

UNIVAC I Computer System



After you look at this yellow page go to the [blue](#) page to find out how UNIVAC I really worked.

My name is Allan Reiter and in 1954 began my career with a company in St Paul, Minnesota called Engineering Research Associates (ERA) that was part of the Remington Rand Corporation. I was hired with 3 friends, Paul S. Lawson, Vernon Sandoz, and Robert Kress. We were buddies who met in the USAF where we were trained and worked on airborne radar on B-50 airplanes. In a way this was the start of our computer career because the radar was controlled by an analog computer known as the Q-24. After discharge from the USAF Paul from Indiana and Vernon from Texas drove up to Minnesota to visit me. They said they were looking for jobs. We picked up a newspaper and noticed an ad that sounded interesting and decided to check it out. The ad said they wanted people with military experience in electronics.

All three of us were hired at 1902 West Minnehaha in St. Paul. We then looked up Robert Kress (from Iowa) and he was hired a few days later. The four of us then left for Philadelphia with three cars and one wife. Robert took his wife Brenda along. This was where the UNIVAC I was being built. Parts of the production facilities were on an upper floor of a Pep Boys building. Another building on Allegheny Avenue had a hydraulic elevator operated with water pressure. If too many people got in it would go down rather than up.

We were hired by the Field Service Division to maintain installations of the UNIVAC I System. We obviously needed to know how these complex things worked and along with other new hires were sent to New York City where we attended UNIVAC I classes. This was during 1954 when NYC was considered a nuclear target area of the cold war and there we were on an upper floor of the Remington Rand Building, a 20-story structure at 315 Park Avenue South. One tidbit of information I still remember from these classes was that the total capacitance of the power supply of the Central Computer was .7 of a Farad. I think it was Norman Jacoby, an instructor, who pointed this out.

I had always been a Brooklyn Dodger fan and took advantage of being in NYC by going to a game at Ebbets field in Brooklyn. I was quite lucky that day and managed to get a home run ball hit by Don Hoak of the Brooklyn Dodgers, still have it. I was in the center field stands and had a real fight on my hands but came up with the ball.

Eventually all four of us were assigned to various field locations and lost contact with each other. I am, however, still in contact with Vernon and with Paul's widow. Paul probably worked with the UNIVAC I longer than any other one else. He was assigned to Life and Casualty Insurance of Tennessee (L-C Ins) in Nashville and eventually hired on with that company. UNIVAC I (serial #24) was used for thirteen years and was retired in 1970. When they updated to newer equipment he took possession of the Supervisory Control (SC) console and stored it in his garage. I heard that his children played with the console switches when they were growing up. It has since been relocated in a Computer Museum in Boston.

After a brief period at General Electric in Louisville where UNIVAC I (serial #8) was located I was assigned to Wright-Patterson AFB (WPAFB) near Dayton, Ohio. Air Material Command (AMC) was being used for inventory and related activities by UNIVAC I (serial #10). It was there I met Robert Stark. Bob and his wife Lois live in the Twin Cities area so I see them ever now and then. Bob supplied several of these photos, shown in the Photo section of the blue page. He also gave me valuable technical data in areas not familiar with me, such as the memory changes for UNIVAC II. The major change for UNIVAC II was removing the 7 large mercury tanks used for the 1,000 word main long term memory of UNIVAC I and replacing them with the new magnetic core memory. This increased the number of words that could be stored in UNIVAC II from 2,000 up to an optional 10,000. Bob worked on both UNIVAC I and II where I worked only with UNIVAC I. I replaced Kevin Leenay when he was

reassigned to a group that developed the UNIVAC II in St Paul, MN.

