An Interview with

IAN DOWNIE

OH 440

Conducted by Thomas J. Misa

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Control Data Corporation History Project

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Charles Babbage Institute
Center for the History of Information Technology
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Ian Downie Interview

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## Abstract

In November 2013, CBI director Tom Misa conducted a series of oral history interviews with 13 former employees of Control Data Australia (1963-89) including the details of each person's career, before and after working for Control Data. Topics that are common to many of the interviews include Trevor Robinson's key role in organizing Control Data Australia; the early computer sales in Australia to the Bureau of Census and Statistics, Department of Defence, Postmaster General, Commonwealth Scientific and Industrial Research Organisation (CSIRO), Bureau of Meteorology, and several prominent Australian universities. Control Data Australia did business data processing for such large concerns as Broken Hill Proprietary (BHP), Telstra, and others. A distinctive emphasis was its work in developing computer systems for race-track betting for the state of Victoria's Totalisator Agency Board (TAB) as well as for other Australian states and New Zealand. Other topics include relations with Control Data's headquarters in Minneapolis, business data processing, data centers, database management, networking and Cybernet, and projects done in several Far East countries.

Interviews were conducted with Richard Bament, John Baxter, Ron G. Bird, Tony Blackmore, Lyle Bowden, Marcel Dayan, Ian Downie, Julie James, George Karoly, John O'Neil, Garry Pearce, Rob Robertson, and Bruce Wilson.

Misa: My name is Tom Misa. I'm here in Melbourne, Australia; it's the 18 November 2013. I'm with Ian Downie, who was involved with the Control Data Australia Company. Ian, we'll be focusing mostly on your CDA years, but could you say how you became interested in computing and how you joined that field?

Downie: I started off at the age of seven or eight being interested in a bit of family history. My grandfather was a radio amateur for two or three years in the 1919-1922 timeframe, and he was a policeman. And he was basically responsible for the introduction of two-way radios in police cars, the first so-equipped police force in the world. That's what got me interested in electronics and amateur radio in the first place. He unfortunately died seven years before I was born, so I didn't ever get to know him. My father was one of those people that believed in his oldest son being capable of doing anything anyone could do, if that were possible. And so, from a very early age, I was taught how to use a hammer, how to screw pipe, how to build things; how to lay bricks, how to mix concrete; all of those sorts of things. I have a fairly high IQ; I think last time it was checked, around 150. So no genius by any means, but no dill either. I left school in the middle of twelfth year, when the family went dairy farming; so for a couple of years I was a dairy farmer. Couple of years after that, I was a herd tester, where you did quantitative/qualitative analysis of the milk production of dairy cattle, checking predominantly for butter fats in total production. When it became obvious that we were going to become artificial breeding operators, with your arm in the backside of a cow to the elbow many times a day, I didn't really want to do that. Being called the "bull boy" by all the local girls had something to it but it wasn't what I wanted to be so I left home,

and I left the farm, and I moved to Melbourne and for the next 15 years worked in the can-making industry, Containers Limited, one of the two big can makers in Australia. After 15 years with them, I got retrenched along with about 20 percent of the company's employ, when they fought a takeover issue from a competitor, and they had to then produce aluminum cans, which meant amassing $30 million in capital, from some way. And I got retrenched as a result of it. That last few years of that involved the manufacture in-house of fluidics. Fluidics is non-moving part air logic, and it was that that basically got me into logical analysis, timing, and things of that nature. And when I was retrenched, I thought I would do Control Data Institute, and that meant leaving home for five months, working five hours a day, five days a week, investing 3½ thousand dollars, which was about six months' salary, and leaving my wife with two children.

Misa: The 3,500 that would be the tuition then?

Downie: Yes, plus the cost of accommodation and all the rest of it. Leaving a wife with two babies, one and two year old, and being nine months pregnant with a third. So not wanting to go to Sydney to do that, I went to Control Data in Melbourne and asked to do an aptitude test. They told me that as long as the check didn't bounce, I was eligible to start the course, but they would give me a qualification test after lunch if I cared to come back. The result of doing that test, I was offered a job to start the following Monday morning, and I became a terminal engineer. Terminal engineering, as you probably know, is repairing and maintaining equipment in customer sites, in the way of batch terminals; 200UT 731 and 734 systems. I did that for 12 months until somebody decided that

perhaps I could actually work on mainframes, as well. In the first seven or eight weeks, we chased ones and zeroes around diagrams with Bob Munnings, and at the end of that six weeks or seven weeks, I was placed in the Bureau of Statistics here in Melbourne.

Misa: At the government office?

