VIP CLUB
Established in 1980

CP-823/U Communications Log

INTRODUCTION

The following chronological entries document the communications triggered by Todd J. Thomas' July 24th message. Todd found a tidbit about the CP-823/U computer on the VIP Club web site. The following communications have dug deep into the memories of several retirees, thereby adding information about this early 60's computer. S/N 1 CP-823 had been stored for ~ 40 years! This investigation also identifies the UNIVAC 1020 as the CP-754/A. Ten days of rapid fire communications follow hereunder – a situation summary is at the end of this paper on page 19.

7/24/2010, 3:37 PM – T. J. Thomas to Lowell Benson

Hi: I found your email on the vipclubmn Legacy site. Very nice site. I was wondering if you would consider correcting a fact or two on the website if I can prove to you the information is in error. I was also curious as to why there is no information on, perhaps one of the most historically significant milestone computing systems - the Univac 1830, CP-823/U. Thank you for your time and I await your response, TJ Thomas

7/25/2010, 10:48 PM - Lowell Benson to T. J. Thomas

Mr. Thomas: We'd welcome updates or corrections to any of our web pages. The CP-823/U computer is mentioned in section 3.8 of our web site page, http://vipclubmn.org/CP30bit.aspx. If you have additional information to add, please send it to me.

- Why do you consider this machine to be historically significant?
- Did you work at Johnsville in the 60's?
- Did you know Roman Fedorak? Regards,

7/26/2010, 7:52 p.m. – T.J. Thomas to Lowell Benson

Hello Mr. Benson:

Yes I saw the mention in 3.8. I believe the first part, "CP-823 (TYPE 1830)" was referring to the failed attempt with the left-over ADD computer, A-NEW MOD1. The second part of 3.8 mentions the CP-823/U, A-NEW MOD3, but nothing about it. I believe the Univac 1830 CP-823/U is as historically significant as the Univac 1824; it was developed relatively at the same time and they shared many of the same parts. But which was finished first?

- For example: In the Memo, "Meeting Held In St. Paul 9 and 10 January 1964", besides the list of attendees, it includes a list of topics such as "6. Univac currently indicates a complete mod of chip packaging away from the M2 approach. Chips will lie flat on board instead of on edge. Heat will be dissipated via a copper sheet (a normal un-etched printed circuit board) rather than by aluminum heat sinks. This seems to reduce the heat problem as well as size and weight".
- Also, in a UNIVAC Intra-communication memo dated March 9, 1964, From: W.C. Nelson, Computer Engineering Dept. to M.R. Clement, Programs Management, CC: F.E. McLeod, R.P. Blixt, R.D.

Brattland: "FILM MEMORY: Arrangements have been made with the 1824 Engineering group to have the Avionics film memory be ordered, assembled and checked out by them and delivered to Computer Engineering for integration into the Avionics system. The film memory will be of the "A2" design which is similar to the existing 1824 computer memory. INPUT/OUTPUT: An initial order for CP-667 type cards has been placed for the I/O laboratory box. The order will be supplemented as the logic design is completed."

<u>Which leads me back a correction.</u> The Univac 1830 CP-823/U Serial A1 Memory is 32k or 28k core, not 16k core as on your website. The memory contains seven 4096 word core stacks and one 4096 word NDRO Thin Film stack. The seven DRO core stacks are surrounded by hundreds of Brundy packs; cordwood blocks. The memory unit alone weighs 120 pounds.

As you probably know, The CP-823/U Serial A1 Computing System is modular, another "historic" quality. The Computing System consists of: 1) Avionics Power Supply, 2) Central Processor, 3) Memory Unit, 4) Four identical Airborne I/O units, 5) Ground I/O unit (which contains 278 27-pin CP-667 cards).

The Processor and Airborne I/O units use 90-pin PC cards, many of which contain up to 64 10-pin flat packs each. I believe some are what your website refers to as "1824 chips". WS 279, WS 280, WS 281... The Processor alone uses over 2500 3-3 NAND gate and 170 4-2 10-pin flat packs. The NDRO Thin Film "Film Write" module also uses WS 132 chips.

To answer your last questions, no and no. Would you like a picture of the CP-823/U?

7/26/2010, 10:20 p.m. – Lowell Benson to T.J. Thomas

Mr. Thomas: First, I'm copying W. C. Nelson on my reply to you. To the best of my knowledge the other people mentioned in the 1964 memo, {copied in your previous message}, are deceased. If you have a photo of the CP-823, I'd appreciate receiving a copy. What is written on the web site is my recollections from 1966 when I was one of the logic designers of the 1830A (CP-901) computer. My recollection was that I'd been told that the processor unit contained 16k of memory and that expansion to 32k required a second chassis. Apparently my memory isn't correct – thank you for the correction.

You seem to have detail knowledge and some documentation – what is/was your source? Do you happen to know the whereabouts of the original unit? Regards,

7/27/2010, 6:55 p.m. – T.J. Thomas to Lowell Benson

"You seem to have detail knowledge and some documentation – what is/was your source? Do you happen to know the whereabouts of the original unit?"

I have all the original documentation; from the hand written engineering notes, to the detailed reports, to the hundreds of blueprints and pink sheet logic drawings, PC card assemblies, interface drawings. I also have the original unit(s); remember, it's modular, so they are all separate pieces of the Computing System. Give me a few days and I'll send a picture. I'm in the process of cleaning up the CP-823/U. I'm not a professional photographer, but I have an excellent digital camera. It takes huge pictures, 600kb (2300x1700). Can your email receive pictures this large? The detail is awesome if the picture is edited. Maybe you can talk to your

Board of Directors and see if they would like to free-up some dedicated server space. We could do a full page story with pictures.

I also offered some pictures to the National Naval Aviation Museum, since, without the CP-823/U prototype, there would be no CP-901 or P-3C Orion. I have not heard back from them.