I spent about two years at WPAFB and met my late wife Mildred Perry there. She was a UNIVAC I programmer and worked for the government. Arlin Fraederichs, who now lives in Stockholm, WI also worked at WPAFB and was my best man when Millie and I were married in 1957. I still visit Arlin occasionally. Arlin certainly has a good memory. He produced a list of all the UNIVAC I people he worked with at WPAFB. I added Kevin Leenay since he left before Arlin arrived. Here are their names: Tom Robinson, Robert Stark, Frank Smith, Kevin Leenay, John Spengler, Allan Reiter, Arlin Fraederichs, Curt Leeper, Vern Olson, George Miller, Ray Feagan, Bob Johnson, John Andersen, Bennie Muffett, Gordie Johnston, Bob Morgan, and Glen Parrish.

Another rather notable person who was a USAF UNIVAC I programmer at WPAFB, and one that many Univac people know, especially those in Roseville, MN was Airman First Class John W. Fore Jr. He was there during the time I was and was soon promoted to Lieutenant. His signature is on my 25 year Sperry Univac plaque along with F. W. Reindel's. I had many pleasant memories of these two associates. I just noticed both of them prominently used the middle initial W in their signature.

Univac II was built in St Paul, MN from a Univac I (serial #16) that was shipped from the factory in Philadelphia to St Paul in 1955. That prototype Univac II went into operation at Sperry Univac's Plant 5 located on Prior Ave in St Paul. I knew three of the people that programmed on that computer, Willis Unke, Bibsy Kinghorn and my late wife Mildred. I still see Willis and Bibsy every now and then. There is a picture of that Univac II in the Photo section of the blue page.

1970 was the end of the UNIVAC I and the UNIVAC II era that lasted almost 20 years. The last two UNIVAC I's in operation were at L-C Ins in Nashville, TN. The oldest one was serial #24 and the newer one serial #37. My late friend Paul Lawson nursed these two UNIVAC I's along through the years.

During the preparation of this page I came into e-mail contact with several individuals who worked with UNIVAC I. One of them is Ed Lankford who worked in Paul Lawson's group in Nashville. He recently sent me a copy of the pages of a printout from the L-C Ins UNIVAC I, which is dated August 12, 1970. This was sent to him by Larry Logan, a Programmer/Analyst on the UNIVAC I at L-C Ins. It likely is the last printout of a UNIVAC I. I have included the last page of this gem below. The printout was from the Supervisory Control typewriter that was attached to the UNIVAC I. It was used to let the operator know the status of a programs progress and was initiated by programmed instructions directly from the computer.

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WUPRE N000002
SERVO 5
WUGRE N000003
WUPRE N000003
WUGRE N000002
SERVO 6
WUPRE N000000
TAP E WU N 01
00000001:370
COMPU TER 01
00000001:371
TAP E WU N 01
00000000:01
COMPU TER 01
00000000:00
END W02
SERVO 5
WUPRE N000005
AUGUST 12, 1970
3:25
    
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The other person I am in contact is Peter Zilahy Ingerman, PhD who programmed UNIVAC I (serial #37) at the U of Pennsylvania until it was bought by L-C Ins. He recently developed a UNIVAC I and II Simulator that runs on Windows. He has made the Simulator interface so realistic it brings back the feeling you are actually working on the computer. Download the [Simulator](#) and step back in computer history to enter the exciting world of UNIVAC I.

I tried it out in the summer of 2004 and found it a delight to work with. I entered a program in absolute form using the Simulator just like I did in the old days when I used the UNIVAC I. Naturally I had to debug it before it ran.

Below in the first line is the 9 word program. It contains 18 instructions including two constants, a counter variable and two transfers (one conditional). The program was prepared and debugged by the Simulator and assigned to UNISERVO -. It runs on the Simulator for 4 seconds and prints the contents of the variable on the SC console typewriter after 2,000 program iterations. Then the Simulator finishes by rewinding the virtual program tape and stops at the 90 instruction. If you attempt to run this program you must turn the power on the lower part of the Simulator. This will then show the printout of 2001. The remaining 5 lines of zeros make up the 60-word (720-character) output tape block written by UNIVAC I. I changed the 5 actual lines of all zeros to the prose version because all zeros fouled up the display. A word length of 120 characters is normally out of bounds in the documentation world anyway. The tilde characters in the first line were used by UNIVAC I programmers on their coding sheets to represent 6 zeros. They were actually large upside down tilde markings. I used them in the first line to reduce the number of zeros in the line. Using absolute addressing the first 2 instructions are in memory location 0. There is a code card in the blue page that shows the complete instruction set of UNIVAC I.

