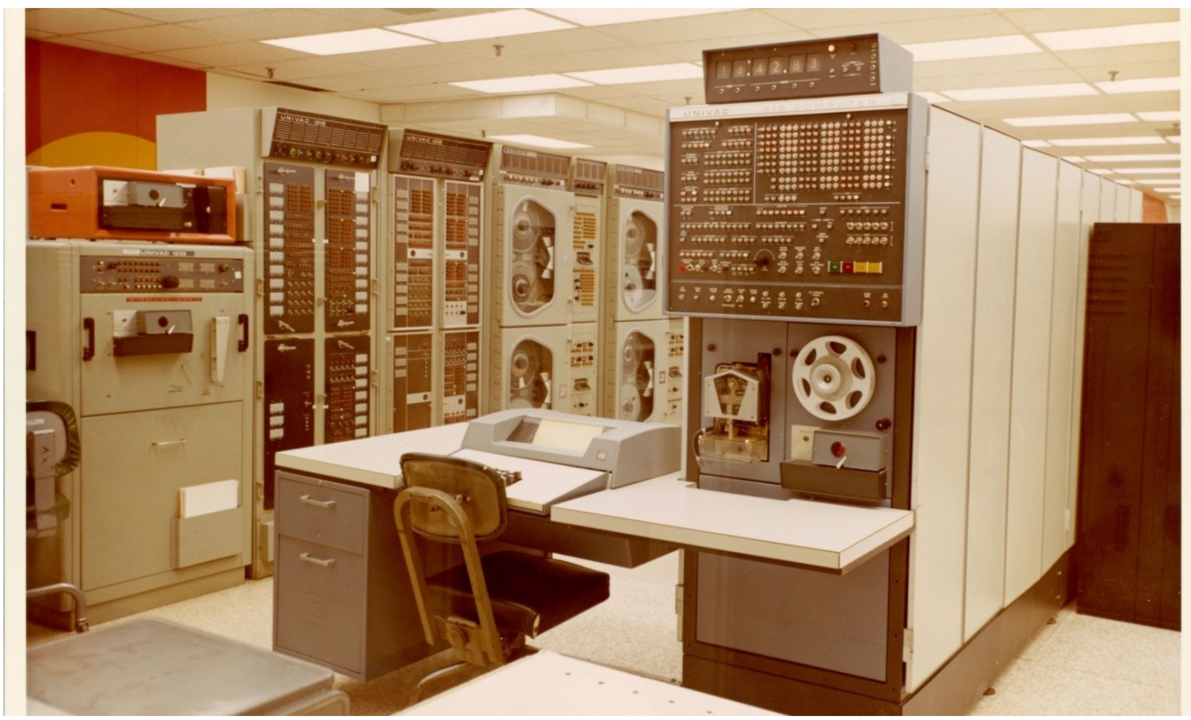
Eighteen Bit Computers

INTRODUCTION

This article was inspired by communications from three 'outside-of-Minnesota' people who discovered our IT Legacy web site via their internet browsers:

- From George Keremedjiev; Director of the American Computer Museum in Bozeman, MT: "We have the last remaining mainframe computer used by NASA for the Apollo Moon Missions, a UNIVAC 418-II used at Mission Control in Houston. We will be opening a new comprehensive exhibit on computers and the Apollo Moon Missions on June 1, 2015."
- From Duane Craps: "The Mid Atlantic Retro Computer Hobbyists (MARCH) are looking for info on 1219's, 1532's, and 1540's that they rescued from Johns Hopkins APL."
- From Anders Carlsson, Sweden: "Hello. I am an old service engineer from Univac to Unisys. I am trying to find out if there are any more physical units (418-II) in the world. Our simple website has some pictures from our collection, https://datamuseet.wordpress.com."

The VIP Club, here in Minnesota, appreciates the efforts of these people and their organizations in preserving parts of our Information Technology (IT) Legacy. This paper includes communications clips from these people and retirees who have contributed to our web site anthology. *LABenson*



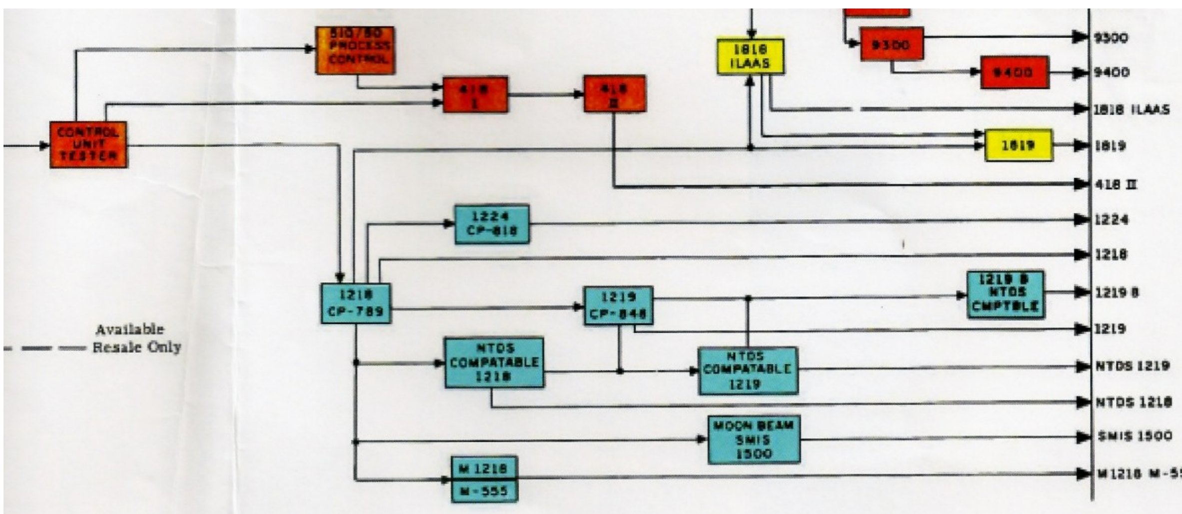
This NASA installation[1] has (left to right) a UNIVAC 1232 I/O Console, two UNIVAC 1218 computers, two UNIVAC dual transport 1240 magnetic tape units, and a UNIVAC 418 computer with operator keyboard/printer. The elapsed time mission clock above the 418 operator/maintenance console shows 14:42.83 hours/minutes.

