



This is a brief report on the Vintage Computer Festival (VCF) West XII from the IBM 1620 Jr. project's perspective.

## VCF West XII

Started by Sellam Ismail in 1997 and taken over by the Vintage Computer Federation in 2015, the VCF brings together a wide range of people who have a strong interest in “vintage” computers. In this context, “vintage” roughly means 1960 – 1980 machines, not what the CHM considers vintage. This year VCF was again held at the Computer History Museum (CHM) on Saturday, August 5<sup>th</sup> and Sunday, August 6<sup>th</sup>. Almost 700 people attended. The website for VCF West is: <http://vcfed.org/wp/festivals/vintage-computer-festival-west/>

VCF West XII included:

- Twenty-seven exhibits by individuals, groups, and organizations. In general, the majority of artifacts in each exhibit were up-and-running.
  - Current state of the art in Apple II – Lester Barrows
  - Newbear 77-68 – Simon Wynn
  - Playing Adventure on IBM 5150 – Tim Conrad
  - New hardware and obsolete software – Bradley Grantham
  - The MOnSter 6502 – Eric Schlaepfer
  - The First Practical Chess Computers – Cole Erskine
  - Classic Atari Computers – The San Leandro Computer Club
  - Cray SuperComputer – Tony Cole
  - Home Computer Games! – The Museum of Art and Digital Entertainment
  - Vintage Toys & Noise – Michael Hill
  - The Amazing Commodore Amiga 2000 – Bill Borsari
  - Retro Battle Royal: Amiga vs Atari – Bill Borsari
  - Tek Graphics and Apple LISA – Lyle Bickley & Bob Rosenbloom
  - The Apple Network Server – Cameron Kaiser
  - The IBM 1620 Jr. – The IBM 1620 Jr. Team
  - Rare Computers from Japan – Duncan MacDougall
  - Boot bytes for notes – Jeff Albrecht
  - How to diagnose and Repair a broken KIM-1 – Dwight Elvey
  - Xerox Alto – The Living Computer Museum
  - From MIKE 3 to Ferguson Big Board – Larry Pezzolo
  - Wild Micros at the I/O Corral – David Henderson
  - SDF Public Access UNIX System – Stephen Jones
  - Multics – Jeff Kaylin
  - Southwest Technical Products Corp. – Michael Holley
  - Floppy Disks – Foone Touring
  - The Proto Preserve – Hap Plain
  - CHM – CHM Volunteers
- Eleven talks, panel sessions, and CHM demos.

- State of the Computer History Museum – Dag Spicer
  - IBM 1401 Demo
  - Early Apple - Bruce Damer, Paul Laughton
  - “Medium iron” restoration panel – Lyle Bickley, Ken Sumrall, Joe Fredrick, Carl Claunch, Ed Thelen, Robert Garner, Pat Buder, Marc Verdiell
  - Resurrecting Habitat, an early graphical MMO – Chip Morningstar, F. Randall Farmer
  - PDP-1 Demo
  - Early Commodore panel – Chuck Peddle, Leonard Tramiel, Bill Herd, Yash Terakura
  - My first experience using KiCad – Dwight Elvey
  - Xerox Alto restoration panel – Ken Shirriff, Carl Claunch, Luca Severini, Marc Verdiell
  - Xerox Alto PARC panel – John Shoch, Dick Lyon, Geoff Thompson, Dan Swinehart
  - Before you turn it on: Initial system debugging – Lyle Bickley
- A consignment area where a wide variety of old machines, software, books, and miscellaneous items was available for purchase.
  - A set of judged awards and a people’s choice “Best in Show” award. This year’s judges were Daniel Kottke, Mitch Waite, and Chris Garcia.

## IBM 1620 Jr. Exhibit

In mid-June, the IBM 1620 Jr. team decided to exhibit at VCF West in whatever state the machine was in by then.



The exhibit consisted of:

- The functionally complete IBM 1620 Jr. front panel with a Raspberry Pi 3B and three daughterboards driving all of the LEDs, toggle switches, and buttons.
- An IBM/Lexmark Wheelwriter 1000 typewriter with breakout board, on static display.

- A partially complete, cycle-level simulator able to run the demo program.
- The IBM 1620 “Power of 2” demo program.
- A 2.8’x4’ display board with key project information.
- An “IBM 1620 Data Processing System” nameplate on top of the cabinet.
- A “Project Notebook” containing the project description, status reports, design notes, schematics, software listings, a listing of the software library, and two IBM 1620 reference manuals.
- The book “Programming the IBM 1620” by Clarence B. Germain.
- A vintage photo of the IBM 1620 in operation and the IBM 1620 “Blueprint” ad.
- A set of old and new toggle switches.
- A signup sheet for visitors to leave comments and/or sign up for email updates on the project.