Here's a brief list of documents, reports, memos... that I have to try and establish a timeline. These don't include the documents without dates or drawings:

TIMELINE OF UNIVAC 1830, CP-823/U DEVELOPMENT (PROJECT A-NEW Mod III) ESTABLISHED FROM THE FOLLOWING DATED DOCUMENTS IN MY POSSESION, May 29, 2010, T.J. Thomas

- Nov. 7, 1961- Memory Search Routine, ADD computer, Coding Forms, Coded by: Dan Brophy. (Routine's primary purpose is to expedite program debugging in the ADD computer).
- June 28, 1963- Report: Instruction Simulation for XN-1, A-NEW System, F.K. Lenker. (The ADD 1020 Instruction Simulator is a program which runs on a 1206 computer).
- Oct. 21, 1963- Final Report on Avionics Unit Computer Study (feasibility study of Avionics computer, for Navy Dept., Bureau of Weapons, NADC, contract N62269-2276).
- Jan. 9 & 10, 1964- Reports: Meeting Held in St. Paul (Attendees, Outline: Topics Discussed, Outline: Actions to Be Taken on Results of Meeting with Univac Personnel).
- Jan. 16, 1964- Memo: UNIVAC 1830 Unit Avionics Computer, (general proposed description).
- Jan. 30, 1964- Notes: Chip Count for Cards, Central Computer, H. Steinberg, (Notes, 2 pages).
- Feb. 17, 1964- Memo: Dynamic Diagnostic Maintenance Routine (a set of programmed tests of the 1830 computer presently under consideration).
- March 9, 1964- Memo: Progress Report, 1830 Computer Development, From: W.C. Nelson, Computer Engineering Dept., St. Paul. To: M.R. Clement, Programs Management cc: F.E. McLeod, R.P. Blixt, R. D. Brattland. (Equation files for logic simulation are being generated. Developing resistor and capacitor packages for logic modules. Contacted 1824 Engineering to build Film Memory Unit. Ordered CP-667 cards for lab box).
- July 30, 1964- Memo: Central Computer, Module Assembly Priority List, From: J.E. Rapinac, Avionics PERT dept. To: R.D. Brattland, cc: G.M. Bestler, F.E. McLeod, M.R. Clement, L.F. Nesler, H. Osofsky.
- Feb. 1, 1965- A-NEW Tech Note III-3A: 1830 Ground I/O Unit, A.R. Tossell.
- March 30, 1965- A-NEW Tech Note III-9: 1830 Bootstrap Routine and Utility Package Description, P.L. Youngner.
- May 21, 1965- A-NEW Tech Note III-2C: Central Processor to Memory Interface, R.F. McMahon.
- June 3, 1965- A-NEW Tech Note III-10: CP-823/U Central Processor Operation, J.C. Hartman.
- July 20, 1965- A-NEW Tech Note III-6C: CP-823/U (1830) Central Processor, A.R. Tossell.
- July 20, 1965- A-NEW Tech Note III-7A: CP-823/U (1830) Memory Unit, J.A. Anderson.
- July 27, 1965- Final Interface Test Specification: CP-823/U- Multipurpose Display Interface; DS8355 A-NEW 71003, Prepared by Systems Engineering; W.J. Schrag, Approved by R.P. Blixt.
- Aug. 18, 1965- Memo: +3 Volt, Airborne I/O Interface (covers interface characteristics of miniaturized airborne I/O system (1830).

- Aug. 31, 1965- Memo: 1830 Wire Tab Changes for Isolation Box Installation, From: Jim Ellsworth, ACD&D, St. Paul to Ray Szczech-Warminster, Pa.
- Sept. 16, 1965- Memo: 1830A Computer (pre-production description, 12 pages).
- Sept. 17, 1965- Notes: Logic Card Modifications, Air I/O (1 page).
- Sept. 19, 1965- A-NEW Tech Note III-4B: Interface: Central Processor Unit-Airborne I/O, R.F. McMahon.
- Oct. 28, 1965- Memo: CP-823/U Combined Power Supply, From: M.L. Buesseler, Avionics Dept. to F.E. McLeod, L.R. Wozniczka, (documentation of power supply performance, combined supply for Serial I CP823/U Computer, as observed during testing).
- Dec. 1, 1965- Report/Manual: Mod 3, Regulated Power Supply, A-NEW, Oscar A. Schott Co., Minneapolis, Minnesota, (covers installation, operation and maintenance of Regulated Power Supply, p/n 7901459-00).
- Dec. 14, 1965- Memo: Confirmation of Telecon - Air I/O Indicator Modification Required on Serials I & II, From: George Kydd, Univac, St. Paul To: J.A. Anderson, R.J. Szczech Univac-NADC Johnsville, Penn.
- May 13, 1966-Memo: 1830 Memory Stack Change of Delay Line Termination, From: R. Mattie, Aerospace Comp. Des. & Dev.; To: Jack Anderson, NATC, Jerry Butenhoff, Patuxent River, Maryland. cc: F.E. McLeod, R.L. Bowar, W. Schrag.
- June 16, 1966- Report: CP-823/U Reliability Improvement Report covering period April 18 through May 6, Prepared for U.S. Naval Air Development Center, Johnsville Pennsylvania, June 16, 1966. (17 pages, All Testing and Environmental Testing of Computer).
- July 7, 1966- Memo: Isolation Boxes Discrepancy Sheet, NATC, Pax River, MD.

7/27/2010 8:54 PM – Lowell to Jim Rapinac, Ray Bowar, Curt Nelson, John Hartmann, and George Kydd with cc to John Westergren, Harvey Taipale, Larry Bolton, and Quint Heckert

Gentlemen: Below my signature is a series of e-mail messages between myself and a TJ Thomas. Since your names are mentioned, I'd like your comments as I (we) document this piece of our Legacy.

As you read the messages, do you know of anyone else mentioned who is still 'with us'? Regards,

7/28/2010 10:25 AM – John Hartmann to Lowell and others.