[1]From the Dakota County Historical Society's Lawshe Memorial Museum collection, scanned by Keith Myhre.

Contents

Control Unit Tester (CUT) – the 18-bit Beginning

This extract from a May 1968 computer genealogy chart shows the CUT in red at the left.



Harry Wise, an early UNIVAC employee and IT Legacy Committee history source wrote:

1. The Control Unit Tester (CUT) was a spin-off of the Univac 490; the first of a series of 18-bit machines in the 510/580/418/1218 line. The CUT was just what its name implies – it was intended for testing peripheral control units in manufacturing for the Univac 490 and the Univac 1107 peripheral equipments, i.e. tape units, printers, drum memories, etc.
2. The 18-bit line really got its start when Univac sold the 18-bit architecture to Westinghouse for them to brand as the Westinghouse Prodac 510 and Prodac 580. They were the same machine with fewer options in the 510. Many of the cards in the Prodac machines were labeled "418".
3. The Univac 418 was the commercial 18-bit machine that had a hard time making it through the Blue Bell, PA management. Blue Bell management did not want to be in the "mini-computer" business, in spite of the fact that the 418 was more powerful than the Blue Bell

UNIVAC II and UNIVAC III machines. At this time, DEC was just getting started in the mini computer business. The 418 was also a much better machine then the early DEC processors.

4. The Control Unit Tester, the 1218, and the 418 were all inter-twined with the same basic 15-pin printed circuit cards. This was the second time that Univac had both a defense and commercial version of the same machine. Only the reverse this time, from commercial to military. {Editor's notes: The first was in 1961 when the 642A processor was repackaged as the UNIVAC 490.}

Notes about the items (boxes) on the genealogy chart are as follows:

Genealogy Item	Mostly extracted from our web site, http://vipclubmn.org.
Control Unit Tester 1st in 1962	From Ernie Lantto: The CUT dimensions were 44.5" x 46" x 23.5" totaling 27.8 cu ft. It weighed ~800 lbs and consumed ~1,000 watts. It had eight 18-bit channels (4 at 36 bits) and 8k words of 8-microsecond core memory.
S510/80 1st in 1962	The Process Control computers for Westinghouse; see Harry Wise's comment 2 just below the genealogy chart part on the previous page.
1218 CP-789 1st in 1963 326 built	Initially used in the NTDS system for the 'Identification Friend or Foe'. This demonstrated transponder communications led to the FAA terminal control applications. The 1218 dimensions were 72" x 26" x 28.5" totaling 30.8 cu ft. It weighed 866 lbs and consumed 937 watts. It had eight 18-bit channels (4 at 36 bits) and 16k words of 4-microsecond core memory. Based on the Univac 418 design, the 1218 came with COBOL, very necessary for the software development.
418 I, 1st in 1963	The first units came out in 1963.
1224 , first in 1963 CP-818, in 1965	This entry is a chart lineage error; the 1224 was a 24-bit ISA machine initially using PC cards from the 642A as the 1218 had. This machine had applications for the Air Force's intelligence FLEXCOP operations. A second lot received the military nomenclature
NTDS Compatible 1218 First in 1964	NTDS compatible was not a new nor a different design, rather a paper title for the units that were delivered to NASA for tracking in rugged environments or on board ship. This unit type was also used at JPL for telemetry processing. This unit type was also for the FAA's Automated Terminal Radar Systems (ARTS I) in Atlanta Georgia. The processors were used for tracking aircraft and aircraft transponder communications.
M 1218 M-555	The M1218 version was sold to the USMC for their 'Landing Approach System-3', the first delivery was Oct. 23, 1965. M-555 was in 1967 for the MASU project
1219, CP-848 First in 1965 367 built	The 1219 dimensions were 72" x 26" x 28.5" totaling 30.8 cu ft. It weighed 968 lbs and consumed 1478 watts. It had sixteen 18-bit channels (8 at 36 bits) and 32k words of 2-microsecond core memory. This was the 2-bay configuration. There was a 3-bay configuration with 65k words.
418 II	First units in 1965, note that the 418 III came out in 1969

Genealogy Item	Mostly extracted from our web site, http://vipclubmn.org.
NTDS Compatible 1219 First in 1965	Used for FAA's ARTS IA system as both the tracking and display driver system processors.
Moon Beam First in 1965 SMIS 1500	The SMIS 1500 became the core of the Navy's on board Management Information System to keep track of all the logistics such as ammunition, foodstuffs, etc. A variation with more memory was designated the AN/UYK-5. This system used for inventory control was developed for the AFS-1 through -7, the MARS Class Combat Stores Ships. See Appendix C for an expanded definition of the system. Some Navy user experiences are at http://www.navydp.com/phpBB3/viewtopic.php?f=5&t=210
1818 ILAAS First in 1967 Qty built = 2.	This was an airborne version of the 1219 using mechanical technologies from the CP-823 30-bit computer. The characteristics were a 2-microsecond memory in 4k to 32k words. This unit had only 27 instructions with 3 index registers mapped onto core addresses. It also had just 9 interrupts and 1 Real time clock. It had an Assembler and Utility Package. Project start was March 1966, first delivery in May 1967.
1219B First in 1968	This became the base computer for TARTAR, TALOS, and TERRIER missile launching from ship installations. *Digital TALOS Shipboard Missile Fire Control System* - Univac utilized a smaller word length digital computer. We developed and wrote the software to digitize the former analog fire control computer that controlled the TALOS shipboard missile system. The system was implemented on several Navy cruisers as the MK-152 system.
1819 First in 1968, 2 delivered	The 1819 was an airborne version of the 1219 using mechanical technologies from the CP-823 30 bit computer. They were delivered to Sperry on Long Island with the nomenclature CP-914.

