

Early Electronic Calculators; A Personal and Computing History



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Preface

This document is a PDF version of an article written in December 2025, and uploaded to LinkedIn, on the history of Sumlock Anita Calculators and my personal connection.

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Introduction

I have been asked on a number of occasions, “*what first got you interested in electronics and computing?*”, or words to that effect, and it’s a fair question. For me, though, this started from the day I was born (or one might say even before that), and I’ve never wanted to do anything else—and I never have. This might need some explaining and in this article I want to give an overview of the history of the earliest electronic calculators interwoven with my own early personal history to which it’s inextricably linked. This is just for fun for something over the holiday season.

Along the way we will be looking at some of the technology and how it all worked and cross reference some of the key dates with my own beginnings and the start of my life in computing and electronics. Before looking at the electronic calculators, we’ll start with a summary of what immediately preceded them for doing arithmetic calculations as, as we shall see, it leads straight into the electronics.

Pre-history

Before electronic calculators, calculations done for business used a more mechanical approach. Immediately prior to this there were electromechanical devices, but before even this there were purely mechanical machines. There were various types of mechanical calculators from a variety of manufacturers, but I want to concentrate on those made by a particular company, Bell Punch, as their machines are the direct ancestors of the world’s first electronic calculators.

Bell Punch

Bell Punch were a British company set up in the latter part of the nineteenth century making ticketing machines from busses and tramways. Over time they branched out into other types of ticketing machines as well as totalisers and taximeters. All of these devices have some of the characteristics of adding machines and so it was only natural that they started making mechanical calculators. These were a type of machine called a comptometer, originally developed by Felt and Tarrant in the U.S. at the end of the nineteenth century. The image below shows a Bell Punch Sumlock 912/S comptometer from around the 1950s:



The device consists of a number of keys in columns numbered from 1 to 9. We can ignore the fact that one of the columns has a single key, as this is to do with the old system of currency in the U.K. consisting of pounds shilling and pence which was not a decimal system. Mercifully, this changed in 1971, and this fact will shape the calculators, as we'll see.

Calculations

To do basic addition one can clear the calculator with the knob at the bottom right and enter a number (and let's just use the keys to the left of the single key column) by pressing down the required keys simultaneously. So, to input the number 123, 3 is pressed in the right most column, 2 for the next and 1 in the third column. This number then shows up in the numbers in the window below. To add to this number another number is simply entered, and the machine will add this to the already entered number. This can be repeated to add any number of values to total them up—before spreadsheets.

Internally (with a somewhat simplified explanation), cogs for each column are rotated by the amount entered for that column with a connection to the column to the left for advancing when the cog does a full circle equating to 10. The clever bit is having the “carry” added to any number being entered in the column to the left (and I'm not mechanically minded enough to explain how this works).

Another feature of Bell Punch's comptometers is that if two keys in the same column are pressed, which can happen if adding at speed, the column will "lock" and not allow the keys to be pressed down so that correction in pressing may occur without destroying the ongoing calculation. This feature was known as "Sumlock" and hence the brand name of the Bell Punch comptometers.

A key thing to note is that, on each key, there is a large number with a smaller number to its left. You'll notice that the larger and the smaller number add up to 9. Before the two's complement that you're probably familiar with there was nine's complement. This allows the device to be used for subtraction as well. Here, to subtract a number the smaller of the digits is used for which key to press entering the number *less one*. That is, for 123, press keys with the larger digits of 876 (123 in the smaller values). An oddity is that if a digit in the number is 0 then the (larger) 9 key is pressed, but if it's 9 there is no key marked with this digit as a smaller number, and no key for that column is pressed.

The row of little switches below each column are used for subtraction as well. Once the first number is entered the "subtraction" button immediately to the left of the most significant digit is pressed to stop this digit changing during subtraction (which is really an addition). For simpler devices without this feature the overflow digit is just ignored. Below the window with the digit output display are a set of small knobs that allow a little marker to be raised. These don't do anything to the calculation, but it can be used to mark a decimal place for adding real numbers.

The comptometers can also be used for multiplication and division as well. I won't go through all the details of these, but I did work out the procedure for dividing 22 by 7, the approximation for Pi, to serve as an illustration.