Lowell et al, I was not associated with the CP-823/U or the 1830 or any of the avionics projects at Univac/Sperry or Unisys. I know a lot of the people involved but I was not one of them. The J C Hartman is not me, he is John C. Hartman and he is dead. I am John M. Hartmann please note that the middle initial is different in our names and John C. spells his family name with one n and mine is spelled with two (2) n's i.e. Hartmann. I knew John C. and yes there were two of us at Univac/Sperry and Unisys: John C. Hartman and John M. Hartmann. Sorry I can't help you out on this one. Yours, John M. Hartmann

7/28/2010 11:25 AM – Larry Bolton to Lowell and others

In the first e-mail below, there is the statement "The seven DRO core stacks are surrounded by hundreds of Brundy packs; cordwood blocks." In our hardware artifact collection are five such packs that we have

attributed to the CP-823/U computer. See my attached photo. I'm not sure if the triple-wide module was used in the memory or elsewhere. We also have several new unused Brundy headers used to form the mounting base of these modules (named Brundy because that apparently was the manufacturer of the headers. An apparently stylized 'B' shows on one of the items).

We believe there were two styles of these 'cordwood style' modules. An earlier version, we believe shown in some photos, was used in ADD and had pins on the bottom instead on the spring finger bolt-on header. The pins were either soldered in to a main board or were inserted into barrel style contacts. The spring finger bolt-on version that we have, we believe, was used by CP-823. Using the bolt on mounting certainly made replacement easier but I do have to question the reliability of such a single point contact to the board.

Our modules use mostly discrete germanium transistors. One has a hybrid device in a 10-pin TO-5 can and another has a newer 7901000 series monolithic microcircuit flat pack.

I don't know if the ADD modules were potted or not. The module with the aluminum case is fully potted. We also have one of these (not photographed) where an attempt was made to depot, presumably for failure analysis purposes.

Originally, we had no clue as to where these modules were used and no one I talked to could recall them. Then one day I was looking thru our document archive and came across a bulletin on the CP-823. That bulletin included diagrams clearly showing these modules and the fact, as stated below, that these were part of the memory. It also describes the microcircuit technology use in the processor as stated below.   Larry Bolton – Hardware Artifact Cataloger

7/28/2010 12:02 p.m. – Jim Rapinac to Lowell

Lowell; These names bring back a lot of memories. My entry was when I did the PERT planning for the CP832/U although I was transitioning to Avionics Marketing under Clem Clement who now lives in Maine and is about 87 years old. Unfortunately he is being treated for cancerous tumors but had been in excellent health until just recently.

As I recall, Brundy packs were used in the CP823/U core memory circuitry and were designed by Ray Bowar. This design had a high failure rate. The core stack designer put the diodes on core planes inside the stack. The diodes had a high failure rate and repair was tedious since the planes had to be disassembled to get to the failed diodes. The Printed circuit headers were supplied by Brundy.

I was also on the ADD program and the welded logic modules were potted. Regards; Rapp

7/28/2010, 9:27 p.m. – Lowell to Mr. Thomas

TJ: You indeed have a treasure trove of CP-823/U data. I can handle the photo size that you mention, however not more than three at a time. I've sent these e-mails to our VIP Club Legacy Committee; have received some additional comments which will be posted into section 3.8 of our 30-bit computer page this weekend when I do my monthly updates. I'll let you know when that update takes place.

Since I was a rookie design engineer on the CP-901, I do/did know most of the people whom are noted in the documents which you have. In addition to Curt Nelson, I've asked George Kydd, Jim Rapinac, John Hartmann, and Ray Bowar for their recollections. Most of the others, whose names are in the memos, are deceased.

We are in preliminary discussions with the Minnesota Air National Guard Museum about displaying artifacts in the future when they obtain a new museum building. If you tire of hanging onto the CP-823 hardware and documents, let us know before consigning it to the scrap heap. We've already sent two pallets of documents to the Charles Babbage Institute for use by researchers. Regards,

7/29/2010, 7:44 p.m. – Todd J. Thomas to Lowell

Lowell, I will send you some more pictures tomorrow (Friday) evening. I'll try to reduce the size also. I forgot to mention I also have the control console (maintenance panel). I call it a control console because that is what's on the drawings. I hope you will consider removing all of the first part of section 3.8. I know you wrote it, but it reads as if the Univac 1830 was a failure. Only the A-NEW MOD1 was a bust. I think that's what you recall. The CP-823/U was Univac 1830 was A-NEW MOD 3, as Mr. Blixt and Rapp wrote in the Systems/Airborne page. This is the system that the Navy tested extensively and tracked a submarine with.

Text and photo above by Todd Thomas.

Also, if you are interested in pictures, I have CP-667 type, 27-pin cards from the control console that contains 14-pin flat packs. Westinghouse 526 & 527 I believe. Here's a couple of pictures of the whole computing system and the 32k memory unit. I'll send more tomorrow night. Todd J. Thomas

*NOTE: This e-mail had the first five photos attached, one of which is inserted on the previous
page. Some of Mr. Thomas's photos are snapshots of document pages, others are of the
various computer units, others of specific printed circuit cards or nameplates.*

7/30/2010, 5:48 p.m. – Todd J. Thomas to Lowell

Lowell,

Here are some more pictures you may be interested in. They are in no particular order. I have tried to name them so they have a description.

I reduced the size of most of the pictures but left a few large in case you want to enlarge, crop...The control console, front view and the CP-823/U cabling diagram are large for detail purposes as is some of the memo copies. Use these as you will and feel free to give a copy of the memos to the authors. I don't have a pdf copier, so a photo will have to do.

The memo by Mr. Nelson is very discolored. I will send them in several emails. Let me know if you need a picture or close-up of a certain area and I will try to oblige. The same goes for any data you may require. The source control drawings are for the TI 14-pin flat pack on card 7070725-00. These cards replaced an earlier card. I think there's one in Airborne I/O Serial A4, 7017710-00 I believe. The 27-pin cards are definitely CP-667 type. I sent a picture of a 4224040-00 with hybrid 10-pin T05 cans and the same card (experimental) with Westinghouse 14-pin flat packs. Todd J. Thomas

NOTE: This e-mail had six photos attached.