Not on the 1968 genealogy chart; in 1969 UNIVAC began development of type U1825, AN/UYK-11. We subsequently built and delivered 130 units to the US Air Force. This computer design mapped the 18-bit ISA onto a 36-bit physical structure using plated wire memory. These units had extremely high reliability, averaging less than a single failure over measured 5-year periods while operating 24/7 as the Minuteman launch & mission control computers.

I do not have an exact count, but there were about 2,000 units with this 18-bit ISA. LABenson

American Computer Museum in Montana

Help sought – {Editor's note, this was distributed to VIP Club members via a newsletter}. The American Computer & Robotics Museum in Bozeman, MT has just acquired the UNIVAC 418-II that was used in Houston during the Apollo Moon Missions at the Mission Control Center. It was implemented along with the three UNIVAC 493 computers for the reception of the telemetry data prior to it being passed on to the IBM 360s on the other side of the room. If any of you has any direct/indirect information about the specific duties of the NASA UNIVAC 418-II, please send a note to labenson@q.com."

Phil Ross responded: In my humble opinion, we ought to put together an unabridged list[2] (and geographical display/picture?) of all of the Univac computers used in support of the Apollo program ... and provide it with any display of individual items, etc.:

- the DSD 1218-family (from Mercury and Gemini) used at almost all MSFN stations worldwide
- the 418-family used at MCC/Houston
- the 490-family used at MCC/Houston and GSFC/Goddard
- the 1100-family used at NASA/Huntsville and JPL/Pasadena
- the DSD 1230-family (of "telemetry" and "command" computers used at all MSFN and DSN stations worldwide

For example, there were close to fifty 1230 computers used worldwide for each Apollo flight. NASA also started to use the "spare" 1218s (left over from Mercury a/o Gemini at each site) for the MSFN ASTAM project ... for "Automated Site Test and Monitoring" of site equipment to aide in determining pre-flight (launch) site readiness.

When you add 'em all up, Univac (quantitatively) had quite a worldwide presence and provided a lot of mission jigsaw puzzle pieces for the Apollo program.

Phil Ross worked for Univac at NASA/GSFC, DSD/TSD and FSD/Washington DC, UAL/Chicago, RSDC, BBHQ. During the Apollo Project at NASA/GSFC in Greenbelt, he was a systems programmer and then a systems design engineer (for Remington Rand Univac DSD/TSD). Phil wrote programs in AS-1, and CS-1 primarily for the "Telemetry" (downlink streams) computers – which were Univac DSD 642B (modified) computers (aka Univac 1230 computers).

[2] Editor's note: This paper primarily addresses the use of the 18- bit computer families. The 30-bit line (490 series and 1230 upgrades of the 642B); the 36 bit line (1100 series); and the later 16-bit 3760 communications processor are not delved into by this paper.

Mid Atlantic Retro Computer Hobbyist on the East Coast

Email communications from Duane Craps: I have been looking for tech info for the Mid Atlantic Retro Computer Hobbyist (MARCH) for info on 1219's, 1532's and 1540's that we have rescued from Johns Hopkins APL. We think we will be able to get the 1219 and 1532 publications from the last SPN-42 installation (Whidbey Island, WA) when they shut down. Yes, there are still operational CP-848's in the wild. MARCH hopes to have theirs operational someday.

Not bad for a 50 year old computer!

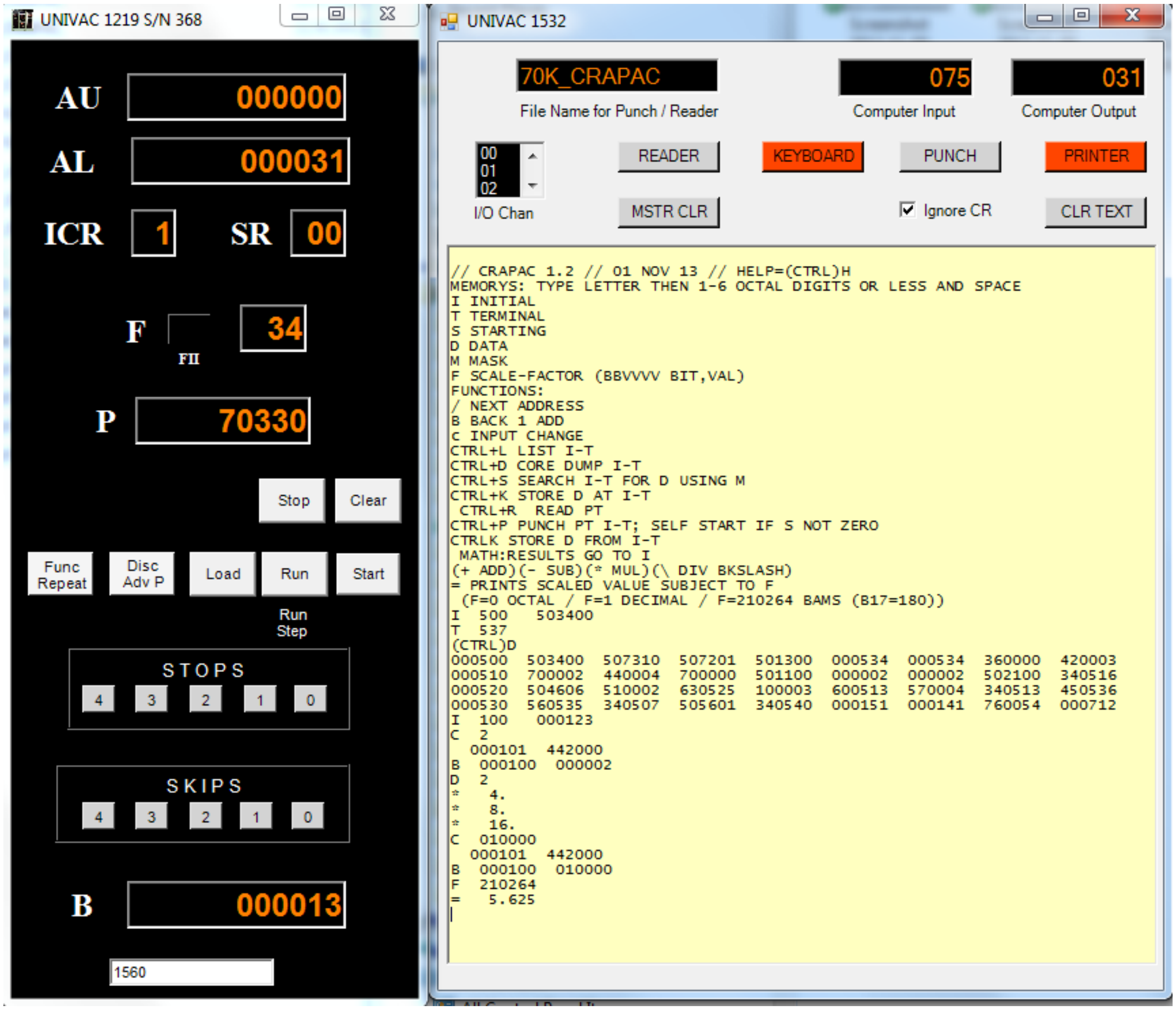
Our suite of equipment came from Johns Hopkins University Applied Physics Laboratory, where it was used to develop software for the Terrier Surface Missile System. If you know of anyone who might have 1540 info, please pass my request along.