Downie: Yes, at the government office. And the couple of weeks of practical experience that I had on that site in the training period, there were five engineers onsite; the engineer in charge and three shift engineers, and another that never left in the daytime.

Misa: Let me ask just a question of clarification; you were employed by Control Data but working physically in the Bureau of Statistics?

Downie: Yes, on Control Data equipment. That site consisted of a 160A and a couple of printers; a 3200 and a 3300. The day I started on the site, the engineer in charge and three of the five; four other engineers all left. And so Bill Clyjne and I ran the site on our own; and two weeks later he went on a month's leave and never came back. And I was there for the next three years until they closed the site.

Misa: Can you describe the work that you did to support the Bureau of Statistics?

Downie: It's basically a planned preventative maintenance and troubleshooting, writing machine language code, not simply ones and zeroes; not any of that higher level

languages; and it was quite rewarding in that you really had to analyze what the fault was and write an appropriate diagnostic if the machine was so disabled that you couldn't run diagnostics off tape and the like. And it was a unique site in that the BDP box, the business data processing box and being amalgamated with a machine it was never intended to be used with, and that was done here locally in Melbourne. I don't recall who it was that actually did that but it was a local mod.

Misa: Modification [pause]?

Downie: Yes, modification of the mainframe and its interface, in order to connect this group of boxes. A BDP box does moves of one or two K of data with four instructions. So, simply a complex [pause]

Misa: So just to be absolutely clear, BDP is [pause]

Downie: Business Data Processing. It did block moves of data from one part of memory to another, or from memory to a piece of equipment, or vice versa. It inserted commas in between the thousands and the millions, and those sorts of things; it added dollars or deleted them in blocks of data; it was quite a complicated piece of gear. Its typical failing mode it would deepend, would get into an endless loop that it couldn't get out of. You then had to scope test points on the machine, in something like 30 ranks of 28 test points, and analyze what it was doing and how far down the path of instructions it had got, and what was the failure mode was before you could hope to analyze what the fault was. The

quick easy way was to hit [stop master, clear, and go], and that would overcome the fault, and lose all of the data that you needed to fix it, and hope to God that somebody else was on shift when it failed the next time, because that somebody else was always going to be me. So that sort of made it that cannot be the way to go. You had to fix the thing. The CPU on that machine was 7,000 cards so there's no way you can shotgun that sort of a problem; you have to know what you're doing. It was a great exercise in learning troubleshooting techniques and logical thought analysis, and it is a part of what I learned using fluidics. My kids had the typical Commodore 64 and that sort of thing; I also studied at night school prior to joining Control Data, doing black and white TV, and radio repair work, so that gave me a background in electronics, as well. When the Bureau of Stats machines were removed and we cut them up with an angle grinder because they wouldn't fit in the lift anymore, I then transferred to the TAB.

Misa: And the Bureau of Stats, when were those machines taken out?

Downie: I think about 1978 or 1979; right about then.

Misa: Then you moved to the TAB.

Downie: TAB, which had similar 3000-type machines, along with 1700 machines. Lots of teletypes; half a dozen of them, I think. And a 300-line crossbar exchange. So it was a very broad scope of things mechanical, electrical, electronic.

Misa: Physically, that facility was here in Melbourne?

Downie: Yes, here at Number One Queens Road.

Misa: Quite close to here, then.

Downie: Yes, quite close to here. No longer there, the building's been reallocated to other purpose, and they shifted out of the city proper into the suburbs.

Misa: Can you make any comparisons between facilities and scheduling of work between the Bureau of Statistics and the TAB? Their purpose is quite different.

Downie: Bureau of Stats worked five days a week, and around the clock, midnight Sunday to midnight Friday night. TAB, being the racing industry, was six a.m. to one a.m., seven days a week, although there wasn't much happened on Sundays. It was fairly rare for race making book on Sunday. But it was a real time live data system so if they were betting on anything happening, then the machine had to be up. Up time was critical. Unlike Bureau of Stats, if it failed, then they just sit around and wait for you to fix it. Although they had two machines and they could run the printers on the 160A, that wasn't quite so bad.

Misa: Could you say how that high degree of reliability was achieved for TAB?

Downie: Provocative maintenance; sorry, preventative maintenance [pause].

Misa: It could be provocative, too.

Downie: Planned might mean scheduling, running margins and replacing things that failed on the margins is what kept its reliability high. The crossbar exchange was a perpetual source of annoyance. I can't remember who built that but every now and then something would fail, probably due to residual magnetism, and the crossbars would lock in and then not drop out again, and so it would lock up this one, and that one, and the next one, and the one after it, until you eventually lost 15 to 20 percent of your exchange.