7/30/2010, 5:51 to 6:15 p.m. – Todd J. Thomas to Lowell

NOTE: Seven e-mail messages received with 45 photos in total.

7/30/2010, 7:22 p.m. – Lowell to Rapp

Rapp: J.T. Thomas has started sending me photos of the CP-823 hardware and documents in his possession. It is so appropriate to forward you a document from 30 July 1964!

Mr. Thomas has a 'treasure trove' of items. My present intent is to compile his set of photos into a document which will become our web site September 'Article for the Month'. Regards,

*NOTE: There is some irony in that a 30 July 1964 memo by Jim Rapinac was sent back to him
on 30 July 2010!*

Document photo by Todd Thomas

7/30/2010, 7:37 p.m. – Lowell to Todd

Todd: Thanks for all the photos and document scans. In addition to doing an update to the web site, I think that I'll collect all of your photos and document scans into a single document - then post it as our September article for the month.

I notice that the running time meter on the 'control console' {panel photo} shows 8084.9 hours.

In addition to the hardware chassis, do you have any of the cables which would connect the chassis together? My guess is that the power supply requires three phase 220V 400hz power input versus land base 60hz 115V input. Regards,

7/30/2010, 7:44 p.m. – Lowell to John, Larry, Quint, & Rapp

John, et al. Here is the first set of photos, etc. from Todd Thomas. I don't know yet how he happened to get this 'historic' computer but I will find out soon. Regards,

7/30/2010, 7:55 p.m. – Todd to Lowell

Lowell, One of the emails should have a picture of a box of cables with the isolation boxes on the ends. There's probably 75 pounds of cable. Most are 90-wires. I can pull some out tomorrow and photograph. I've

been reading all the programming and testing notebooks for the CP-823/U. So much stuff. I'll get back to you tomorrow. Todd

7/30/2010, 8:26 p.m. – Rapp to Lowell

Lowell; My past has come back to haunt me. Where did you get this document? {Editor's note: *Referring to the 30 July 1964 memo.*}

The CP823/U Computer, which we called Black Beauty, was almost a disaster. The new design for the CP901 was a success. How did we maintain our sole source position on the P-3C computer production?

Simple, we controlled the 30 bit software, compilers and the operational program and NADC and Lockheed had no choice but to stay with Univac. Ciao for Now! Rapp

7/30/2010, 10:05 p.m. – John to Lowell, et al.

All: He must not be married or have an extremely understanding wife.

Paul Hove's son, Jeff, is collecting old computers. I believe he has a number of them including a UYK-20. He had asked about some documentation a couple of years ago which I provided. John

7/30/2010, 10:37 p.m. – Larry to Lowell, et al.

The neat part is the cordwood modules have part number 7017420 stamped on them. We have both a potted and un-potted version of this module in our collection. Larry

7/31/2010, 1:08 to 3:19 p.m. – Todd to Lowell

> *NOTE: Ten e-mail messages received with 47 photos in total.*

8/1/2010, 3:38 p.m. –Lowell to Todd

Todd: I have saved 102 images from 20 e-mail messages into my PC memory, does this agree with your 'sent' count? I have posted one of these photos onto our web site, section 3.8 of http://vipclubmn.org/CP30bit.aspx. I've also updated most of the text of that section, including a caveat that there is more information to come as I and others review the information which you've photographed for us.

I'll distribute this memo and some of the photos to the core members of our Legacy Committee. One of them was a component engineer for over 40 years, thus may be able to answer the resistor flat pack question.

In some previous Legacy communications {before our CP-823/U communications started}, Mr. Rapinac had informed me that the CP-823/U contract was $2M for the engineering and build of the one unit.

In the 1960s UNIVAC had a model shop that built most mechanical parts of prototype units. Our manufacturing organization also had a machine shop for small lot manufacturing of mechanical parts. Since the various I/O, memory, and processor chassis most likely used a lot of common parts – they were quite likely built in-house.

I also have a few questions for you:

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- Where was this computer system stored for 40 years?
- How did it come into your possession?
- Do you 'personally' own the CP-823 hardware and associated documents or does it belong to an organization for whom you work?
- Did you find any 'software' tapes [paper or Mylar or magnetic] within the documentation boxes?

Over the next month or so, I'll put together a 'report' using most of the photos you've taken. I'd appreciate it if you could make an editorial pass at such a report. Then we'll make a distribution to some of the UNIVAC old timers who worked in Johnsville (NADC) in the 60s to request comments and possible aircraft installation photos.

As our Legacy Committee co-chair, I'd like to thank you for bringing your CP-823/U information to our attention and for sharing it with us. Regards,

8/1/2010, 3:46 p.m. –Todd to Larry

Larry, Here's a few pictures of some of the seven 4096 DRO core stacks in the CP-823/U memory, (also contains one 4096 NDRO Thin Film Stack). Also a list of cordwood electronics used in the CP-823/U. The 7017420 is an Electronic Switch Block (150 used), 7017461 is a Logic Driver Block (30 used) and 7017425 is a Sense Amplifier Block (210 used).   BTW, the Memory Unit alone weighs 120 pounds. Todd J. Thomas

8/2/2010, 11:58 a.m. – Larry to Todd and Lowell

I am checking into the black flat pack question. Unfortunately, our hardware artifact collection does not include any 90 or 92 pin cards so I don't have those to go on.

I question the assessment that this is a resistor pack. The circled 2 is the identification used by Sprague. Although they did do resistors, they are more commonly connected with capacitors. The format of the part number you provided is more similar to that used for ceramic capacitors than resistors.

What is the size and number of leads on this device? I do have samples of dual ceramic capacitors in a black flat package measuring 0.25x0.3 inches and which have three leads (two on one end and one on the other). We also used a triple capacitor pack but that had four leads all in a row and stood up on edge on the card, not a flat pack. A resistor pack would likely have more leads. In the meantime, I am trying to track down the part number.