MARCH has a Yahoo group with 474 members: https://groups.yahoo.com/neo/groups/midatlanticretro/info. In addition, Duane Craps has a yahoo group for old military Univac Technicians: https://groups.yahoo.com/neo/groups/UnivacComputers/info. On this web site, there are files for my 1219 emulator, assembler, and programs. The emulator is in visual basic and only runs about 2000 instructions per second, but that is fast enough for utility type operations. On top of the next page is a screen shot of the emulator in operation with a memory dump of the 32-word bootstrap located at memory address 500_8.

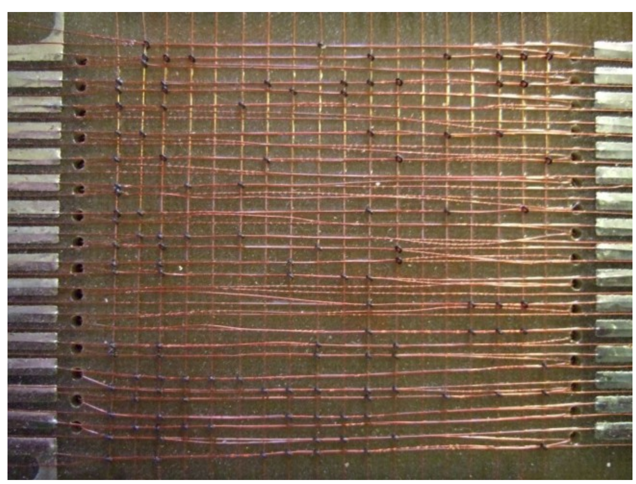
I wrote a keyboard UPAC so that MARCH would have something if they get their hardware working. Still hope to run into a copy UPAC 1B

I have received a copy of the FACT test and paper tapes for the 1219B and am using them to squish bugs in my 1219 emulator. I built a paper tape reader with a photodiode array pulling down the internal pull-up resistors on an Arduino microcontroller. The rest is software.

{Editor's notes: 1) The bootstrap base address for the 1219B was 500_8 whereas the 1218 base address was 200_8. 2) This 1219 picture was provided by Duane Craps.}



A Swedish UNIVAC Computer Museum



Mr. Carlsson: thank you for the snapshots of the Univac 418 II bootstrap memory card. I see 18 vertical wires on the card, indicative of the 18-bit word length of the 418 commercial computer series. I do not have the instruction set in front of me, however vaguely recall that many of the input/output instructions for 18-bit computers started with octal code 50. With that in mind, I traced the horizontal wire core locations from top to bottom to get the following bit patterns, i.e. machine code instructions.

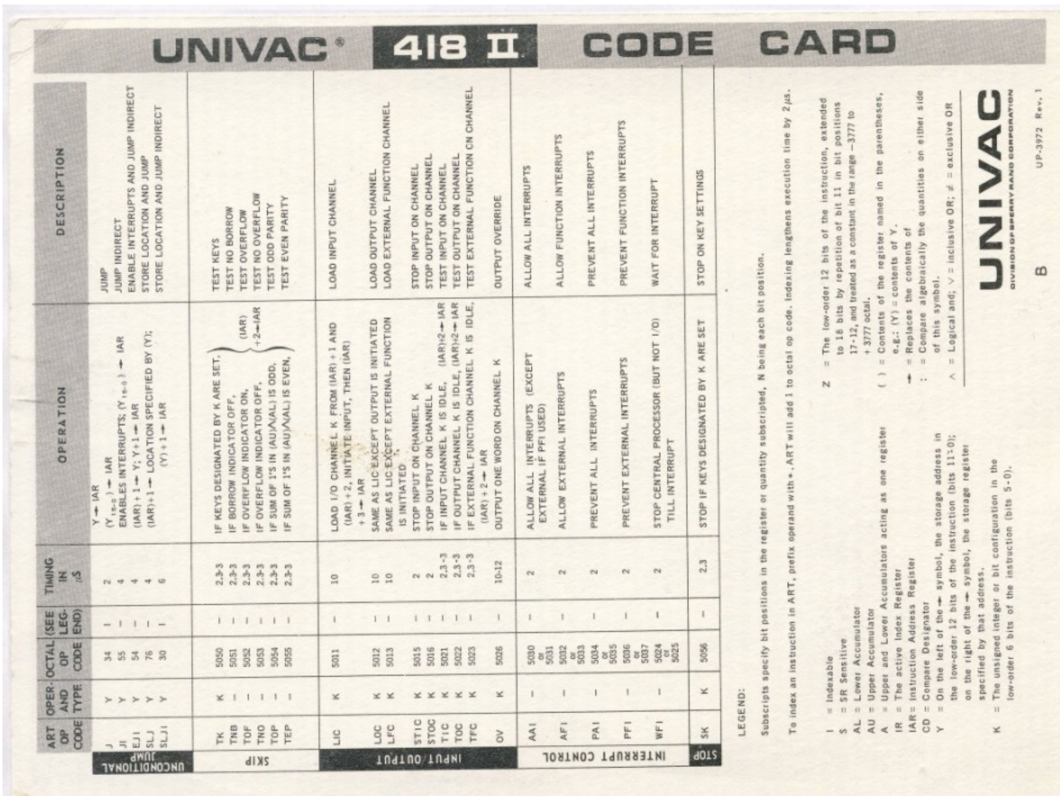
The top to bottom physical sequence is not the program execution sequence!