Misa: Crossbar sounds like telephones.

Downie: Yes, 300 remote betting agencies were connected to the mainframe by this crossbar exchange.

Misa: So this is really running a computer network, pure and simple.

Downie: Yes.

Misa: Not the internet, but a computer network that's being run through the phone system, set up for a real time application.

Downie: Yes.

Misa: Nothing like that had been done in Australia, I bet.

Downie: The Bureau of Stats had remote terminals that were connected to the 3200.

Misa: Would that've been a real time application?

Downie: No, not really. It's the analysis of data collected in the census and the distribution of it when people have requested and paid for information about some particular aspect of business, or population, or age groups, or whatever.

Misa: Can you give me a sense of about how many people would have been working to keep the TAB running? Just the computer staff.

Downie: All the external stuff was run by TAB's own people, and that wasn't maintained by CDA. There was an engineer in charge and I think three daytime engineers; and a couple of early morning and late afternoon; there were evening shift engineers; about six or eight people.

Misa: Six or eight, okay.

Downie: And then shift work, and all of those sorts of things, of course.

Misa: Now, my understanding is with TAB that wasn't a single system?

Downie: When I started there, there were three systems; two [real time race track] systems; and a third one in the basement, which was the accounting system, not time critical. Even to the extent where they had their own gas-fired turbine standby power supply, too, to run the race system in the event of power failures. That's how time critical it was. We did have, I think, two or three failures in the couple years I was there. One of them was caused by our own people when they were doing on the floor maintenance on the system's disk drives; a brand new engineer, a university graduate, was working in the false floor installing braided ground straps to cabinets. And because of the old braid, it was corroded and whatnot, and so the big 150-watt iron he was using would get very dirty; they're inch-wide straps that you have to sweat; solder into it so you could drill a hole and then bolt them to the subframe or to the machine. And he got a little confused and put the iron down on one side, and the rag he was cleaning the soldering iron with on the other, but he got out of sequence and, of course, it smoked. Then you've got 30 seconds to get out of the place before it drops half a ton of halon gas into the computer room and shuts down all power to the building. And he got terminated as a result of that; something I wasn't happy about because I think it was lack of instruction, lack of supervision had caused the fault as much as it was his apparent carelessness.

Misa: In retrospect, it was a reckless thing to do but you have to be told how to do this type of repair.

Downie: Well, all that he knew what to do was remove the iron from the rag and go and push a isolate button, and the event wouldn't have happened.

Misa: An isolate button to take that part of the system out.

Downie: Yes, so the halon wouldn't have been released. He could've just simply put out the rag with a $CO_2$ bottle. The fact that he wasn't trying to do any of that was the reason why the whole thing failed and it wasn't really his fault; it was lack of training on the part of the company, in my view, but not too many people agreed with me. [Laughs.] Especially my boss. However, there was a 1700 system; have you ever heard the term "schmooing" the memory, the core memory?

Misa: Schmooing, no, why don't you describe that, please.

Downie: Diagnostics run on [DOS equipment], were basically running margins, where you increase the positive volts by five percent, or seven-and-a-half, or ten percent, or twelve-and-a-half percent. And then you do the same on the negative voltage. And then you run splits, both up, both down, and one with each way. And this shows you marginal transistors and circuits that would normally run but might fail if things got a little bit further down the out-of-bounds area. Schmooing the memory was doing something similar. Core memory use was two power supplies, and you would run the diagnostic loop, and increase the voltage up until it failed, and then reduce the voltage down until it

failed, and then split them until it failed, and you would get an area of voltages, and then you would reset it to the middle so you would have the optimum margin for variation before it would fail. And that was schmooing the memory.

Misa: What you're really talking about is techniques for doing evaluation and preventative maintenance and trying to be able to spot conditions or spot components that could fail.

Downie: Reliability. One of the things we had to do at the Bureau of Statistics in the early days, all of the printed circuit cards had 15 pins. They were, I think, probably brass or bronze pins, gold plated to make them not oxidize and higher reliability. But somewhere down the track they outsourced that to Mexico, and they were then only tin plated pins, copper pins. And after a number of years, they did oxidize a little, and did become an intermittent fault. So every once in a while you had to pull, in your morning maintenance period between seven and eight o'clock, pull 40 or 50 cards and wipe the pins with a brass-bristled suede brush to delete the oxidation, and then put them all back in again. And that improved the reliability, as well, of the 3000 machines at the Bureau of Stats.

Misa: So during this morning maintenance routine, from seven to eight, what other types of activities would you end up doing? You were saying each morning.