I notice on the parts list photo I was sent, there is a reference to a resistor flat pack with part number 7900632. I am trying to get a description of that with supplier part number to see if there is a match.

More later. Larry Bolton – Component Engineer, retired

8/2/2010, 6:53 p.m. –Todd to Lowell

Lowell:

The Univac 1830, CP-823/U was donated to Drexel University in Pennsylvania around 1970. I have a few notebooks from the early 70's documenting the daily operation of the computer and a list of some of the

students who operated it. (This would account for the high hours on the clock). The last entries were, I believe, 1973. Apparently headed for the scrap heap in the 70's, it was rescued by a graduate student who stored it until I recently purchased it from him. Yes I do own it. No software but several programming notebooks for Instruction Repertoire, Bootstrap, Service Library.

I sent a few items to Larry Bolton about the resistor flat packs. Here's an early preproduction description of the 1830A, and an unidentified 24-bit computer. Let me know if you need any additional information or photographs. Todd J. Thomas

> *NOTE: 13 photos attached to this message.*

8/2/2010, 9:58 p.m. – Larry to Todd, cc: Lowell
Great pictures.

You win. It is apparent from the photo that they are resistor packs. Also, 7900632 is the probable part number. Also, Halex and Sprague are apparently were both sources for this item. I will be able to verify this if I can get a copy of the spec next time I am in plant.

There appear to be four types of integrated circuits used, as you already know.

- 7900570 3-3 Gate, DTL, WS281, originally developed for an integrated circuit study (see the note at the bottom of the page showing processor chip counts versus card type)
- 7900616 2-4 Gate, DTL, WS279, developed for Avionics (reference to CP-823?)
- 7900617 3-3 Gate, DTL, WS280, developed for Avionics (reference to CP-823?), at this time I do not know the difference between this and 7900570
- 7901001 2-2-2-2 Gate, DTL, WS287, developed initially for CP-667, several other suppliers were eventually qualified for this item and usage on other computers continued well into the 1980s.

I find the parts list interesting in that several items appear to have dual drawing numbers. One is our procurement spec number. I do not recognize the other number. Thanks for sharing this information.

Larry Bolton

Larry,
Here are a few items for your evaluation. In the very large book of CP Module Maps, I sent you one page which is a map of a PC card (not the card shown); 8 rows of 8, as in the enclosed picture of the 90-pin card. This card also has a few Halex resistor packs, apparently replacements per the date code. The maps are marked 3-3 or 4-2 for the gates, "open" for empty and "res" for resistor packs. I also enclosed a chip count page for the Processor. There is a column for resistor packs. Also, possibly of interest, a parts list for the Current Regulator. Note the integrated circuit, logic gate, quad-2 input using DWG #7901001.

And one more item; I enclosed a Univac Tech Memo for a 24-bit computer: CP-754/A. Let me know if I can assist you further, Todd J. Thomas

8/2/2010, 10:06 p.m. – Larry to Lowell

I have received a few photos from Todd as well in discussing the modules, resistor packs, and integrated circuits. It appears you received quite a few. Do you think you have them all? Could Todd have sent me others or did he send me some he had already sent you? Do you want me to forward the ones he sent me and you can sort out the duplicates. Larry

8/3/2010, 8:46 a.m. –Lowell to Larry

Larry: I've now received 108 files from Todd. Please forward the ones which you've received and I'll merge with what I have. Then I'll burn all of them onto a discs for use at LMCO and CBI. I'll give a disc to Quint at the board meeting tomorrow – in addition to hardware photos, Todd has photographed quite a few document pages or covers.

I've also started a 'communications log' to consolidate e-mail text into one document. Thanks for looking at some of the part numbers of the CP-823.

I think that the CP-823 use of some of the CP-667 modules now explains why we couldn't directly track some IC use back to the CP-667 time frame.

Also associated with the CP-823 [some have called it Mod 3] apparently was a variation of the ADD 1000 which may have been labeled the ADD 1020 [either Mod 1 or Mod 2]. I think that this is another small track of history that hasn't been researched yet. Regards,

8/3/2010, 9:09 a.m. –Lowell to Legacy Committee, et al.

Greetings to the Legacy Committee:

Over the last two weeks I've exchanged numerous e-mails with Todd J. Thomas after he found the CP-823 mentioned on our Legacy web site. I'm now forwarding his most recent e-mail to all of you. He has sent 108 hardware and document snapshots which will take us some time to collate and digest. I've already used some of his information on our web site, look at section 3.8 of the 30-bit computer page.

My question to the committee is *"Is there anyone still around who worked with NADC in Johnsville between 1964 and 1970?"* I'd like to get his/her recollections to add to the history of this computer. A summation of this CP-823 communications, etc. will become either the Sept. or Oct. web site Article for the Month. Thanks, Lowell

"Lowell, The Univac 1830, CP-823/U was donated to Drexel University in Pennsylvania around 1970. I have a few notebooks from the early 70's documenting the daily operation of the computer and a list of some of the students who operated it. (This would account for the high hours on the clock). The last entries were, I believe, 1973. Apparently headed for the scrap heap in the 70's, it was rescued by a graduate student who stored it until I recently purchased it from him. Yes I do own it. No software but several programming notebooks for Instruction Repertoire, Bootstrap, Service Library.

I sent a few items to Larry Bolton about the resistor flat packs. Here's an early preproduction description of the 1830A, and an unidentified 24-bit computer. Let me know if you need any additional information or photographs. Todd J. Thomas"

8/3/2010, 9:14 a.m. – Curt Nelson to Lowell

Lowell, I found an old box of papers, etc., which I had forgotten and dug out some stuff which may be of help to you. Let me know if you want any of it.