We need to preload 22 into the machine in the far left digits by, say, pressing the 5 key in the leftmost column four times to load the top digits, and the 2 key of the last column once. Because we are dividing by 7, which has 1 whole number (we'd ignore any decimal values if it had any), the decimal point is 1 place up from the 22 we've preloaded. So we raise the little metal indicator under the display between the two '2' digits.

We now need the 'nines complement' of our divisor. So in our example, the nine's complement of 7 is $7-1 = 6$, and using the smaller number is the key with a larger number of 3.

Moving from the left most digit, we select the column where our divisor will first divide into the dividend. So not above the left most 2 (7 doesn't go into 2), but above the

second 2. This is the column we will start from. We press the 9's complement value (larger 3 in this case) for as many times as the column immediately to the left indicates (in our case 2). If that column to the left increases its value then that becomes the new number of times to press the divisor. If it wraps to 0, then an implied 10 is indicated, and we must press that many times etc. Eventually you'll 'catch up' (left digit didn't change after the number of presses) and the column is finished. You then move the divisor a whole column rightward and repeat the process. A step-by-step illustration is shown below for 6 decimal places.

Column	Press	Displayed	Comment
		2200000	Start. Press at least 2 times.
3-----	->	2500000	
3-----	->	2800000	Caught up. Move left, press 8 times.
-3-----	->	2830000	
-3-----	->	2860000	
-3-----	->	2890000	
-3-----	->	2920000	Catch up column increased, new target 9.
-3-----	->	2950000	
-3-----	->	2980000	
-3-----	->	3010000	Catch up column increased, new target 10.
-3-----	->	3040000	
-3-----	->	3070000	
-3-----	->	3100000	Catch up column increased, new target 11.
-3-----	->	3130000	Caught up. Move left, press 3 times.
--3---	->	3133000	
--3---	->	3136000	
--3---	->	3139000	Caught up. Move left, press 9 times.
--3--	->	3139300	
--3--	->	3139600	
--3--	->	3139900	
--3--	->	3140200	Catch up column increased, new target 10.
--3--	->	3140500	
--3--	->	3140800	
--3--	->	3141100	Catch up column increased, new target 11.
--3--	->	3141400	
--3--	->	3141700	
--3--	->	3142000	Catch up column increased, new target 12.
--3--	->	3142300	
--3--	->	3142600	Caught up. Move left, press 6 times.
--3-	->	3142630	
--3-	->	3142660	
--3-	->	3142690	
--3-	->	3142720	Catch up column increased, new target 7.
--3-	->	3142750	
--3-	->	3142780	
--3-	->	3142810	Catch up column increased, new target 8.
--3-	->	3142840	Caught up. Move left, press 4 times.
-----3	->	3142840	
-----3	->	3142846	
-----3	->	3142849	
-----3	->	3142852	Catch up column increased, new target 5.
-----3	->	3142855	Caught up and finished

So, since we raised the metal indicator between the leftmost digit and second leftmost digit initially, the display now reads 3.142855. Compare this to the actual value (to 6 places) of 3.142857—a difference of less than 0.00007%. Not bad! This may all seem like hard work and error prone compared to an electronic calculator, and in this example it really is. But imagine, say, dividing 4312.87 by 965.78. It is still easier, maybe,

on an electronic calculator, but because you can enter the divisor as a whole (9's complement), it is surprising how quickly a result can be obtained with practice with just a few cogs and levers. So these mechanical devices can do all four basic arithmetic functions, and people (usually women) were trained to use these machines efficiently. One odd fact I read from a training manual was that it was taught to uses only the lower half of the keyboard when doing addition, pressing keys in a column twice to get the desired number. I can only assume that this was for efficiency of motion. The upper keys were used, I think, when using 9's complement otherwise it would be a bit of a head mess, but I'm guessing. Bell Punch did make a range of "Plus" abbreviated keyboard comptometers with numbers from 1 to 5 in each column. A plus device from around the 40s or 50s is shown below:



So how did we get from here to electronic calculators, and what's my connection?

The World's First Calculators

Bell Punch got interested in the idea of an electronic calculator in the 50s and started to develop such devices. A company was set up to develop and manufacture these new devices called Sumlock Anita, where Anita was supposed to mean "**A New Inspiration To Accountancy**" (or sometimes Arithmetic).