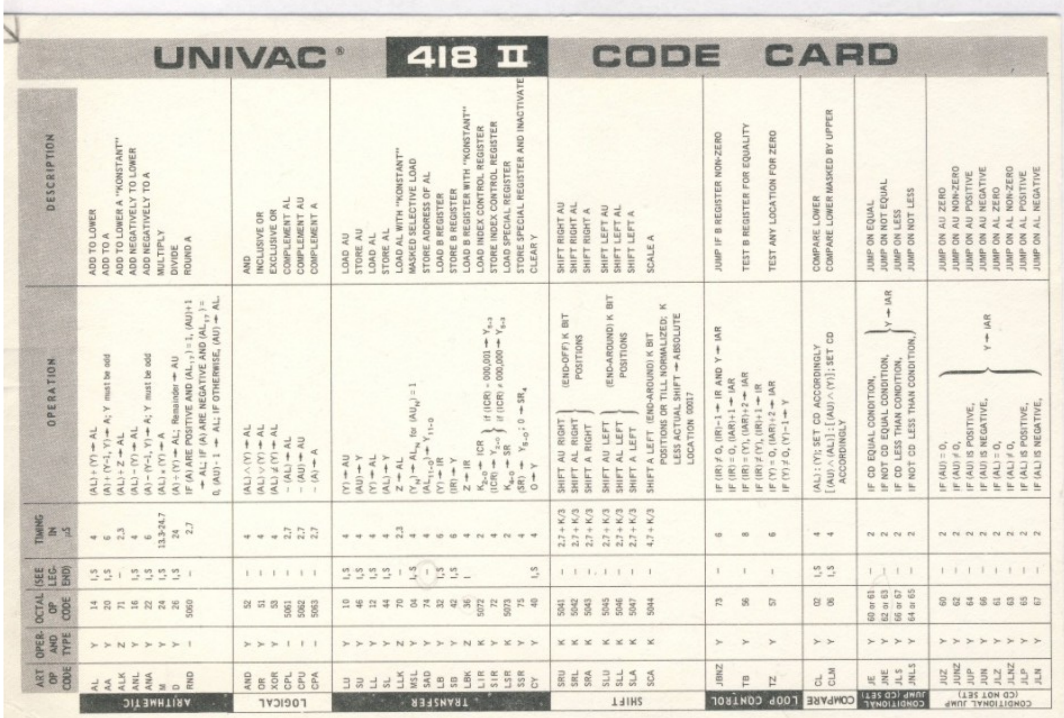
Row	Binary Bits	Octal Code(s)	Instruction
1	010 000 001 000 000 000	20 1000	Add contents of Adr 1000_8 to A
2	011 100 000 010 010 111	34 0227	Move contents of Adrs 227_8 to the Interrupt Address Register.
3	010 000 000 000 000 000	20 0000	Add A
4	101 000 100 111 000 110	5047 06	Shift A left 6 bits
5	101 000 010 100 000 000	5024 00	Wait for interrupt
6	101 001 000 000 000 000	51 0000	Inclusive OR
7	000 000 000 000 000 000	00 0 0000	
8	110 000 000 010 010 100	60 0224	Jump if Au Zero to 224_8
9	000 000 000 000 000 000	000000	
10	101 000 100 001 000 001	5021 01	Test Input on channel 1
11	000 000 000 000 000 000	000000	
12	100 101 000 000 000 000	45 0000	Store Al
13	100 000 000 000 000 000	40 0000	Store Zero
14	110 000 000 010 010 010	60 0222	Jump Au Zero to 222
15	100 000 000 000 000 000	40 0000	Store Zero
16	011 101 000 000 000 000	35 0000	Jump to
17	101 000 001 001 000 000	5011 00	Load input channel with 0 (zero)
18	101 000 010 001 000 000	5021 00	Test Input on channel 0
19	101 000 010 110 000 000	5026 00	Output a word on channel 0
20	000 000 000 000 000 000	000000	
21	000 000 000 010 001 110	000216	216_8
22	000 000 000 000 000 000	000000	
23	000 000 000 010 001 110	000216	216_8
24	101 000 001 001 000 000	5011 00	Load input channel from nxt adrs
25	101 000 001 011 000 000	5013 00	Load input channel, fct code
26	011 111 000 000 000 001	37 0001	Enter B with constant 1
27	101 000 111 011 000 000	5073 00	Load special register w/0
28	010 100 000 001 010 101	24 0125	Multiply x contents of adrs 125_8
29	101 000 001 111 000 000	5017 00	Terminate external function
30	011 110 000 000 000 000	36 0000	Enter B
31	101 000 001 101 000 000	5015 00	Terminate input Ch
32	101 000 111 010 000 001	5072 01	Load Index Control Register with 1

Of course, these 32 words of non-destructive readout include some constants for external function codes to the device from which larger programs are being read – usually, the first program loaded is a more sophisticated loader. A few of the instructions are also used to setup an initial interrupt process for the selected channel.