- A copy of a technical paper by Bob Blixt called: A-NEW: A New Data Processing System. No date on it but presumed to be late 1963.
- Aviation Week publication reprint from July 8, 1963. Article is Navy Adopts New ASW Approach. Picture of the computer ADD 1020 with Cdr. Swenson.
- Picture as above but 8x11 size.
- Picture of ADD computer at a display site.
- Picture of block of components in welded package for ADD 1020.

My memory of all this is pretty hazy after nearly 50 years of decay! My excuse is that I turn 85 this month. I am continually impressed with your accomplishments in the VIP club---keep up the good work! Curt

8/3/2010, 12:23 p.m. – Rapp to Lowell

Lowell; There is a small enclosure on the top right side of the power supply. We called it a dog house. The designer couldn't fit all of the components in the case so he put them in the "dog house". I had to go to NADC and explain this design error to the customers. I can still hear their laughter!!!!! Rapp

CP-823/U Power Supply module photo by Todd Thomas

8/3/2010, 12:29 p.m. – Rapp to Lowell

Lowell; Some names of living people that worked at NADC or spent a lot of time there include John Markfelder, Tom Rougier, Ned Hunter, Gene McCarthy, and perhaps Tom Knops. They can also give you more names. Rapp

8/3/2010, 1:52 p.m. – George Kydd to Lowell

Hi Lowell. Yes, I was involved in the preproduction ADD 1020 project installed at Johnsville PA. As I recall: The processor was an extra or unused ADD computer from an Air Force program.

I worked the buffer memory unit that interfaced with the ADD computer to enable it to communicate with NTDS type peripheral equipment. It was installed in a hanger mock-up of the P3C aircraft in Johnsville (plywood panels were cut to resemble the aircrafts outer shape and no equipment was to protrude outside of them).

The processor was installed in June 19??, I installed the buffer memory unit the 4th of July weekend (there was an aircraft accident in the area and all the roads were closed so I had a difficult time getting to the site). The LORAL Corporation had the equipment inter-connect contract and was the main contractor that I interfaced with as well as the Navy.

After the CP901 was developed and delivered, I recall this computer was used as a preproduction unit for the Navy Submarine Service. Their production computers were cabinet remodeled CP901 computers.

The last I heard of the ADD 1020 was from a hospital in the Boston MA area where a doctor was using it to do some lab research. As I recall he contacted me about a burned out circuit component in one of the modules (as if I could remember if it was 100 or a 1000 ohms).

I have often wondered why this computer and the 24 bit Nike Zeus computer were not included in the Univac history. George Kydd

8/3/2010, 2:21 p.m. – Larry to Todd

I was in the plant today researching the 'resistor pack'. The official latest title for the 7900632 is 'Resistor-Capacitor 9 Element Network'. It contains eight 750 ohm resistors and one 0.005 uf capacitor. Pins are numbered 1-10, starting with pin one at the index mark and going counterclockwise. Pin 5 is the common pin. Pins 1-4 and 6-9 are via the resistors. Pin 10 is via the capacitor. When the item was obsoleted, there were three sources:

- Halex part number 100797
- Spraque part number 200C1100 (the 30Y699 shown in the photos is not mentioned so that is either some other marking or it was replaced for some reason)
- Mepco part number TM445-01

By the way, now that I knew it was a resistor pack, I did find two unused Halex parts in my parts drawer. I also looked into the difference between the 7900570 and 7900617 3-3 gate integrated circuits. Schematic is the same but the 7900570 uses 1K ohm bias resistors and the 7900617 uses 3K ohm resistors. The higher value resistors tend to slow the device down. The 7900570 has a prop time of about 20-25 nsec but the 7900617 has about 60 ns. I'm not sure why they wanted to slow it down. Maybe had to in order to save power for the airborne application. That's all. Larry

8/3/2010, 4:28 p.m. – Lowell to Curt

Curt: I would like to have the items which you mention, especially the info about the ADD 1020 and the Aviation Week item show the computer which led to the CP-823/U. I'm wondering if the UNIVAC type number 1020 is the unit which received the CP-754A nomenclature (see page scanned by Todd.) I'd also like to scan the photo with Cdr. Swenson. Thanks for your continuing support.
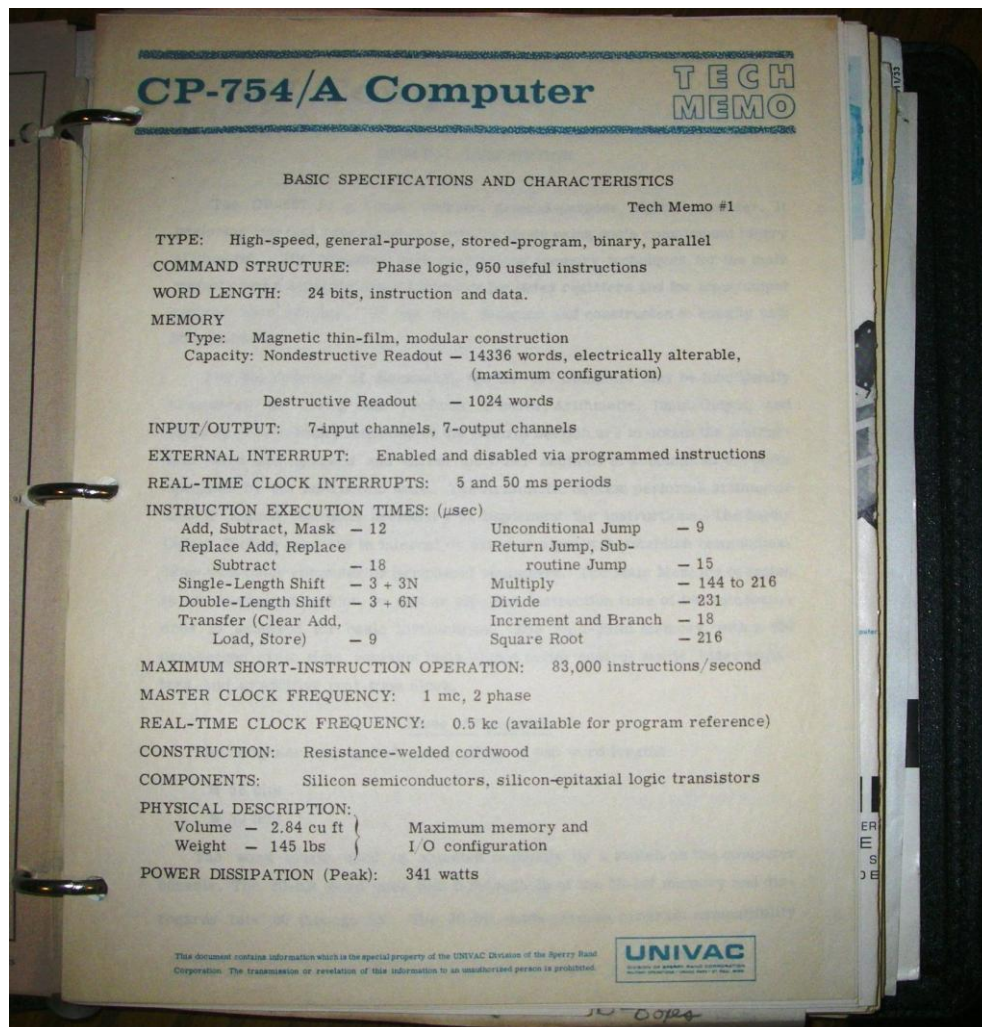
Document photo by Todd Thomas