Steve, Joe, and Dave manned the exhibit on Saturday and Sunday, 9am to 6pm both days. There was always at least person manning the booth, but usually two or all three were there. That proved very helpful because there were often several people / groups at the exhibit at the same time with different levels of understanding and questions.

The judges awarded the IBM 1620 Jr. exhibit First Place in the Mainframes & Minis category.



Here are links to some videos of the event:

- <https://youtu.be/qnjtna0tRhg?t=13m34s> IBM 1620 Jr overview
- <https://youtu.be/qnjtna0tRhg?t=21m32s> Mainframe & Minis award announcement
- [https://youtu.be/e4JH26yF\\_u0](https://youtu.be/e4JH26yF_u0) IBM 1620 Jr – Power of 2 demo program
- <https://youtu.be/mEpyAzVdw5w> IBM 1620 Jr – Lamp/Switch test
- <https://youtu.be/dRLVOxTcIzw> IBM 1620 Jr – IBM 1620 in lights
- <https://youtu.be/GXIENtEGhEA> IBM 1620 Jr – Snake lights

The team plans to exhibit at VCF West XIII, August 2018, a fully functional simulator, an operational console typewriter, and the ability to run IBM diagnostics & vintage software from the Maniotes collection. It is unlikely that a fully operational card reader/punch unit will be ready by then, but some demonstrable functionality should be.

## Comments and Feedback

The most valuable part of exhibiting at VCF was all of the conversations with visitors. Most attendees had never heard of the IBM 1620, but were curious. Some had vague knowledge of the machine and wanted to know more about it. A few people had used the system “back in the day” and were excited to see it running again. Some of the best comments and suggestions came from CHM staff and restoration volunteers.

In no particular order, here are some of the key comments, feedback, and additional thoughts:

- The most common adjectives used were “wow”, “amazing”, “fantastic”, and “incredible”. Some people were describing the IBM 1620 Jr. itself and others the effort that’s gone into creating it.
- Different aspects of the IBM 1620 Jr. seemed to appeal to different people. Most were taken by the 100’s of blinking lights, toggle switches, and push buttons used to operate the machine. Some were more interested in the electronics of the original machine and/or the Raspberry Pi implementation. Many were fascinated by the 1620’s use of variable-length, decimal arithmetic via add/multiply-table lookup. Some couldn’t believe that one could do real computing on such a slow, limited-memory computer.
- Four visitors said that they own IBM 1620 front panels and would like to duplicate what’s been done with the IBM 1620 Jr. Bob Rosenbloom [vintage computer collector and builder of an FPGA-based IBM 1130 replica] plans to try designing an FPGA to mimic 1620 code execution. The project team intends to make all of the information on Jr. [designs, schematics, circuit board layouts, software, etc.] publicly available.
- David Wise [CHM IBM 1620 Restoration Team and owner of the only operating IBM 1620 in the world] asked via email whether Jr. was mimicking the 10 Hz flicker in the control lights. It is not [currently] because the team didn’t remember this detail of the machine and it’s not explicitly described in any of the IBM documentation.
- One former IBM 1620 user commented that Jr. was too quiet. Where is the fan noise of the real machine?
- Ed Thelen [CHM IBM 1401 Restoration Team] was astonished and excited to see the IBM 1620 Jr. Based on other similar comments, it seems that the project is generally unknown to CHM staff and volunteers. Ed made the great suggestion that the back of the case be clear plastic so that interested people can see inside.
- Three people were specifically interested in the project’s display board – content and layout. One took a picture of it and the other two asked to be sent the PDF file. They want to do something similar for their projects.
- Chris Garcia [CHM Curator and VCF West judge] was very excited about the project overall and its value to the museum. A no/low-maintenance, long-life, robust system for hands-on use by visitors to experience what vintage computing was like in the 1960’s, is a new category of device. He felt the term “re-creation” best fits what the IBM 1620 Jr. is. He thought that the education department could use it in a number of different ways. It could also be used to satisfy a recent request he had from the Baseball Hall of Fame – a film showing the IBM 1620 Baseball Simulation Program in action.
- It became clear that more graphics are needed to clearly explain the IBM 1620’s architecture, particularly how it does variable-length, decimal arithmetic. Arm-waving only goes so far to describe it.
- Several visitors were very interested in the plans for the console typewriter. They asked if it could be adapted to mimic a Teletype KSR-33. With the addition of RS-232 and/or current loop interface(s) and some firmware changes it could be. By adding two USB slots, it could also emulate a Teletype ASR-33 using USB memory sticks in-lieu of paper tape. A member of the CHM PDP-1 Restoration Team asked if it might be used as the PDP-1 console typewriter. It could with appropriate firmware changes and the correct interface.

