure, as such, to get it fixed and it's just getting, get it right rather than get it fixed.

MM: Yea.

JH: So, because these systems have to be tested, before they go on the aircraft, the tests were all very manual. You would actually have to sit and record results of the cockpit display unit or CDU as it was called.

MM: Right.

JH: You were having to take measurements manually for, say, a one-hour test and it, it all had to be within certain parameters, you had to go to pass. So, they decided, very labour intensive and dull as hell, just taking readings, so then they decided to buy, they, can't remember who it was, bought in computers…

MM: Right.

JH: …because these things called computers started to appear. And so they would get computers in-.

MM: Just to pause there, what period are we talking about, when this is happening?

JH: This would be 1985/86ish, mid-eighties.

MM: Ok, ok, yep.

JH: So, yes, there were computers around back then, but they were typically mini-frames,

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JH: main-frames…

MM: Right.

JH: …which are quite industrial, tend to sit in a room, whereas these were portable computers.

MM: Right.

JH: Personal computers is the name that they have now.

MM: Yes.

JH: So, you would have a personal computer next to each test rig, doing these monotonous recordings. Of course, for these computers to do their job, you needed somebody to maintain them. So, while I wasn't involved in how you're using the computer, to record the recordings, they needed somebody to 'What if the computer doesn't start up? How do we get it started to then run the software that does the data log in?'

MM: Yea.

JH: An at the same time, I had decided to take myself back tae night school at the Knox [Knox Acadamy], which is the secondary school that I got educated at, in Haddington…

MM: Yea.

JH: …for the purposes of the recording. And to do the basics of word-processing and spreadsheets.

MM: Right.

JH: And somebody cottoned on 'Oh, John's doing a night school with computers, very generic [?], he might be interested in looking after the computers, because Ah've no idea what to do with them.'

MM: Yea.

JH: So, that's how Ah got first involved with the computers.

MM: That's interesting, isn't it?

JH: Ah, actually, took over from a guy who coincidentally was also from Haddington, there's a theme there, who was moving on from the company, he'd actually already started it.

MM: Right.

JH: That's why Ah was picked to take over from this guy, to look after the computers and, to cut a long story short, the half an hour a day looking after the computers, rather than fixing the navigations systems, became an hour a day, became half a day,

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JH: became two days a week…

MM: Right.

JH: …and then, eventually, became ma full-time role, looking after the computers as they expanded.

MM: Yea.

JH: An then they decided to create an IT department.

MM: Right.

JH: Because it became quite a substantial job role.

MM: Yea.

JH: Because the old version of a computer department was a department that looked after the main frame…

MM: Right.

JH: …that basically sat in the room and you had dumb terminals an…

MM: Yes.

JH: …and number crunched, whatever it number crunched, in whatever role.

MM: Yes.

JH: So, there was this new segment of computing, personal computers would come into the business and they needed somebody with a different skill set.

MM: Yep.

JH: That's how I got involved and they created an IT department. And the rest is history as far as me being involved with computers, as my career.

MM: So, you're the timing of your career is such that you actually got involved in…

JH: From the very beginning.

MM: …the creation of a new type of activity.

JH: Of desk top computing, you'd be better probably labelling it.

MM: Were

you aware at the time that this was happening or was it sort of incremental?

JH: Ah didn't think it would, I'll give you another anecdote, Ah didn't think it would become what it has, today.

MM: Yea.

JH: And the bit that Ah can recall was, so we had our, we were, actually, the IT and Test Methods Department.

MM: Right.

JH: It was how the methods you used to test the navigations systems.

MM: Right.

JH: So, we were called the IT and Test Methods, because you needed IT to do the test, how we tested the methods you used.

MM: Yep.

JH: And Ah can always remember the boss, at the time, Ah'm sort o jumpin a bit here but Ah can always remember, which Ah'll come back to but Ah can always remember the boss comin back sayin 'Just back from a meeting and they plan to put a computer on everybody's desk.' [*laughter*] an Ah still remember, to this day, thinkin 'Never work, can you imagine a computer on everybody's desk?'

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JH: Now, certain places Ah go to, they have two computers on their desk, never mind one.

MM: Yea.

JH: I can still remember that bit of detail there.

MM: And people have a computer in their pocket now, really.

JH: Yea, ye have a computer in y our phone now.

MM: Yea, exactly, yea.

JH: Do you want me to briefly, Ah'm conscious of the time here?

MM: Yea.

JH: Do you want me to briefly go through the, Ah think it's quite important this, the evolution of computers…

MM: That would be extremely interesting, yea.

JH: …in the workplace.

MM: Yes, yes.

JH: Ah think that's quite important.   What time have we got until?

MM: Till two o'clock. We can make a start but we can revisit, perhaps do another interview, if you have the time.

JH: So, the computers that came in, Ah think this is important, they were very much stand-alone computers.

MM: Right.

JH: None of this, network via cables or wireless, as we are today.