Downie: Yes, those would be there. You would run margins, you'd run diagnostics, you would run voltage checks, you'd clean filters, you would scour the print drum to get rid of paper dust; those sorts of things. You'd check voltages on power supplies; you would check the action of fan fail switches, all on the routine planned basis of daily, weekly, monthly, quarterly, or half yearly, or yearly.

Misa: Certainly, not everything each day . . .

Downie: No, no, no, no.

Misa: . . . but on a schedule.

Downie: You had a specific schedule of things to do on particular days.

Misa: How did that maintenance schedule evolve?

Downie: Long before my time. It came out of Minneapolis. So no, I don't know who started it or how they established the failure points, but it certainly worked. Provocative maintenance, as I said, it did provoke problems, but it was problems that were in non-critical time, when the system was unavailable to the customer so you prevented a problem occurring during operating times.

Misa: So that was for the Bureau of Statistics.

Downie: That was applicable to all equipment with Control Data; terminals, mainframes, the lot.

Misa: So the TAB system, though, you got this period from morning until late at night, one a.m., where the system had to be absolutely reliable, so you'd do maintenance during [pause]

Downie: Right, it had to be absolutely reliable during times when the TAB agencies were open, when people could bet, or when the telephone system betting was available. But outside of those hours, other than when calculating dividends or things like that; you would then have availability on some parts of the machine. You might take one unit out of seven out of circuit; one disk drive, because there's redundancy in all of it. So as long as no other unit had an unplanned failure while you had something else that is available to you for maintenance, that wasn't a problem.

Misa: So with the TAB system, there'd be redundant tape units and redundant CPU units, too?

Downie: They have two systems running in parallel; one the live machine and the other the backup machine. So if one failed the second one could pick it up immediately, or within seconds.

Misa: More or less switching back and forth.

Downie: Disk drives or dual access tape units with dual access so they could access system A or B.

Misa: So that was another way, then, of engineering real reliability.

Downie: Yes. We had very, very few failures that I was aware of.

Misa: Are there any other parts of the TAB years, or the Bureau of Census and Statistics years that you'd like to describe?

Downie: TAB is something that people who are far better qualified than I am, I guess, where our Ross Laws again might be. I can tell you a bit more about TIC, TAC, and TOC for the System 17 system that was installed in Hong Kong, and Natal, and New Zealand; where again, there were redundancy factors that allowed three machines with three front end machines, and three interface machines, all cross-linked to each other. There was so much housekeeping going on that you really didn't get any production out of it. But that's something Ross knows a lot more about than I do; I never really worked in that system.

Misa: I'll hopefully talk with Ross Laws later this week.

Downie: There's up here, other engineers that are far more knowledgeable in that area. But if any of them are still with the company, I don't know whether we can get in contact with any of them anymore. But it was very much subject to interference from the government, because the contract that created the TAB in the first place, was never a fixed target. Every time you write a spec for something, they'd come in with modifications and modifications, and additions, and enhancements, and so on, so you never, ever reached the target because it was never fixed. In the end, I think the Labour government sued Control Data for failing to produce the end result and Control Data sued the government because they had cancelled the orders that they had, by contract, to fulfill. I think they each sued each other for a similar amount and, in the end, nobody did anything good out of it, except for the other company that took over, and the lawyers. But that's something that I don't know a lot of the detail of it; it's something that management could tell you a lot more about than I can.

Misa: What I understood with the [later] TAB contract, it was almost a gentleman's agreement to get a system up and running without necessarily fixing on defined specifications.

Downie: Specifications were very rubbery, they were changing all the time. Have you run across Geoff Hipwell?

Misa: I've exchanged e-mails with Geoff, but I've never met him.

Downie: Geoff, I think, started with Control Data but ended up as management in TAB. He can tell you other side of that story, as well, if you can get to contact him.

Misa: Now, you'd also mentioned that you'd been involved with the petroleum industry in China.

Downie: Not personally, no. Two of our tech support engineers, Klaus Endress and Horst Simon, had both worked in the petroleum industry in China on leading edge Control Data computers that were supposedly only allowed to run the programs that they were intended to run, but the reality is they did all sorts of things out of there — so I'm told — but I have no personal experience so I can't enlarge on that at all. It was interesting that Klaus, also, was brought into Defence Signal Directorate to solve a couple of problems. Being German, I was surprised that they admitted that, but he was the key engineer with the knowledge and the troubleshooting skills. He's one of those typical geniuses, I suppose: hair out [to] here; was what a lot of people would say was extremely untidy, if you looked at his workspace it was stacked out eight inches deep with core dump projects. God help anyone who tried to tidy it up because he knew exactly where to find the core dump from this site or that site, and when it occurred, how deep down the pile it would be. It was purely archaeological sequence, I suppose. But he was a man that could pick up a six-inch stack of 300 sheets of paper printed 136 columns wide, with a dump of the core of a mainframe, and tell you what was wrong, what failed, which word had failed and therefore, which module in the machine had to be replaced, or

the one after, or the one before it. He could solve, in a couple of hours, what other people could spend a week on.