Appendix A of this paper lists a 1218 paper tape load bootstrap program that is executed beginning at address 200_8. The row 4 instruction above shifts the accumulator by six bits, the number of bits of a paper tape character.

We do have a couple of bootstrap listings in pdf copies of 1218 technical manuals. A paper tape listing is Appendix A of this paper. The instruction codes for the 1218 are almost identical to those used by the 418 II as illustrated in this card image from Anders.





NASA installation clips and notes

This item was clipped from a 1965 UNIVAC newsletter, Twins Cities section.

...IES SECTION

JUNE-JULY, 1965

Astronauts Could Depend On Reliable Univac Computers

Highly reliable Univac 1218 Computers operated a total of 910 hours during the historic Gemini 4 space mission earlier this month — without a single failure.

Twelve 1218's, strung out at bases surrounding the earth, kept track of information within the capsule and the astronauts' physical condition during the four-orbit flight.

The computers summarized and stored the data that was beamed to the ground from the capsule. The data was transmitted for final processing on two Univac 490 computers at Goddard space flight center, Greenbelt, Md., and the Houston mission control center.

The systems also enabled the National Aeronautics and Space Administration controllers at Goddard to select and examine specific in-flight information such as the astronauts' pulse beat, blood pressure and temperature, on a real-time (no delay) basis.

The 1218 computers, made in Univac Plant 3, are installed at Cape Kennedy; Bermuda; the Canary Islands; Corpus Christi, Texas; Guaymas, Mexico; Kauai, Hawaii; Carnarvon, Australia; Wallops Island, Va.; Greenbelt, Maryland, and aboard two tracking ships on the Atlantic Missile Range.

From Ron Q. Smith Subject: UNIVAC 1218 in Australia - A UNIVAC 1218 was installed at the Honeysuckle Creek tracking station. http://www.honeysucklecreek.net/station/technical.html

From Phil Ross: Toward the end of the Honeysuckle Creek web document, there is a picture of the computer room, showing the two Univac M642B computers with an extended memory unit (EMU) in between. “Telemetry” computer is the left one; “Command” computer is the right one (at every site, worldwide). Trivia: The “Honeysuckle Creek” (Canberra) site is now a camping area, but the 26 meter DSN dish has since been moved about 7 miles north to the current NASA/JPL CDSCC site where it’ll be used in the near future for educational purposes.

From Arlyn Solberg: Univac had both 494's at Mission Control Center (Bldg. 30) and 1230's which were being installed at Apollo tracking sites around the world. The 1230's were replacing the Gemini program 1218's which were connected to U494's at Goddard space Center in Greenbelt, MD which in turn was connected to Houston's 494's via three 40.8 kbs land lines. There was also a 1218 computer in Building 30 that drove all the big screen displays in Mission Control. I believe it interfaced with the 494's receiving satellite tracking data in real time and driving the big wall displays showing the satellite and a couple of track revolutions. I had two programmers and two engineers on a one-year contract that was extended several times. The Manned Spacecraft Center was south of Houston about 20 miles; chosen as the best location in the USA by Lyndon Johnson who was President at the time. The 'Campus' consisted of about 20 buildings of various sizes on about 100 acres. I recall that Vic Benda (subsequently helped start AIC) probably wrote most of the programs for the 418 II and Bob Malnatti helped design interface hardware between the two systems.

From Jerry Anderson: "In the mid 1970's, I sold heavily modified Univac 3760[3] communications computers to NASA NASCOM. These units replaced three UNIVAC 494s (two live and one standby) and a room full of multiplexers (probably 18 or so). Whereas the communication speed for the older equipment was 9.6 kbs, the 3760's could process at a breathtaking (56 kbs) and the footprint was a fraction of what had been in place.

This was a big deal for NASCOM in that the underlying software, operations, and maintenance protocols also changed significantly. UNIVAC managed all of the hardware and software integration as well as the implementation and it went really well. UNIVAC personnel also worked very closely with NASA engineers and operations persons throughout the entire process.

The UNIVAC Salt Lake City engineering team was extraordinary as was Nate McCawley of the software division (already under Contract to NASCOM). These changes modernized the operations and ultimately saved NASA lots of money. I hope that this helps. Since my neighbor was with NASCOM at the time, I checked with before drafting this message."

Editor:

Lowell A. Benson is a 1966 BEE graduate from the University of Minnesota. His UNIVAC positions started in 1960; from 1963 to 1966, he was a computer operator in plant 1 working with the 1004, 1206, 1218, 1219, 1232, 1240, CP-667, and SS-80. In 1994 UNISYS gave him opportunity to find other employment. He joined the VIP Club in 2002, elected to the Board in 2005 when he volunteered to co-chair the IT Legacy Committee. He started the vipclubmn.org web site in 2006 then began the 'Article for the Month' series in April 2007 [http://vipclubmn.org/documents.html#Articles.]

Thanks to all who have contributed to this article.

[3] The U3760 was a variation of the U1616 16-bit computer, both developed in St. Paul. It was the first UNIVAC/Sperry machine to incorporate an IBM byte-serial interface. The U3760 was superseded by the DCP-40 which used microprogramming techniques from the AN/UYK-20 16 bit computer.

Appendix A - 1218 Bootstrap to load from a paper tape.

d. MANUAL READING OF A PROGRAM. - At times it is necessary to inspect each instruction of a program or routine, displaying each instruction consecutively at a slow speed (STEP MODE). This may be performed as follows:

STEP 1. Place the SEQ STOP/STOP switch momentarily in the down position.

STEP 2. Push the OP STEP MODE button.