MM: Yea.

JH: Interconnected.

MM: Or the internet of things seems to be the phrase we use now, they were very much stand-alone computers, they only had floppy discs, an I mean floppy discs, there was no hard discs. Floppy discs were

the, is it five and a quarter inch? An you could floppy them, you only had the mono-chrome screen, it was green and black then or green on black. It then evolved to, they were networked using ethernet techn-, there were two types of technology available, there was what was called 'Token Ring' and there was also 'Ethernet'.

MM: Right.

JH: Now, Ethernet is the one that dominates the world now. If you're wired using an Ethernet, a standard network cable today, it's Ethernet. There was a technology called Token Ring, which you really need to Google the differences…

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MM: Right, ok.

JH: ...but Token Ring was very much a one to one round a ring.

MM: Ok.

JH: It was Token Ring and apparently a logical token, I'll very briefly describe it, apparently a logical token would be passed round this ring.

MM: Right.

JH: And the computer would grab that logical token and say 'Right, I want to talk on the network now.'

MM: Right.

JH: Then release that and somebody else would grab that logical token

MM: Ok.

JH: …whereas Ethernet is a 'Can I speak now? Can I, nope, somebody else, can I speak, right Ah,m gonnae [*sh…*].

MM: Got ye.

JH: Talk over the bandwith. Token Ring, my understanding is nobody uses it now, but it was very prevalent back then. However, the computers I got involved in, they were all Ethernet…

MM: Right.

JH: …and they used, they were connected using what was called 10BASE- T cabling which to you and me looks like TV co-ax cable.

MM: Right.

JH: If you could imagine today's Ethernet cable, it's got about eight pairs, it sort of eight, four sets of pairs or is it five sets of pairs?

MM: Right.

JH: On what's called an RJ45 square connector, on the back. The Ethernet back then, 10BASE-T, ten being the speed, ten megahertz was liked TV Co-ax and it came out to what looks like the old TV, if ye can imagine the old analogue TV socket, it was an outer round shell with a single core in the middle.

MM: Yea.

JH: 10BASE-T was quite similar to that, but it had a mechanism of mechanically locking it…

MM: Right.

JH: …rather than being pure friction fit.

MM: Yep.

JH: We were also limited to that, that run of cable could be no more than 100 metres and, don't quote me on this, but you were limited to about twenty devices on that 100 metre run.

MM: Right.

JH: It was just the specification an all that, and that run had to be terminated at the end with a, Ah think it was a fifty [?] cap.

MM: Right.

JH: And if I got the call, because it was an area I was working at, an open area, I'd maybe get 'John, the computer's no working'. I would look, I would look to see where the cleaner was and lo and behold, here's the cleaner has got her cleaner caught up in the co-ax cable that just run along the ground.

MM: Right.

JH: And she'd split the, it came away, just the physical force had split this T- piece…

MM: Gotcha.

JH: …that plugged in to the back of the computer.

MM: Yea, yea.

JH: And you simply screwed them back in again.

MM: Right, right.

JH: So, that was like early diagnostics, where was the cleaner? These networked computers then started to talk to other buildings on the site.

MM: Yea.

JH: And you needed things called wiring cabinets, which are still very much prevalent today.

MM: Right.

JH: And it was around about then that that little story about 'Oh they're planning to put a computer on everybody's desk' came out. Ah thought 'Wow, never, never do it.'

MM: Yea.

JH: They, go back to the computers, then started to get computers with 16 colour screens on them…

MM: Right.

JH: …which was 'Wow!', they looked so vibrant but nowadays just look so dated and then you started to get the discs, no hard discs still, you started to have to use the three and a half inch, they called them floppy drives but it was hard plastic, you couldn't really bend them but they still called them floppy discs, back then. And you also had to watch back then that the capacity was either 720K bits or it was 1.44 meg, which is nothing, in this day and age.

MM: Yea.

JH: But you had to make sure your drive

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JH: supported the 720, the lower spec ones, to the 1.4 meg, 1.44 meg discs.

MM: Yea.

JH: Then the computer, they were Ferranti computers back then as well, actually, badged Ferranti.

MM: Well, that's what Ah was gonna ask where, who supplied the computers, who manufactured them? If it was IBM [International Business Machines]

JH: IBM was still very expensive, niche, market and Ferranti also had a commercial division, like the Dalkeith site, but they were down south, and they produced their own Ferranti badged computers.

MM: Did they?

JH: So, because we were Ferranti…

MM: You'd use them, yea.

JH: …we had an obligation to buy Ferranti computers.

MM: Sure.

JH: They then went to Digital.

MM: Right.

JH: Ferranti went out of business, obviously couldn't compete in the marketplace because everybody would be trying, was trying to create IBM clones. We had very few, actually IBM badged computers, Ah think because of the cost.

MM: They were very expensive.

JH: It's a bit of a guess there but they would have been very expensive.

MM: Yea.