0	1	2	3	4	5	6	7	8
z	L00004G00006	B00006T00007	A00005C00006	~U00001	~002000	~000001	~~	5000066-0000 900000~

z (ten words of zeros, 120 characters)
z (ten words of zeros, 120 characters)

Ed Lankford holds the distinction of being the person who maintained the last operational UNIVAC I. Another interesting fact is UNIVAC I actually out-lived its replacement, the UNIVAC II. Ed along with Paul Lawson also held the record of most years of UNIVAC I experience. Ed just recently discovered the second UNIVAC I acquired by L-C Ins (serial #37) was the one Peter Zilahy Ingerman, PhD programmed at the U of Pennsylvania and it had the new I instruction, (rL) → m installed as a field upgrade. It arrived in 1963 in pieces with very little documentation so Ed was not aware of the I instruction addition but had the computer up and running in record time. A 1964 photo of Paul and UNIVAC I (serial #37) in operation is shown in the Photo section of the blue page. There was some confusion about the serial number of this machine and that was cleared up by George Gray, the Univac historian, who was updating the history of the 1100 series in Roseville, MN with Ron Q. Smith, an 1100 Series expert.

Ed also mentioned Paul Lawson helped make arrangements to obtain a third UNIVAC I. It was a parts computer with tape drives, long tanks, and other parts connected to an eastern salvage location. This UNIVAC I (serial #6) was from the US Navy Bureau of Ships. Parts cannibalized from it helped keep the other two Nashville L-C Ins UNIVAC I's alive until 1970. An amazing story, imagine, a parts computer on location. Ed still has a lot of UNIVAC I parts in his attic. He also supplied me with the pictures of the long and short mercury tanks and of Paul Lawson, my friend, who was hired by ERA the same day as I was. These pictures are shown in the blue page. If there ever were an effort to rebuild a UNIVAC I, Ed's knowledge of UNIVAC I and the parts in his attic would play a prominent role.

Larry Logan, the Programmer/Analyst on the UNIVAC I at L-C Ins, mentioned above several paragraphs, showed this page to Morgan Huff who communicated to me via letter, which I have edited below in italics. He was a programmer on the UNIVAC I (serial #1) used at the Census Bureau in 1951 and finished his UNIVAC I work at Nashville, Tennessee in 1970 as VP of their Data Processing Department. I really enjoyed his contribution to this page. He was called "Mighty Mo" a reference to the Battleship Missouri, which is on location at Pearl Harbor, Hawaii. The Missouri (BB-63) was the last Battleship built and the one that Supreme Commander for the Allied Powers, 5 Star General Douglas McArthur, presided over during the signing of the Instrument of Surrender on September 2, 1945 on the 01 deck level of the Missouri, anchored in Tokyo Bay. Major General Curtis LeMay was on deck and watched about 500 B-29 Super Fortress's fly over the proceedings.

You will find a reference in Morgan Huff's input to Herb Finney, the USAF Lieutenant who programmed music for the Univac I. Do any of you know his whereabouts? If you do let me know.

This is the start of 11 paragraphs of Morgan Huff's input.
I was directly involved with the UNIVAC I for 20 years beginning in 1950 at the Eckert-Mauchly Computer Corp, which was later bought by Remington Rand, Inc. I am the only person involved with the first machine put into operation, the one belonging to the Census Bureau, and the last one in operation in 1970 at the Life and Casualty Insurance Company of Tennessee (L-C) in Nashville, TN.

I had been an Aviation Radioman in the Navy flying in PBY's, PBY4's, and PBY5's in WWII.