STEP 3. Place the MASTER CLEAR switch momentarily in the down position.

STEP 4. Set the starting address in the P register.

STEP 5. Place the RESTART/START STEP switch in the down position.

With STEP 5 completed the contents of the address which was placed in the P register will now be displayed in the Z register. The S register contains the address of the contents of Z and the P register contains S+1. The instruction in the Z register has not been performed at this time. When the start switch is again depressed the instruction in Z will be performed and the next instruction will be read. The computer stops with Z containing the next instruction, S containing the address of Z and P containing S+1. STEP 5 is repeated as many times as necessary to complete the program or routine.

3-4. WIRE MEMORY (BOOTSTRAP).

a. GENERAL. - The 1218 Computer has 32_{10} memory address locations (00200_8 through 00237_8) which contain the wired memory bootstrap program for an initial load or bootstrap program. The computer can have a bootstrap written for paper tape, magnetic tape, or Teletype. The following paragraphs describe the paper tape bootstrap as a typical example.

The wired load program provides the ability to enter an initial package of utility routines which may subsequently be used to enter and debug more sophisticated programs. These memory address locations have unique characteristics in that they operate in a special type of non-destructive read-out mode. They are not accessible to the programmer for store type instructions.

The wired memory bootstrap program first locks out all Interrupts then loads in the 1218 Utility Package. The utility package is formulated so that only the basic load routine is read into memory addresses 00240_8 through 00404_8 via wired memory load program. Control is then given to a temporary check sum verification routine of the utility package which verifies the basic load routine. A utility package routine then reads the balance of the utility package. If the check sum verification is incorrect, the computer will come to an unconditional STOP with AU equal to the tape check sum and AL equal to the load check sum.

b. OPERATING INSTRUCTIONS. - Instructions for the LOAD MODE and AUTOMATIC RECOVERY MODE are described below:

(1) LOAD MODE. - The load mode is used when the manual selection of the wired load program is desired and the computer is in the Master Clear state.

STEP 1. Place paper tape Utility Package in reader (assuming paper tape input).

STEP 2. Master Clear the computer.

STEP 3. Set the LOAD MODE selector button.

STEP 4. Depress START switch. If tape and load check sums agree the computer will come to an unconditional STOP with AU and AL cleared.

(2) AUTOMATIC RECOVERY MODE. - If a fault condition occurs during the running of a program and the AUTO RECOVERY switch is in the UP position, an interrupt will address 00200_8 (starting address of the wired load program). This locks out all Interrupts and initiates the wired load program which loads in the Utility Package. For paper tape input, the Paper Tape Utility Package must have been placed in the reader (may be positioned on any leader frame) for the recovery to be completed.

NOTE

A fault condition occurring during the running of a program with the AUTO RECOVERY switch in the NEUTRAL position, will cause a jump to address 00000. Action will continue as programmed.

c. WIRED MEMORY PAPER TAPE LOAD PROGRAM.

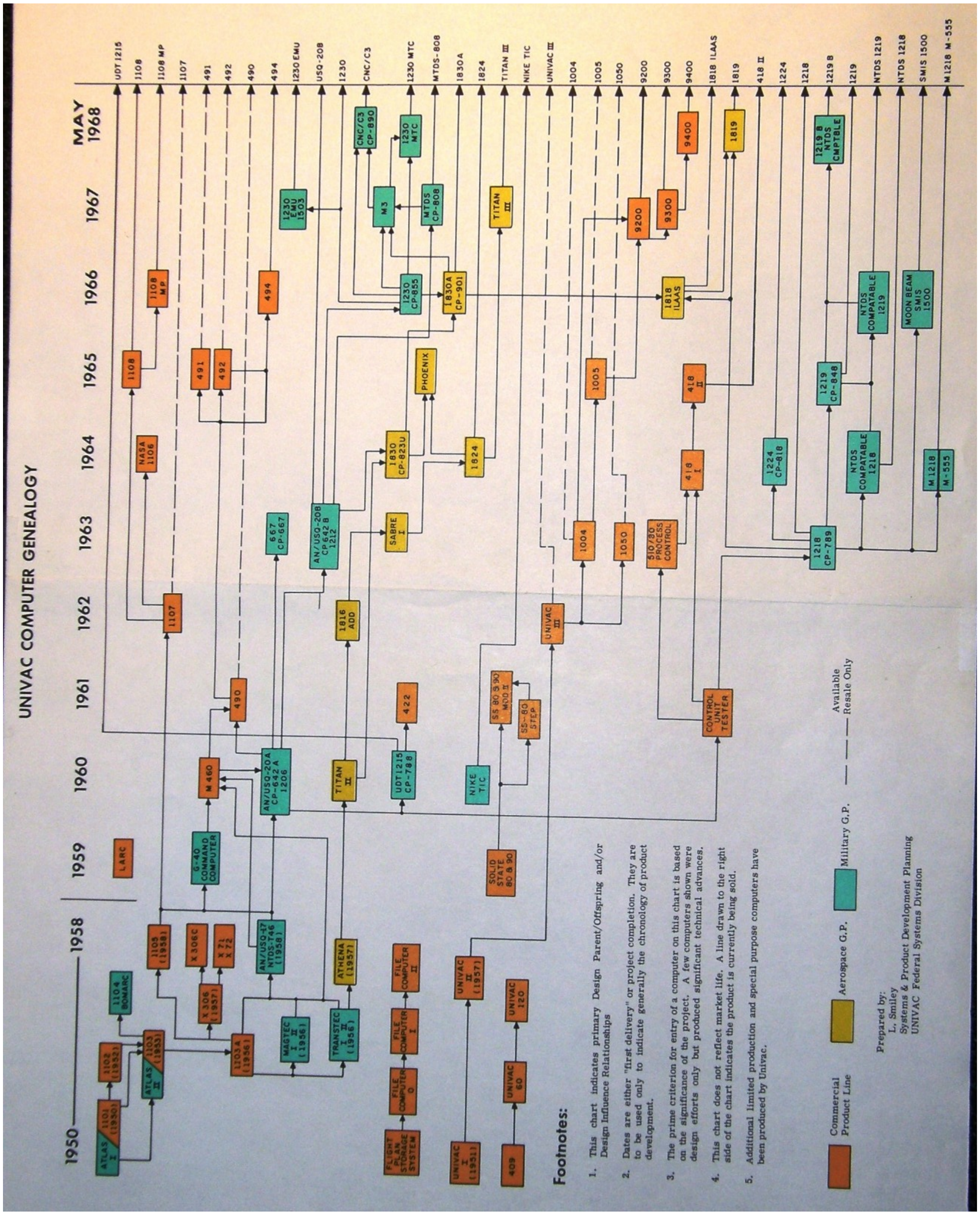
00200	50	3400	SIL 0	Lockout all Interrupts
00201	50	7310	ENTSR 10	Special Register Active-Stack 0
00202	50	7201	ENTICR 1	Set ICR
00203	50	13k	EXF k	Enable EF BUFFER (k is the channel number)
00204	00	0235	0 0235	Terminal Address Designator
00205	00	0234	0 0234	Initial Address Designator
00206	36	0000	ENTBK 0	Initialized word count
00207	42	0003	STRB 0003	Store current word count
00210	70	0002	ENTALK 2	Initialize character count
00211	44	0004	STRAL 0004	Store character count
00212	70	0000	ENTALK 0	Clear AL
00213	50	11k	IN k	Read a frame
00214	00	0002	0 0002	Data buffer
00215	00	0002	0 0002	Data buffer
00216	50	21k	SKPIIN k	Active check
00217	34	0216	JP 0216	Active