Misa: How do you think he developed such…

Downie: I have no idea. He's way more intelligent than I.

Misa: Had special insights.

Downie: Yes. I think he probably fits the genius mold fairly well. And, of course, Horst Simon was very, very close second.

Misa: How long did you end up doing the work with TAB, then?

Downie: I moved out of TAB to Defence Signals Directorate, and I can't talk about that. Other than the fact that it was the site that we maintained 10 hours a day, and had standby call-in, if need be, if it failed. It was a site that was very difficult to work at because anything that did fail had to stay on site. If you couldn't repair it on site, it got put in the store [storage] and was left there forever. One of their preventative maintenance routines involved a spike generator, that produced I think, a three or four nanosecond pulse of 300 volts, that you attached to the subfloor frame, and the second lead went on the machines that you were testing, and you would put 50 or 60 spikes into the skin of the machine, basically a static discharge. The mainframe would never fail but the IBM crashed quite

frequently so we only had to do it three months, then they told us not to do it anymore. So that was the end of that. The DG machines that were down in the basement, which I think interfaced the antennae systems and encryption people had a lot of cards in there that were typically 18 or 20 inches square and had a couple a hundred chips per board; and every chip had a tantalum capacitor on it to keep noise off the supply rails, and they would typically fail in a short circuit mode and trip the breakers. So very difficult to find one of 250 capacitors, and when they failed, there was no easy way of finding them, and so I think there were 18 or 20 boards sitting in a cupboard that we weren't allowed to take out to repair, and at $16,000 or $18,000 a card, it wasn't an easy machine to maintain. I did eventually find a way of repairing them. So we had 18 spares. [Laughs.] It was funny; you could take a 2400 reel of tape out of the office site if only you had diagnostics written on it. But a memory card that had to be refreshed every two or three milliseconds, or you'd lose the data, that weren't allowed to go offsite.

Misa: Was there any explanation for why?

Downie: Security. Even to the nth degree, the day that we uninstalled the 405 card reader on that site, had a core memory with the image of one punch card; it was 80 columns of 12 bits.

Misa: Equivalent essentially to . . .

Downie: . . . to one hole of punch card. And before we'd pull that machine out, we ran boxes of blank cards, 50 percent punch cards, or 50 percent punch cards, 100 percent punch cards, and I ran through it hour after hour after hour. I blew through [writing] the memories in the core. Having done that for three days, we then took a pair of scissors and cut all the wires around all of the cores, so that we could separate the cores out, put them on a steel plate, and pounded them with a hammer, and then there were taken to the basement and dissolved in acid. Now, if that's not the nth degree of paranoia, I don't know what is.

Misa: A little magnetic core beaten to a pulp?

Downie: Yes. Beaten to powder and then dissolved.

Misa: Dissolved in acid. There's no data ever coming out of that.

Downie: [Laughs.] Nobody was getting any data out of that of any value to anyone. It's interesting, they shut the site down at one stage because apparently the Americans sat outside in the adjacent street, and they said they could read the image off the cathode ray tubes by analysing the noise, the electrical noise that was radiated out of the building, and so we had to screen the whole floor to prevent that.

Misa: Some kind of mesh around the floor?

Downie: Faraday caging. It was an interesting place to work and you typically walked on to the site past a glass house with a manned guard; and you showed your pass as you walked through and he'd glance up from his newspaper and he'd look at it. One of our red rag friends that was a very left wing Labour party supporter got a wind of this bloke and he cut out a picture of Mickey Mouse, pasted it over his photograph on his ID card, and he walked through the glass house for about a fortnight . . .

Misa: As Mickey Mouse?

Downie: . . . with Mickey Mouse as his photo, until one day, he said, he got about two steps from the guardhouse and somebody hit him square in the middle of the back and said, one more step and I'll shoot you dead. Let me have another look at your pass. So he was banned off the site after that, but rightly so. On another occasion, there was one of our other guys that said two blokes in [white] coats approached him on the site and said to him where was the x-ray department? We don't have an x-ray department as far as I know. Of course you do; every hospital has an x-ray department. Oh, no, you're in the wrong building. They're next door.

Misa: A hospital.

Downie: Yes. Oops. So that's how good their external security was or wasn't. Very different thing inside the building itself, but that's as much as I'm allowed to talk about.