- Twenty-four people signed up to be added to the mailing list for future project updates.
- Two people volunteered to help with the project.
- One heavy user of the IBM 1620 stopped by at least 5 times on Saturday to talk. He had programmed four different 1620 systems and asked lots of questions about the project. He questioned the decision to replicate an IBM 1620 Model 1 Level F punched card machine – he feels that the Model 2 was a much better and more interesting computer. For background, the primary reasons for the machine chosen were:
  - The CHM's restored IBM 1620 is a Model 1 Level F punched card machine. The IBM 1620 Jr. is meant to be an offspring of that system. The team has more experience and documentation for that computer.
  - The Maniotes software collection was from an IBM 1620 Model 1 punched card installation. While the Model 2 could run all of that software, none of it made use of the Model 2's special features.
  - The spare front panel was from a Model 1 Level C paper tape machine. Relatively few labelling additions are needed for a Model 1 Level F punched card system. To replicate a Model 2 front panel would require completely relabeling the two left-most, upper panels plus some changes to most of the other upper panels.
- Robert Gardner [CHM IBM 1401 Restoration Team] spent time discussing the project and was impressed with what's been done to-date. He expressed concern that younger visitors might quickly get bored with blinking lights, toggle switches, push buttons, and a console typewriter. He suggested connecting a physical Logo "turtle robot" to the machine whose motion could be controlled by the 1620. The Logo computer language was created in 1967, but the physical "turtle robot" was introduced later. No version of a Logo system is known to have been written for the IBM 1620. However, his suggestion of having some physical object controlled by the computer, besides the typewriter, is good. What was authentic to the IBM 1620 was the IBM 1627 Plotter. Two such plotters were purchased for the IBM 1620 Restoration Project, but were never refurbished. Perhaps in a later phase of the IBM 1620 Jr. project, one of the plotters could be restored and added. It is a simple, low-maintenance device although additional supplies [paper and pens] would be needed.
- Terry Walker came by the booth to reminisce about the IBM 1620 and donate a copy of the output of a slot machine program written by fellow students at University of Texas, Austin. He doesn't have the program, source or object, but felt that it would be easy to re-create given the output. Program switch 1 was used to "pull the handle". A random number generator which incremented the wheel positions ran as long as the switch was on. When the switch was turned off, the program would print a random witty remark, unless program switch 2 was on. Finally, it would print what was showing on each wheel, the player's gain or loss, and his new total. Some of the remarks were "off color" and could be excluded if program switch 3 were on.
- One visitor, who had used an IBM 1620 in the late 60's, asked about the music program. This was an iconic program for the IBM 1620 where a transistor radio was placed on top of the 1620 cabinet, tuned to dead spot on the dial, and music could be heard. The RF transmission was a by-product of the magnetic core memory in the 1620. The IBM 1620 Jr. can't reproduce this for the same reason that the museum's restored 1620 can't – there is no operating core memory. However, Peter Sampson [CHM PDP-1 Restoration Team] wrote his own music program for the restored IBM 1620 that could play music through a speaker connected to one of the front panel display lights. This

special wiring was a non-standard, user-modification to the museum's IBM 1620 done by its original owner. With a modification to the simulator program to toggle the Raspberry Pi's audio circuit when specific front panel lights are lit, the IBM 1620 Jr. could run Peter's music program.

## Next Steps

In general, the project will proceed as currently planned. Development of the simulator will continue. The console typewriter will be designed, implemented, and integrated. The software library will be converted, organized, and tested. The website will be created and populated with information about the IBM 1620, the IBM 1620 Restoration Project, and the IBM 1620 Jr. Project. The creation of a card reader/punch unit will begin.

There will be several modifications and possible future additions to the plan based on VCF feedback:

- The email list for project status reports will be updated. The PDF file for the display board will be sent to those who requested it. Design information, schematics, and daughterboard layout files will be sent to the IBM 1620 front panel owners. The people who volunteered to help with the project will be contacted.
- A clear plexiglass back will be added to the cabinet.
- A 10 Hz flickering of the control lights will be added to the simulator. "Fan noise" will also be added.
- When designing the adapter board for the console typewriter, consideration will be given to adding additional interfaces and code to support other uses of the device.
- The changes needed to run Peter's music program will be added to the task list.
- Adding an IBM 1627 Plotter to Jr. will be added to the futures list.
- Exhibiting at VCF West XIII (2018) will be added to the schedule.
- Priority will be given to being able to run the IBM 1620 Baseball Simulation program sooner rather than later.