00220	50	4606	LSHAL 6	Assemble word
00221	51	0002	SLSET 0002	Enter character in A
00222	63	0225	JPALNZZ 0225	76 code found
00223	10	0003	ENTAU 0003	Anything in yet
00224	60	0213	JPAUZ 0213	NO - still leader
00225	57	0004	ISK 0004	YES - is word formed
00226	34	0213	JP 0213	NO - read rest
00227	45	0236	STRALB 0236	YES - store
00230	56	0233	BSK 0233	Load routine all in
00231	34	0207	JP 0207	NO - continue
00232	34	0240	JP 0240	YES - to Utility routine
00233	00	0147	0 0147	Number of words in load
00234	00	0151	0 0151	Start Reader, Enable Reader Disable Punch codes
00235	--	----	Not Used	
00236	--	----	Not Used	
00237	--	----	Not Used	
00001	00	0000	00 0000	B-register index reference
*00002	00	0000	00 0000	Data buffer
*00003	00	0000	00 0000	Word count
*00004	00	0000	00 0000	Character index

* These addresses (normally used as Index Registers) are used as temporary storage areas during the execution of store type instructions contained in the wired memory load.

{Editor's Note: that this bootstrap listing came from a bit savers web site document.}

Appendix B – 1968 UNIVAC Computer Genealogy Chart



Appendix C – SHIPBOARD UNIFORM AUTOMATED DATA PROCESSING SYSTEM[4]

The Shipboard Uniform Automated Data Processing System (SUADPS) serves as a good example of ADP systems used aboard ship. This ADP system is currently in use aboard carriers, tenders, AFSs, and repair ships. The system consists of a computer, an operating system, applications programs, and clerical procedures. The SUADPS was designed to satisfy afloat supply and accounting requirements through maximum automation of routine functions and at the same time provide a wide range of options that can be exercised at the shipboard level. All major files are maintained on magnetic tape, thus greatly reducing manual filing. Input is introduced to the system via the media of punched cards or magnetic tapes and now input from scanners may become possible. The computer system updates the appropriate magnetic tape files through a series of computer runs to reflect quantitative and monetary changes occasioned by the transactions processed. The computer produces outputs reflecting inventory balances, replenishment position, financial and accounting data historical data and exception data requiring supply personnel attention.

EQUIPMENT Shipboard ADP equipment that comprises the SUADPS is identified by both a military designation and a civilian designation. The complete computer system, consists of the components listed below, and carries the military designation AN/UYK-5(V). It is also commonly known by its civilian designation U-1500. When referring to the entire system or individual components m military communications, it is correct to use the military designation. The following equipments comprise the AN/UYK-5(V) computer system: CPU—The central processing point of a computer system. Electronically gathers the input data and produces output. MAGNETIC TAPE UNIT—A high-speed input and output device for the CPU. INPUT/OUTPUT TELETYPEWRITER—A low-speed input/output device for operator communication with the computer. CARD READER-PUNCH-INTERPRETER (CPRI)—Provides the required capability read, punch, and interpret EAM cards. HIGH-SPEED PRINTER-Primary means to of providing printed output from the system.

SUPPORT EQUIPMENT In addition to the primary AN/UYK-5(V) computer components for processing of data, the source documents (input) must be provided by keypunches and verifiers. In some instances interpreters and card sorters are required for off-line or auxiliary jobs (small things not controlled by the computer). This equipment is designated as support equipment. The information contained them is intended to familiarize you with the characteristics and purposes of the various types of support equipment and not to qualify you as an operator.

SYSTEM FILES The SUADPS is a uniform system among the various ship types (SUADPS-207 and SUADPS-AV (207)) in that common routine functions are performed the same manner, and the AN/UYK-5(V) (U-1500) computer system is used by all. There are three basic types of files maintained in the SUADPS: 1) tape files, 2) manual files, and (3) output files. However, system file names vary among the different ships. Certain magnetic tape files which are maintained in both SUADPS-207 (AD/AR, AS, AFS) and SUADPS-AV (207) (CVs, CVNs, LPHs, MAGs) segments are described in the online article.

[4] http://navyadministration.tpub.com/14242/css/14242_196.htm from John Westergren.