Misa: Can I ask — and again, not to pry — but how did you end up moving from the TAB, which was a more commercial-oriented site, to the DSD, which is of course a secure military site?

Downie: There were regularly two or three engineers that rotated through DSD. One of those left; I think he was riding a bike and got hit by a car and broke a leg so he was off site for quite some time, we know that they replaced. So I was put into that rotation. For a while, then, they decided they were better off with one engineer alone onsite, and unless he was gone to a meeting or something, they had to have somebody else trained to look after it, but that's all. It got to the point where they'd change the password every month. You weren't allowed to reuse a password for two years and you weren't allowed to tell anyone what it was; and you weren't allowed to write it down anywhere; but everybody had to know what it was.

Misa: Had to actually keep the password in your head.

Downie: Yes. But if you were then the engineer tomorrow, you had to know what that was; but I wasn't allowed to tell you; and I wasn't allowed to write it down; and I wasn't allowed to record it; and it was different from the last one.

Misa: So, a Catch 22 problem, not easily solvable.

Downie: Well, we cheated. When it was decided that there would be a monthly renewal of passwords, we said right, the password this month is eight letters, A-B-C-D-E-F-G; and next month it'll be B-C-D-E-F-G-H; and the month after it'll be C-D-E-F-G-H-I.

Misa: You set up a pattern.

Downie: Yes. We set up a pattern, which totally defeated the point of having passwords in the first place. [Gesture]. You kept on having them.

Misa: And how long did you work for DSD?

Downie: About three years, I think, from memory.

Misa: Three years. And that would've been roughly when?

Downie: Would've been 1981, 1984.

Misa: 1981 through 1984.

Downie: I think that's getting probably fairly close to the management buyout, and CDA becoming an independent company.

Misa: Do you have any observations you'd like to share on that transition?

Downie: Not so I'd want to put any of them in print.

Misa: Okay, that's fine.

Downie: The company was bought out by Philip Micheau and Doug Dent, and so the company then became MIDEN, the first couple of letters of each of the two surnames. And I think they were not really aware of where the industry was going, and it was when mainframes were disappearing; that is, Control Data's mainframes were disappearing.

Misa: I would say pretty much everybody's mainframes were disappearing.

Downie: Yes, apart from IBM, and the Japanese companies.

Misa: Which they say they are no longer a mainframe company; that's another path.

Downie: Around that time, Control Data Australia really got into the third party maintenance with printers, PDPII, and VAXs, and a few other odds and ends. And that was the way we were headed when I think corporate decided that no longer would we as a corporation be involved in education, medical, weather forecasting, scientific and whatever other the fifth one was. And so they would get rid of all of the overseas branches and companies, and that's when the management buyout occurred, as I understand it, anyway.

Misa: Would you like to comment on your years after working for CDA?

Downie: Yes, because basically the company didn't change a lot as far as we in engineering were concerned. It became more engineering services and less professional services, and CDI became a totally separate company. I think it was sold to Computer Power, from memory, and that might've preceded the management buyout by a year or two. Computer Power, yes, I think that's what it was.

Misa: Computer Power.

Downie: CDI had gone through an interesting history, in that I think when it was first started in Australia it was subcontracted out to a lady I can't recall and don't want to.

Misa: Control Data Institutes.

Downie: Yes. She basically ran a card punch and review bureau, and it was a sweatshop. The 026, 029 readers and verifiers were stacked into the room to such a high density you had to shuffle sideways to walk between them. After a couple of years of that, then they pushed her aside and the company got seriously involved in it. And I don't know how long we had it after that it was actually sold off, anyway.

I was involved in the repair center, after I left DSD, which was then moved from Cheltenham, the manufacturing facility down there, and brought into Collingwood, when we moved out of St. Kilda Road to Collingwood. We did a bit of external third party repair work for Apple, repairing Mac SE, and that was a very intermittent business. We were, I think, repairing Mac SE modules for a fixed price of $64. Apple could get them repaired in Singapore for 58, but we could turn them around in three days and they took nine weeks to turn them around, but all of the stuff went to Singapore except when they were overloaded and then it came to us. So that was a successful business but an intermittent one. Shell's franchise service stations, we got an interest in when Shell decided that the company that manufactured the equipment didn't want to maintain it, but at the same time, Shell wouldn't tell us what the cost of components were, or the mean time for repair, or mean time between failure. Not sure they even knew, but they didn't want to reveal it to us, commercial inconfidence. And they wanted the company to do it that was big enough to have the expertise, and big enough to sue for a million for contract failure if it occurred, where they'd gone bankrupt, so Control Data was chosen. And that was dropped in my lap to try and work out what we would charge, and what we'd repair, and what they'd accept, and what the response times would be, and all that sort of setup. And I think in the first year we had something like 40 service stations under our wing, which were predominantly capital cities. And because we couldn't get the data to base the numbers on, I persuaded Shell and the manufacturer of the gear to change the system so that in fact we could become a distribution point, and a labor source, and a repair source, but that the manufacturer would carry a perpetual warranty on it so that if anything failed, we'd swap it out and they'd fix it at their cost. Because they wouldn't tell