8/3/2010, 4:28 p.m. –Curt to Lowell

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Yes, the CP 754A is the same as the ADD 1020 as in Bob Blixt's paper. I will put the items I have in the mail tomorrow. Curt

8/3/2010, 6:45 p.m. –Todd to Lowell

Lowell,

I contacted the man who stored and I acquired the CP-823/U from and asked him if I could identify him. After all, if he hadn't rescued it from the Drexel dumpster, it wouldn't exist now. He said he would be honored to be mentioned. His name is Sam Goldwasser. He is a laser guru and EE. He once "cobbled together a half dozen power supplies and had the Processor running loops out of the Control Console. All the lights blinking like a 1960's Sci-Fi movie". Our exchange: "Yes, please tell them and they can feel free to contact me if they like. Having this computer "live" again, if even on a Web site would be cool. Hey, maybe they'll help get it running again! :) Now I'll have to dig up the color slides I took of the console and CPU running. Might be faded by now though. "Custodian" of antique computer for around 30-40 years. :) And sure as heck, it would have ended up in the trash - no one at Drexel wanted it! P.S. Now hook up all the cables!!! --- Sam "

8/3/2010, 8:54 p.m. –Lowell to Todd

Todd: Thanks for information about the Drexel rescuer. Would you contact Sam, perhaps have him send me his e-mail address or relay these questions to him.

- When he had the unit running, were the power supplies laboratory bench supplies?
- Or did he provide AC power into the CP-823/U power supply conversion unit with dc voltages distributed to the processor, memory, console, and an I/O unit via the cables?
- What type of fan(s) and 'duct tape' sealed air flow pipes did he use?

Without either a positive or negative airflow, the units would begin to overheat in 20 to 35 minutes. It would take another 45 minutes for the chassis to cool back down to room temperature. Ambient air heat radiation from the metal chassis would not be sufficient to keep the internal components cool.

If you (we) could replicate that hook-up (the wiring diagram which you photographed seems to be relevant,) then we could possibly take advantage of the 'movie' inquiry copied below my signature. I think that it would be quite exciting to get this unit powered up and check to see if memory, processor, etc. still function.

FYI, I could probably create a small machine code program, load it into memory from the control console, then run it to make the control console lights blink in a variety of patterns. My UNIVAC/UNISYS career summary is in section 3.3 of http://vipclubmn.org/people1.aspx. Regards Lowell A. Benson - from my laptop, at cabin or traveling.

On **Wed, 7/14/10, Al Rollin >** wrote: Subject: FW: Retiree Inquiry
Date: Wednesday, July 14, 2010, 12:09 PM

Gentlemen,

Here is an opportunity to put an antique on display in a major movie. Let me know asap if you know of a working 1960's era UNIVAC> al Rollin

From: Gould, Georgie R. **Sent:** Wednesday, July 14, 2010 9:15 AM
To: Jerry Feldscher; Al Rollin **Subject:** Retiree Inquiry

Gentlemen, Unisys has received a request from the producers of an upcoming "Men in Black 3" movie for a working 1969 Univac model to use in the move. Any ideas who might have one? Please let me know.

Many thanks, Georgie

8/4/2010, 6:29 a.m. –John Westergren to Lowell

From: Garyld Harms recollections.
Sent: Tuesday, August 03, 2010 1:53 PM **To:** paul hove, Westergren, John H
Subject: Re: Fw: EXTERNAL: CP-823/U (1830 computer)

Paul, I don't remember any of my people working on the 1830. I think that was Harold Combs' bailiwick. Bob Hedlund might be a source of information. I knew the guy who was the EIC at Johnsville for many years but his name escapes me. If I can come up with it, I'll get back to you. Garyld

Ron Morris just popped into my mind but I'm not sure that's correct and I don't know his current whereabouts. I'll keep the wheels turning.

8/4/2010, 8:44 a.m. –Lowell to George Kydd

George: Great feedback, thanks. Why wasn't the ADD 1020 and NIKE-Zeus included in the 'web site history' - simple! When I created the web site, I wrote what I knew about the computers on a genealogy chart. As time has gone by, I've requested information from others as the processors or systems have popped up in communications. We still have a few 'sleepers' that need digging out of some people's minds. Thanks again, BEST REGARDS

## 8/4/2010, 6:53 p.m. –Sam Goldwasser to Lowell

Hi: Todd suggested I reply directly to you. I acquired the 1830 sometime between 1970 and 1980, shortly after it was given (unloaded!) to Drexel U. They had no interest in it and it was just taking up space in a teaching lab as I recall.
    I cobbled together a bunch of DC power supplies - bench supplies would be a generous description! Some as I recall I had to build from scratch due to the strange voltage requirements (fuzzy memory at this point) (perhaps HV for the neons).