JH: Because you had a lot of manufacturers cloning, IBM compatible, that was the big buzz word then. IBM compatible. Very few people actually bought IBM computers. And then there was accompany called Digital who produced, they became really quite big in the computer, the personal computer world…

MM: Yes.

JH: …again to differentiate from the mainframe computer world…

MM: Yes.

JH: …which was around at the time. And so we were nothing but Digital computers, they started to appear with hard discs, but you're talking ten meg hard discs.

MM: Right.

JH: Now, you're talking 500gigs…

MM: Gigs, terabytes.

JH: …terabytes, two terabytes, four terabytes, I mean there's just no comparison in capacity. An Ah can always remember the first plotter, which was the predecessor to printers, to colour printers…

MM: Right.

JH: …an a plotter was exactly that.

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JH: It was a device, it was a flatbed device that had little wick, it was almost like the tips of felt tip pens…

MM: Yep.

JH: …in mounts and you literally had an arm that came across, picked the blue one up, picked the green one up, picked the blue one up…

MM: Yea.

JH: …and ye could actually see it plotting or drawing, drawing your image. It took forever [*laughs*].

MM: It sounds like it would do.

JH: It was the predecessor to colour printers, to colour lasers.

MM: Yea.

JH: An it was quite fascinating…

MM: Absolutely.

JH: …watching this plotter drawing, it was plotting graphs, the performance of the systems we were testing, then. Ah can remember that comin in a well, an all being quite fascinated by it.

MM: Yea.

JH: Ah can also remember when spreadsheets came in, Microsoft didn't really exist, Windows didn't really exist, it was all DOS based…

MM: Yes.

JH: …or Disc Operating System based.

MM: Yes.

JH: And you were allowed to create your own Microsoft Disc Operating System. We called it MS DOS, so you had Ferranti DOS.

MM: Yea.

JH: Which was supposed to be almost compatible…

MM: Right.

JH: …but you would find issues with it. So, it was all DOS software then. You then got your DOS, DOS being the operating system that powered a computer up...

MM: Yep.

JH: …and allowed you to use the keyboard, to use the screen. You then layered the software on and you had stand-alone programmes. It was SuperCalc, was the spreadsheet of choice back then, now it's Excell dominates the world. Microsoft didn't really have anything then and you had, what was the Word one, oh, it's Perfect Writer, is the one Ah think we used for the word processor but you're talking very basic stuff here compared to today's versions.

MM: Yea.

JH: And then this system called

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JH: Windows 3.1 came in and it sat on top of DOS, you would always boot up in DOS and hand over control to Windows, Windows 3.1. You then got the networking came into Windows with 3.11, which was also known as Windows for Work Groups. You can Google this, Ah'm not telling you anything new here, obviously.

MM: Yep.

JH: And then Windows 3.1 became Windows 95, was like the real, I would say Windows 95 was the major change to what we know today, it was a pure Windows operating system rather than something that sat on top of DOS. You'd boot into Windows now, then Windows 95 became Windows NT, or New Technology, it was called, abbreviated to NT. It was the commercial Windows operating system of choice.

MM: Right.

JH: And then Windows 2000 and then you have the Window 7 and 8, now currently 10.

MM: Yea.

JH: Office, first Office that came in was Office, what we used in anger was Office 4 and to install it you would have to install it from, Ah always remember it was something like sixteen three and a half inch floppy discs…

MM: Right.

JH: …if you had the standard version, which meant it was Word, Excell and PowerPoint. If you needed the Access, which is a database, you had twenty four floppy discs and for every machine we built we would have to put every disc in individually, Ah can always remember doing that. Now we have what we call an SOE, a Standard Operating Environment…

MM: Yea.

JH: …which is an image somebody has put together an that image gets cloned…

MM: Right.

JH: …an it's the operating system that has the Office, it has your AntiVirus, and it has any other business tools…

MM: Right.

JH: …all on one image now, whereas back then you'd to…

MM: You'd physically-.

JH: …you put DOS on, you put

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JH: Windows on, then you layered on your Word, Excell…

MM: Yea.

JH: …an any other business apps.

MM: It's quite remarkable, the change, isn't it?

JH: Oh. It is, it's tremendous the changes.

MM: Unfortunately, the time has run away with us.

JH: Yes.

MM: I'd be very interested to hear more.

JH: Ah have got more, yea.

MM: If we could maybe revisit after the holidays.

JH: Yea.

MM: But just before Ah switch the machine off, is there anything you just want to round off today with saying that we haven't had a chance to say.

JH: Nothing jumping out…

MM: Ok, ok.

JH: …Ah think we'll keep the rest for-.

MM: Ok, aye, if we, yea, because it's absolutely fascinating.

JH: We're getting into quite techie stuff now that, which Ah think's worth recording so, yes, we will revisit.

MM: Yes, it's very much, this is exactly the sort of stuff we're interested in, the detail, so thanks very much, John. Thank you. Ah'll switch the machine off now.

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