After the war I attended the U of Maryland and graduated in June 1950 with a degree in Business Administration and accepted a job as a programmer trainee at Eckert-Mauchly two weeks later. I was hired by Dr. Herbert F. Mitchell, Director of the Computational Lab, as they called it. Dr. Grace Hopper was among the staff as well as Betty Holberton, Al Tonik, Art Katz, Hildegard Nidecker, and Dick Woltman. Paul Chinitz, Steve Wright, Harvey Rubinstein, Lloyd Stowe and I started at the same time with George Danehower, and Dick Petersen coming aboard that same summer. Part of my training was programming some runs for the Census Bureau's computer UNIVAC I (serial #1).

In the beginning of 1951 I was assigned with Lloyd Stowe to the Office of the Army Air Comptroller, which used UNIVAC I (serial #2). I worked on translation of the system they were replacing with a UNIVAC I. A young Lieutenant by the name of Herb Finney was a programmer there and was also a musician. He recognized that by coding certain computer instructions, he could play music on the speaker system of UNIVAC I. Among the songs were "The Blue Tango", "The Air Force Song", and "The Eyes of Texas".

Both Remington Rand, Inc and CBS thought it would be a great idea if UNIVAC I could predict the winner of the 1952 presidential elections. A noted statistician from the U of Pennsylvania was hired to design the system and we programmed it. I was assigned to handle the input tapes. As the early returns came in they were entered into the computer. All hands were trembling as the program ran. The online typewriter started clacking and said "IKE BY A LANDSLIDE". It was decided beforehand that the broadcast would not go out on the air until those responsible felt it was reasonable, so the statistician was asked to tweak the program and we reran it again. This time the computer said "ODDS ARE 8 TO 7 IN FAVOR OF IKE". This is what went out on the air. UNIVAC I was right the first time since Dwight D Eisenhower did win by a landslide.

I was transferred to General Electric in early 1954 to spearhead their programming effort. I had two UNIVAC I Programmers helping me by the names of Bernie Riskin and John Fedako. GE had a staff of about 10 programmers headed by John Swearingen. John McMahon was in charge of the operation under the leadership of Roddy Osborne, who sold GE on getting the UNIVAC I in the first place. To help in the systems area GE hired the Arthur Andersen Consulting firm who must have sent fifty of their people through GE over the next three years to get experience. This was a real feather in Andersen's cap because they were the first accounting and/or consulting firm to get some experience with a large-scale computer. Bill Matter and Gene Delves from Andersen were responsible for the design of the two systems, Payroll and Inventory Control. GE was doing both systems manually. My responsibility was to lead the programming of those two systems. Being auditors and accountants, Andersen had doubts about UNIVAC I's duplicated arithmetic circuitry. As a result, they put in many extra programming steps to verify addition and multiplication operations. This was a disaster in so far as getting the job done in reasonable machine processing time. When Andersen finally recognized that UNIVAC I's duplicated circuitry really worked, they changed a lot of redundant coding, and got the Payroll System down to a reasonable time frame. The Inventory Control System was so good that management did not want employees talking about it for competitive reasons. In the first year of operation it saved GE some \$1,000,000 in raw material costs.

Late in 1954 I was transferred to Los Angeles to help Pacific Mutual Life Insurance. This was the first Life insurance company that used a computer for controlling all accounting operations. Dick Dotts, VP Planning of PM, was the person that envisioned the use of a UNIVAC I computer to replace the massive files of punched cards, which very often included duplicated data, into a single file system. This system was put into operation in the late 1950's and all other Life insurance companies followed suit. In addition to my duties with PM I was responsible for programming assistance at the Arizona Public Service Company in Phoenix, Arizona, where Glenn Halliday, whom I worked with at PM was sent to help with their system and programming effort. I was also responsible for programming at Univac's Los Angeles Service Bureau.

Early in 1958 I was told by my boss that some people in Nashville, Tennessee would like to talk to me about the job of running their UNIVAC I computer operation. The company was the Life and Casualty Insurance Company of Tennessee. It was the best decision I ever made. I arrived in Nashville in May of 1958 to a city much different than Washington, D.C., LA, New York, and Philadelphia. People actually stopped and talked to you on the street. At the outset, L-C had decided to have their own maintenance staff and among others, hired Paul S. Lawson, your friend. It was one of the best things they ever did. I put Paul in charge of computer operations and maintenance as soon as I could. Ed Lankford worked for Paul.