A young engineer called Norman (known as Norbert) Kitz, who'd worked with Alan Turing on the Pilot ACE computer, headed up the development at a research facility at Uxbridge, West London at a place known as The Island, and a factory in Rodney Road, Portsmouth. The result was the Anita Mk VII and Anita Mk VIII. The Anita Mk VII was launched in October 1961 in Germany at a business Expo in Hamburg, with the Mk VIII

being launched in Britain the week before. The picture below shows a MK VIII from the collection of the Deutsches Museum in Munich that I took a few years back (though I was expecting them to have a Mk VII).



The partially obscured sign reads: "*Desk Calculator. Anita Model C/VIII, serial No. 00260. Bell Punch Company Ltd. London 1963. The Anita was the world's first fully electronic automatic desk calculator; it coped with four basic arithmetic operations. The result was not printed, but appeared in the 12-digit LED [sic] display*". The display comprised, in fact, of "nixie" tubes (more later).

Now this is where the first part of my story comes in. Both my father and mother worked at the Portsmouth factory where these first calculators were manufactured, tested and shipped out. My father had grown up in Portsmouth on the south coast of England, and home to the Royal Navy, and had learned his trade as a young man in electrical and electronic engineering at the Royal Naval Dockyard. The Dockyard was a major employer in the city and many of my family had worked there at some time or another and even my fraternal grandfather had been a blacksmith there and had made some of the east gate iron works (sadly no longer there). My father was recruited by Sumlock Anita to set up and head their production test facility at the Rodney Road site at the very start of the factory. The images below show my father and the site of the Rodney Road factory as it was just a few years ago.



My mother had a different path, growing up in a small quiet village called Sinnington on the edge of the North York Moors, now a national park. This was farming country and my grandfather was a farm labourer. However, at eighteen, my mother decided that being a farmer's wife was not for her and she wanted to learn all about electrical engineering. Now this was in 1947 and there were few opportunities for women to pursue such a path, but the Royal Navy was one of them and so my mother joined the Fleet Air Arm of the Navy as what was known as a Radio Mechanic, learning about and servicing the fledgling Avionics that were being developed and added to the Navy's aircraft for radar, navigation etc. The picture below shows my mother as a Chief Petty Officer (far right) on what looks like a Fairey Firefly aircraft.

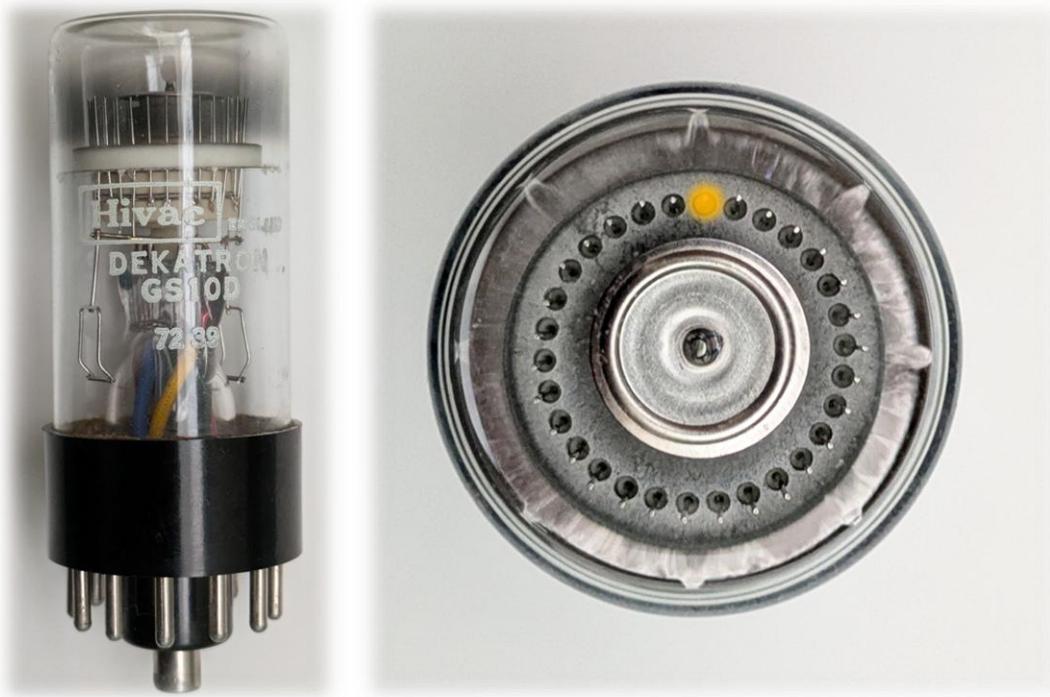


After her time in the navy came to an end in 1961, she (not coincidentally) was in Portsmouth and joined Sumlock Anita as a "test girl" in my father's production test

department, working on the new calculators. She told me once that many of the girls didn't know what these new machines were, with one saying to her "*these are a bit big for radios, aren't they?*".