us what the costs were, they wouldn't give us the drawings of what equipment was constructed of to make it easier to troubleshoot it. That made it much easier for us [and] more reliable for Shell because the manufacturer had the cost if it failed. That's how it became a win/win situation all 'round.

Misa: So you were handling the servicing but you had no clue about the frequency of failures . . .

Downie: No.

Misa: . . . and, of course, it would be a huge financial liability.

Downie: Exactly. And I think we quoted them something like $1,000 a year for the installation and repair per year, and we offered to maintain their back-office PC systems and their attached printers as well, and I think the going rate in the industry then was something like $300 a year, but we were charging $1,000. And I persuaded MIDEN much against his knowledge, that we would sell the PCs — which he wanted nothing to do with because we couldn't compete on price with anybody else — but my argument was if we're going to maintain somebody else's system by swap-out, we could end up with 480 sites with 270 different makes and models of PC. On a swap-out basis where, hang on, what I send back to you is better than what you send to me, I want an improved model that's at least equivalent to mine; I said to hell with that. Let us sell the PCs, we'll

only have one or two model options; they'll all be the same; so it's easy to maintain a very small inventory of spares; and it makes sense.

Misa: So a standardized model?

Downie: Yes, which would've been good, except that we started with 286 and ended up with 486, and there were a few service stations that insisted that they wanted IBM, they didn't want NEC, which was what we were offering.

Misa: You became a reseller, then, of the NEC PCs.

Downie: Yes. They pay cash with order; NEC would grant us 90 days credit after delivery, so we had no investment involved and we could make an eight or nine percent margin on it, and [Doug] said no, he wanted a 36 percent gross profit. We said well no, no, no, nobody's going to wear that. And if they won't wear it, they'll use something else, a prospect where we didn't want to start. And he eventually agreed to that; and that seemed to work reasonably well. Generally speaking, if a PC failed we would replace it in office hours five days a week, based on Australian office hours standard times, and they would replace it. It was up to them to maintain backups, though, so that they could restore their disk drive and that was fine except that NEC disk drives were not particularly reliable. Their failure rate was fairly high on the 36 Meg drive, the base model; and then some opted for the 72 Meg version instead, which were far more

reliable, as unlikely as that sounded at the time. NEC was known as not exactly compatible; not engineered correctly.

Misa: Not exactly compatible?

Downie: NEC, not exactly compatible, not engineered correctly; not even close.

Misa: Unfortunate.

Downie: But they knew that. Sorry. We maintained Shell service stations up a maximum of, I think, about 440 sites, eventually, after six years; and we maintained the price from day one until we finished. Eventually The Hague, Shell head office, decided that no contract could exist for six years without going out to tender, and we lost the tender. Honeywell, I think it was, came in at 66 percent of our base price; and this was in the days when inflation was running around about 18-20 percent. So to maintain the initial price in spite of inflation, we were doing fairly well and making good money out it. Honeywell I think only ran it for about, I think, 12 months and they handed it off to Wang, and at a loss. And it was at that time, when I think I got retrenched from Melbourne and I think within eight or 10 months the company collapsed, bankrupt, because they had lost their major mainframes, Melbourne University, the bureaus — our M.I.T. — the major cash cows for the company and they just went under. They also took 20 percent of our superannuation along with it.

Misa: That was the pension fund.

Downie: Yes. It was invested in the company but they'd already filed. And a lot of engineers wouldn't have been too happy about that; nobody would've been too happy about that.

Misa: Well, quite an interesting career that you've had, Ian.