Robert Williams was my man in charge of programming, the man who knew our business. Larry Logan worked for Robert. Paul Lawson knew the logic of the computer, how it worked. I don't think we ever called Univac for help in getting our machines back up and running. Without Paul's skill and dedication our computer operation would not have succeeded.

At L-C we always had visitors, mostly company sales trainees. We developed a 20 minute dog and pony show on the computer for them including some card tricks and the songs. We had a delegation from Texas visiting one time and one of the young guys wasn't too impressed and said "If that thing is so smart lets have it play The Eyes of Texas". Our computer operator typed in the code for the song, hit the start bar and out it came!!! You talk about a convert!

I received a telephone call in the early 1960's from a friend of mine, Jim Guertin, a Univac employee at the U of Pennsylvania. He told me they were replacing their UNIVAC I and wanted to sell it. He thought they were asking about \$50,000 for it. Paul Lawson and I took off to Philadelphia to look into it. We had lunch with John Morgan of the University, and Jim Guertin. After a few cocktails we got talking about the \$50,000 price tag. Jokingly I said that I would give him \$10,000 sight unseen. John said it's a deal. We made all the arrangements for shipping it to Nashville and installed it about 1962. This was UNIVAC I (serial #37) and was in like new condition.

Around 1965 or 1966 I received a letter from a guy who was trying to unload a UNIVAC I computer that he bought through a US Navy surplus catalog. His was the only bid so he got it. He thought it was worth \$5,900. This was UNIVAC I (serial #6) that was used at the US Navy Bureau of Ships in Bethesda, Maryland. Again Paul and I went off to Philadelphia. We found the seven long tanks were all good. They and some other parts were all we really needed. We were stuck with getting rid of the cabinets, wiring, and the parts we did not need and made a deal with John Ulano, who owned the ABC Junk Company. He said he would give me \$100 per ton. We shook hands and I received a check for \$1,600. We figured these parts saved us about \$40,000.

When it became aware that we would eventually have to replace our two UNIVAC I computers, Paul and I went to visit the UNIVAC I operation at the Carborundum Company in Buffalo, NY in about 1966. They also had two UNIVAC I's and were in the process of replacing their two computers. Both Univac and IBM said that we would have to recode all our programs into the new computer. "Necessity is the mother of invention" proved once again, they had their solution and ours too, regarding the reprogramming problem. An IBM programmer there at the site named Ed Squish coded a program to run on the 360 that simulated UNIVAC I code. He gave me a copy of it and we never recoded a single line of UNIVAC I code for our future machines. This is the end of Morgan Huff's input.

Maintenance personnel were quite fond of UNIVAC I. Many treated it with great respect and some actually talked to it like a member of their family. When Ed was working out a difficult problem, Paul Lawson would ask him if he checked certain things and then added: "Did you talk nice to it?" Programmers often would wait in line day and night to get computer time for short debugging sessions on new programs. Five minutes on the computer could lead to an hour or more rewriting or correcting the program back at their desks. UNIVAC I always had the last word and the programmers really loved and respected it, especially when their programs ran successfully.

Working on and learning the capabilities of the UNIVAC I System was the start of a wonderful career of 34 years with a great computer company that is now known as UNISYS Corporation. Some of the other computer projects I worked on during my computer career were:

1. File Computer High-speed Printer development and deployment at Norwalk Labs, CT and Utica, NY.
 2. Athena guidance computer for Titan 1 Intercontinental Missile System at St. Paul, MN and Vandenberg AFB, CA.
 3. 490 and 1100 Series Computer Language Processor software development at St. Paul, MN.
- Company travel took me to interesting places like Edinburgh, Paris, Mexico City, and to various cities in the states.

Five-year pins (the first three emphasize the UNIVAC tape reel)



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