Electronic Cogs

Maybe the first thing you might notice is that the Anita Mk VIII looks like a comptometer but, trust me, it has no moving mechanical parts as part of the calculating functionality. The heart of these machines, though, are a component called a Dekatron, as shown below.



The Dekatrons are basically electronic cogs. The device is a vacuum tube with a central anode pin and 12 pins on the outside. Two of these are known as guide inputs G1 and G2. Nine of the remaining pins K1 to K9 are for connecting to ground and the last is K0 as an output. The image on the right shows the top view and you'll notice there are thirty pins. 10 of these, every third one, is connected to G1. Shifting one clockwise (say), every third one is connected to G2, and the remaining are connected to the ten K pins. When energized, with G1 and G2 in high state, one of the K pins will glow due to the small amount of neon in the tube and will remain so until a signal is sent on the G pins. If G1 is pulled low with a pulse, the next pin along will get energized from that pulse and the fact that the adjacent pin is active. If G1 then goes high and G2 goes low for a pulse, then the next cathode will energise. When the G2 pulse is removed, with the third pin (a K pin) being already grounded, the glow will move to that pin. The pulse sequence can then start again to move through the next three and so on. Once the

glow has done a full rotating to K0, the energizing of this pin will send a voltage out of this pin, which can indicate to generate a pulse pair for the next stage. So you can see that this can emulate a mechanical cog, with key presses initiating a pulse sequence for the number of the key, and "carry out" from K0 to feed into the more significant stage.

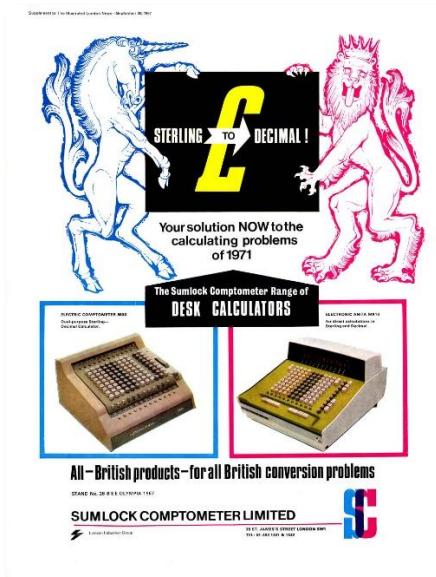
Nixie Tube Display

Returning to the display, these are made up of nixie tubes. Similar to the Dekatron, these are vacuum tubes with a low pressure neon gas. There are usually thirteen pins, with two not connected, one an anode and ten K pin cathodes. This time, though, the K pins are connected to cathodes, each shaped like a numerical digit. The anode is a grid at the front of the device and when energised if a cathode is pulled low then it will illuminate, displaying the number.



Moving Forward

For a couple of years Sumlock Anita calculators were the only electronic calculator devices on the market, and development continued on the Anita calculators. As mentioned before, the U.K. was gearing up to change to a decimal based currency system, and Anita calculators were developed in advance of this to cope with the change. In 1964 the Anita Mk10 was launched. The image below shows the Mk 10 from my own collection and an advert from the time pointing out the calculators being ready for 1971. The calculator on the left in the poster is an electro-mechanical calculator, a 993s, a type I've glossed over so far. These acted much like the pure mechanical comptometers but, instead of using force on the keys to move the mechanics, the keys are switches and electric stepper motors move the mechanics.



Now it just so happens that this is where I first come into the picture as me and my twin sister (Nikki) were born, and my mother was sent congratulations from the people at Bell Punch, as shown in the images below, with a telegram on the left and, to the right, the signatures from her colleagues in a card that was sent to St. Mary's hospital where we were born.



By this time the use of a comptometer key layout was seen as overly complicated, though it had made the transition for a comptometer trained workforce easier and, in 1966, a Mk 12 was launched, with a low cost Mk 11 in 1966, that had a more familiar key layout with a matrix of numbers and operation keys. Unfortunately, I don't have a picture of these models.