Downie: Yes. Since then, I worked with Staging Connections, the audio visual company, as their technician, maintaining all of their projectors, and amplifiers, and speaker systems, and lighting control systems, and all that sorts of things. I spent a couple of years installing pay TV multi-point distribution systems, and satellite systems. And that became untenable when the government decided that Foxtel couldn't take over the company I worked for, so Galaxy went broke. I did a bit of mechanical engineering for a number of companies. I spent maybe another year at SAFCOL, South Australian Fisheries Co-op, back in the can industry again, they are fish canners, predominantly. Have a abalone at $25 a can, being a very highly regarded seafood in China, Japan, the East. Until they came up with a proposal to tighten all the tolerances on things I knew was impossible to achieve, and their can making supplier said it was a bit they wanted them improved by 30 percent and that just wasn't possible so they moved out of Melbourne and lost their major customers. And I did odds and ends then with a clock manufacturing company that does town hall clocks, big clocks. But they also did a lot of electronic clocks as well, including clocks for the gaming industry and the Navy,

supplying digital clocks to the Navy, which displayed either nautical time wherever they were in the world at the time, or UST, British Standard time. And from there, I worked at Tenix Defence Systems, the design and manufacturer-builder of Australian Navy frigates; had a three-month contract with them analyzing the data for repair of all the electronic equipment involved in public address, radio reception and transmission; basically everything electronic except radar, telephone systems and all, as well. And that was such a mess with some manufacturers keeping their documentation in escrow where you would never get access to it unless something failed. And that three-month contract ran to 2½ years.

Misa: Can I just ask you to make any observations you might on the notable experience I had last Friday, meeting the group of two dozen-plus people that are continuing the CDA legacy.

Downie: Australians are a funny people; funny strange not funny hilarious. Unlike the British upper class society, we don't have that below our middle class. And management would treat each other as equals, so there's very little to separate the upper level of management to the floor cleaner, and as such, we enjoy social life together. We often had barbecue lunches on the last Friday of the months and have a wine, or two, or three — but never more — a glass of white or red; a decent steak, a few sausages, a hamburger or something of the sort down on the beachfront at St. Kilda, which is only three, four kilometers away from head office. And provide that no one did the wrong thing, and I don't know of any occasion when anyone did, that continued all of the time that I was

with CDA in Melbourne; we used to have a regular barbecue over at Collingwood as well.

Misa: So almost a company tradition, during the company time, in some ways that that's being continued today.

Downie: Yes. You'd go to lunch at 12 o'clock; you'd come back about one or two, but certainly no later than that. And if you were on site where it was critical, well, you did that; but beyond that, everybody was involved. They had the odd wine tasting at the company office after hours of an evening. Sorts of things that weren't allowed to be done in Minneapolis.

Misa: That's true, yes.

Downie: There are very few people in the company that would disassociate by choice. There were one or two, but only one or two; and I think there were typically 200 or so in the Melbourne office, you know, around the Melbourne office, and I'd count most of them as friends. I'd probably even be able to pat them on the back and ask them for a lend of a thousand, if I needed it, and I don't think I'd get too many knockbacks, but that's the sort of class relationship we had. And still regularly, there's a dozen or more or up to 23 or 24 that get together on the third Friday of the month.

Misa: That was the experience that I enjoyed last Friday.

Downie: Yes. There were more there last week than there would normally be simply because you were there. And there were people that wanted to hear what you had to say and maybe offer some information as well. So, yeah. It was a company I enjoyed working for, and a job I loved to do, it was never work, as such; it was more like being paid to do your hobby. Electronics has been a lifelong interest, and still is. I'm an active amateur radio ham; still building electronics, transmitters, receivers; still involved in a home brew group, where we try and encourage people to live up to the spirit of what the amateur radio license is about, improving self-knowledge and experimenting, pushing the boundaries of knowledge; being involved occasionally in critical things like the tsunamis, the hurricanes, and the like. When all else fails, amateur radio will still work. Been involved in the recovery efforts after bush fires here in Australia; only twice, thank God, actively providing communications when mobile phone towers were out of action and there was no power in the area, but they still managed to be able to keep in contact with people.

Misa: That's right; hams have been pretty creative.

Downie: It's something that seems to be a dying race to a large degree; where it's hard to get the very young involved, unless you go to the preteens, scouts and guides, they're very much into technology. If you can get them to build a Morse key and sound a code, has some magic about it. We've managed to get some of them back, interested in amateur radio. Australia was amongst the first to introduce a new grade of ham, since they got rid

of Morse code as a requirement. Something that I've never been able to master in 30-odd years I've been interested in amateur [radio], partly I suppose, because of hearing deficiency. And that's the result of working in the can making industry 15 years; the ambient noise level was around 105 dB, in parts.

Misa: 105; very intense.

Downie: 105. And that's cost me the hearing in the 2K hertz range. It's 93 dB down at 6 KHz. So when I'm in a quiet room like this, I find listening pretty easy and could probably take the hearing aids out and I'd get away with it, but then bring in three or four others I'd have to have help.

Misa: Well, any other comments or observations that you'd like to record today?

Downie: No, I think that covers most of what I thought to talk about.

Misa: Great. Appreciate your time, then.