    I only ever had the console and CPU running. I was told the memory did not work and didn't try it at all. (It was hard enough powering only the console and CPU!) I was able to execute loops out of the CPU registers, used the repeat instruction/function, etc.   The machine was never on for that long, so there was no separate cooling other than the top of the CPU box being open.   It was stored under conditions I have little doubt would allow it to come alive today.
Please feel free to email about anything else I might know (which perhaps isn't that much!) :)
Regards, --- Sam
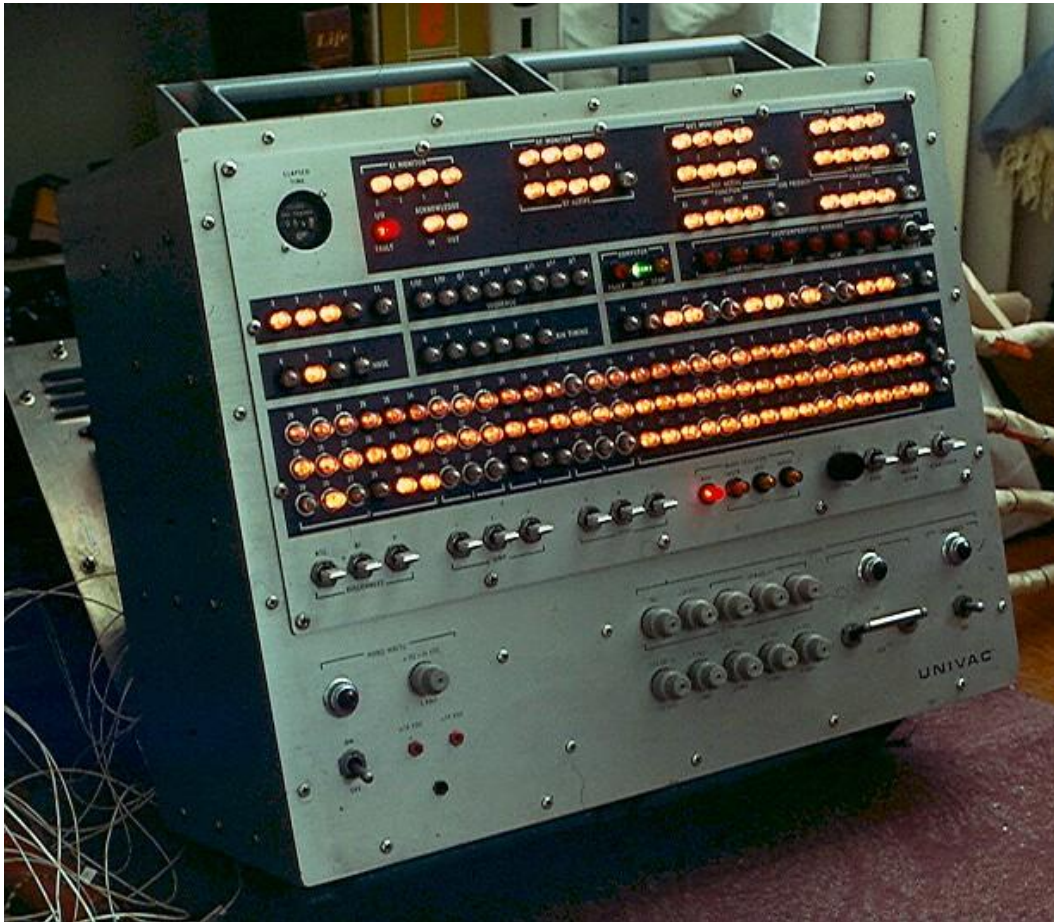
Console photo by Sam Goldwasser, circa 1972

8/19/2010, 7:44 a.m. –Lowell to Todd and Sam

Gentlemen: Attached for your perusal and comment is my 'comm log' associated with the CP-823/U as presently owned by Todd Thomas. Let me know if you spot any glaring errors. You'll note a two week lapse between the last message from Sam to me and this message. In spite of being retired, I've been up to my ears with several personal activities in addition to my volunteering. I and others have quite a bit of work yet to do with this piece of our computer industry history. This attachment is a 20 page document intended to be posted in 10 days as the VIP Club's web site 'Article for the Month' for September.
Thanks again for rescuing this computer from the scrap heap - maybe someday I'll be able to get to your place and put my fingers onto the console to enter a few instructions. Best regards,

SUMMARY

This sequence of e-mails has stirred the memories of several former UNISYS employees. This paper is being sent to a few more, looking for more data and recollections about the early UNIVAC operational support of the Naval Aviation Development Center (NADC).

Mr. Thomas' possession of an intact CP-823/U computer with module interconnect cables brings the hope that it could be somewhat operational again. Some garage shop work is needed to provide a cooling source

and proper input power to the power converter/distribution unit. For all of you readers who remember that 12 0 0 0 is a no-op instruction, stand by as I personally would like to punch in an ENT A or ENT Q instruction followed by a BJP or BSK along with a few other octal codes to get the machine to loop for trouble shooting!

This ten day communication sequence brought me two documents from Curt Nelson which describe: 1)"A NEW: a NEW DATA-PROCESSING SYSTEM" written by Bob Blixt and 2) a re-print of an article from the July 8, 1963 Aviation Week magazine. These describe ANEW as started at NADC in December 1962 including the initial system hardware (UNIVAC 1020, CP754A), various system operations, and a ground based support computer for post flight processing (UNIVAC 1206.) These will become the October and December 'Article for the Month.'

Photo from Curt Nelson

In the meantime, I and others will review the documents provide via digital photos by Todd Thomas, looking for other bits of history which led to the development of the CP-901 and its use as the premier Anti-Submarine Warfare processor from 1970 into the mid 00's.