It is around this time that my earliest memories start, and I was often taken to the factory on a Saturday with my dad. He'd always say he had something he just needed

to do, but I suspect it was just an excuse to take me. I vividly remember the smell of the place, and the old style factory layout. My dad had an office that he shared with another manager, but the most interesting room was the test lab where devices that had failed test were sent for debug.

As well as permanent employees as technicians, my father also organised a training program with the local technical college for any of the test girls that wanted to do this, so that they could do debug and fix themselves. I actually found out the details of this from one of the former test girls, Patricia (known as Pat) Triggs. She took up this offer and when I joined Marconi Space and Defence as an apprentice I ended up in a test department for one period being trained by her, now a test technician herself. You'll see here signature in the image above. I can see why my mother was attracted to my father (though she used to say her mantra was "*if you want o get on, marry the boss*").

Another memorable association with Sumlock Anita was the Christmas parties held each year at the factory. All organised, including entertainment for the kids, by the employees themselves. The picture below shows me at the 1968 Christmas party.



Transistors and Integrated circuits

Whilst the first generation of Anita calculators were selling well, development of transistor and IC based calculators were being developed. These were lighter and fully solid state, with IC from Marconi Elliot. A whole range of this smaller desktop calculators were produced from a basic four function type, to models with memories and square root function. They still employed nixie tube displays though printer versions were also made. The image below shows an Anita 1021 from my collection, which has memory store and square root.



The second generation models were short lived however, and by 1971 new LSI based model were available that were smaller and lighter still. By this time Marconi Elliot had been bought by GEC and had their IC manufacturing closed. So Sumlock Anita sourced their LSI devices for the new model from Rockwell International.

The image below shows an early Anita LSI calculator, the Anita 1000 LSI from 1971, still using nixie tubes, and a later model, a Rockwell-Anita 1211 slimline, from 1974, using a vacuum fluorescent display (VFD).



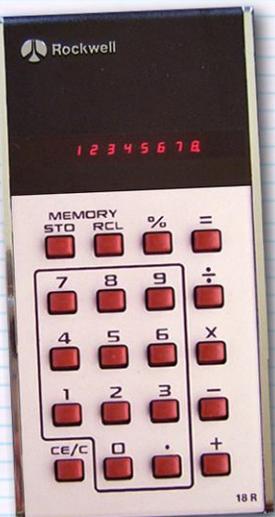
Handheld Calculators

Sumlock Anita were also developing hand-held calculators but, by some accounts, the management were skeptical, and Sumlock Anita was pipped to the post, in the U.K. at least, by Sir Clive Sinclair and his Executive calculator "*the world's first slimline pocket calculator*". None-the less, a range of calculators were launched from 1972 using LED displays and a pair of integrated circuit from Rockwell. The image below shows an Anita 811 from my collection with its box and accompanying wallet, instructions and laminated quick reference.



I remember having one of these calculators (an Anita 810) that my dad gave me (these were usually rejects for cosmetic reasons though fully functional). These were not cheap at the time, with an Anita 811 costing £75 pounds or just under £900 in today's money. These calculators are now starting to look like more modern versions, though, like the previous calculators, they used a form of reverse polish notation in the early models, and switch to the more familiar functionality only in the later models. These later models had versions for business, scientific and conversion.

In 1973, Rockwell International bought Sumlock Anita. A range of Rockwell branded calculators were produced at the Portsmouth factory, and we've seen the slimline above already. The image below shows a typical Rockwell handheld calculator



A black and silver handheld calculator with a digital display showing '12345678'. Below the display is a row of red function keys labeled 'MEMORY', 'STD', 'RCL', '%', and '='. The main numeric keypad has red buttons for digits 1-9 and 0, with black buttons for operators '+', '-', 'x', and '÷'. Below the keypad are red buttons for 'CE/C' and 'ON'. The model number '18 R' is printed at the bottom right.

Because life is full of little problems...



Rockwell brings you The Answers.

Our new line of Rockwell electronic calculators has Answers for everyone. Mothers with checkbooks and charge accounts. Fathers with workshops. Kids with homework. Professionals with technical problems. And all of us who are stuck paying taxes and trying to stay on budgets. Price? Features? Take a look at the chart below. You'll see why Rockwell International—the company that's known for the right answers in advanced electronics. Clip the chart and take it along to a leading store near you. It's full of good Answers to compare with other brands. Microelectronic Product Division, Rockwell International, Anaheim, CA 92803.

Features	Model No.	12R	21R	51R	61R	63R	80R	82R
Adds, subtracts, multiplies, divides	Price*	\$29.95	\$39.95	\$99.95	\$79.95	\$99.95	\$139.95	\$169.95
Algebraic logic	✓	✓	✓	✓	✓	✓	✓	✓
Floating decimal	✓	✓	✓	✓	✓	✓	✓	✓
Built-in rechargeability		✓	✓	✓	✓	✓	✓	✓
Memory		✓	✓	✓	✓	✓	✓✓	✓✓
Percent key		✓	✓	✓	✓	✓	✓	✓
Square roots	✓		✓	✓	✓	✓	✓	✓
Log and antilog functions		✓	✓	✓	✓	✓	✓	✓
Scientific notation and parentheses		✓	✓	✓	✓	✓	✓	✓
Conversions—metric, fractions, etc.		✓	✓	✓	✓	✓	✓	✓
Printed tape		✓	✓	✓	✓	✓	✓	✓

51R 61R 63R 21R 12R 80R 82R

**Manufacturer's suggested retail price in U.S.A.*

The Answers from Rockwell

Rockwell International

Calculators with other branding were also made, such as for the UK department store House of Fraser, Radio Shack and Sears.

The End

After the Rockwell take over, production of calculators at the Portsmouth factory continued until, in 1976, Rockwell announced that manufacture was moving to its Mexican facilities and the historic Portsmouth factory was to be closed and everyone made redundant. I well remember how upset my mother was at that time, as redundancy wasn't that common in the U.K. then, and she was worried about how we would manage. My father did find a place in procurement at Marconi, though. The process of redundancies did have an affect on my father, and he tried to help people in his department find alternative employment as best he could. It was not too long after that time that my father had his first heart attack, and he passed away in 1981 at just 49. My mother always placed some blame on those times in 1976. So, no more trips to the factory.

But the flame still burned bright in me from the trips to the factory and from my parents. When my father was ill was when I was in my last years at secondary school and, although I did well academically, winning prizes for exam achievements, this went downhill as my father became more ill and I did not get the grades I was expected to., and so instead of continuing in full-time academia, I joined Marconi Space and Defence as an electrical and engineering apprentice. This not only gave me hands on experience, but I could continue my studies part time as part of the apprenticeship in purely engineering subjects, gaining enough qualifications to study as an undergraduate for a bachelor's degree. In 1989 I moved to Bristol, in the west of England to do just that, gaining a first class bachelor's degree, and then, when working for Hewlett Packard, I had the opportunity to study for a master's degree. From that day to this, I have been doing engineering and have never even wondered what an alternative career path might have been like.

Conclusions

I have only given a very brief summary of the history of Sumlock Anita in this article. If anyone is interested in more details, both history and technology, there is an amazing wealth of information at Nigel Tout's [Anita Calculators](#) website. It is the gold standard on Sumlock Anita, and if not in there it's not anywhere. I had the pleasure of Meeting Nigel Tout some years back at an event in Swindon with Sir Clive Sinclair as guest speaker about the development of Sinclair Calculators.

It's also about this time, in the majority of my articles, that I reference a project of mine that allows you to explore further with practical models or implementations to allow the subject to be further investigated with a more hands on approach. This is a little difficult with an article about 60s and 70s technology. However, quite a few years ago, I manually put together a [website](#) to teach myself some HTML and JavaScript and wrote a few simulations of the calculators in my collection. On the site, most of the images of calculators can be clicked and a pop up will appear of a usable calculator. Note that some calculators need to be "switched on" and some are reverse-polish notation. The simulations are mostly of the handheld models, but there is also a simulation of an Anita 1000 LSI, with a nixie tube display.

So, to conclude, I have (perhaps somewhat clumsily) woven together a brief history of Sumlock Anita with my own and my family's history. On the one hand the Sumlock history is a case study of the speed of technology development, integration and shrinkage happening at the time, starting in 1961 with all vacuum tube designs through transistors, ICs and large scale integrated devices by 1972—in just over 10 years. From the other perspective it's a tracing of one person's kindling of a love affair with a discipline that hasn't (yet) diminished for over sixty years, inspired by what was happening at Sumlock Anita.

So, "*what first got you interested in electronics and computing?*"—it's in my blood.