

AccessionIndex: TCD-SCSS-T.20211003.001

Accession Date: 3-Oct-2021

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Object name: DEC PDP 11/34

Vintage: c.1976

Synopsis: Rackmountable minicomputer with octal keypad. Model: 11/34A DC, S/N: AG18812.

Description:

Digital Equipment Corporation's PDP-11 family [1], designed by Harold McFarland, Gordon Bell, Roger Cady, et al, became their signature products, highly popular 16-bit minicomputers, [2] [3]. The most memorable features of the architecture were memory-mapped I/O, the register set of six general-purpose registers R0-5, the stack pointer SP and the instruction pointer IP. From the 2nd-generation PDP 11/45 there were dual register sets that supported Kernel, Supervisor and User privilege levels. Most models were able to run the DOS-11, RT-11, RSX-11, RSTS and MUMPS operating systems.

Trivia1: The PDP 11/34 is a direct descendant the PDP 11/15 and 11/20:

- *The PDP 11/05 was an inexpensive (and slow) successor to the PDP 11/20.*

- *The PDP 11/34 was a successor to the PDP 11/05.*

Trivia2: A visual guide to the difference between the 11/04 and 11/34 is shown in [4]

Trivia3: The PDP 11/34 console used an Intel i8008 microprocessor with 1kB of ROM

The 11/34 CPU (KD11-EA) was implemented over two hex-size boards. It had unique MTPS and MFPS instructions, semiconductor memory with 18-bit addressing. Its performance was about 0.13 MIPS. It evolved to an 11/34A to be compatible with an optional bit-slice FPU using 16 x Am2901. A later 11/34C version included a CPU cache; ironically, the CPU clock was slowed to accommodate the cache timing. An optional quad-size card could be added to run a seven segment display and keypad Programmer's Console [6]; this was a very widely purchased option, see Figs.1 & 2.

This item's rackmountable BA-11L CPU chassis contains a 5" 9-slot 'vertical' *Unibus* cardcage (i.e. the backplane is vertical and the boards plug in horizontally). The *Unibus* [5] was an asynchronous bus with 18-bit address and 16-bit data designed c.1969 by Gordon Bell and Harold McFarland. All DMA I/O devices used the *Unibus*, employing memory-mapped I/O registers in the top 8kB of address space.

Warning: this chassis has a H775 115VAC power supply !!!

The individual cardcage slots are in six segments, so cards of single, double, quad or hex width can be accommodated. This 11/34 contains only six modules, but a handwritten label on the chassis indicates it had contained the nine modules listed in the following table. Note that the module "M7840 ARU module?" has not yet been identified from extant DEC listings of modules. Possibly it was an arithmetic unit, but the standard 11/34 floating-point arithmetic module was an M8267 FP11-A Floating Point Module. Alternatively if the digits were mis-read it may have been an M7846 RX11 RX01 floppy disk drive controller.

Slot	Type	Width	S1	S2	S3	S4	S5	S6	Comment
1	M8266	hex	=====M8266=====						KD11-EA CPU datapath module
2	M8265	hex	=====M8265=====						KD11-EA CPU control module
3	M7840	hex	=====M7840=====						M7840 ARU module?
4	M9312 M7859	double quad	=M9312=		=====M7859=====				M9312 bootstrap ROM KV11-LB interface to Programmer's Console
5	M7891	hex	=====M7891=====						M7891-DA MS11-LD 128Kx18 MOS memory
6	M7219	hex	=====M7219=====						M7219 Parallel interface
7	M7762	hex	=====M7762=====						M7762 RL01 interface
8	M7856	quad			=====M7856=====				M7856 Serial I/O (TT0) and Realtime Clock
9	M9302 M8256	double double	M9302		Grant		M8256		M9302 Unibus terminator module M8256 RX211 (RX02) interface

It is hoped the preservation of this item will aid the preservation of another PDP 11/34 in this collection, the TCD Library's first dedicated computer system, in which the chassis exterior panels and slider mechanism are now badly corroded, and need urgent rust control treatment to prevent further deterioration, see elsewhere in this catalog.

For useful guides to resurrection of a PDP 11/34 in a 5" *Unibus* chassis see [6], [7], [8], and for a 10" *Unibus* chassis, see [9], and to recognise chassis or boards see [10]. Also see the documents [11], [12], [13] in the related folder in this catalog.

Many thanks to Doug Leith for donating this item.

The homepage for this catalog is at: <https://www.scss.tcd.ie/SCSSTreasuresCatalog/>
 Click '*Accession Index*' (1st column listed) for related folder, or '*About*' for further guidance.
 Some of the items below may be more properly part of other categories of this catalog,
 but are listed here for convenience.

Accession Index	Object with Identification
TCD-SCSS-T.20211003.001	DEC PDP 11/34 Rack Unit. Rackmountable minicomputer with octal keypad, Model: 11/34A DC, S/N: AG18812. c.1976.
TCD-SCSS-T.20150615.001	DEC PDP 11/34. Rackmounted minicomputer with octal keypad, with RL01 disk drive and LA36 DECwriter printer, from the first dedicated TCD Library computer system, S/N: ??? . 1976.
TCD-SCSS-T.20150615.002	DEC PDP 11/24. Rackmounted minicomputer, with associated cartridge disks and documentation. S/N: ??? . c.1981.
TCD-SCSS-T.20151118.003	DEC PDP 11/84. Late model of the popular PDP-11 series made by DEC, with two RL02 disk drives and THR7000 external drive unit. S/N: ??? . c.1985.
TCD-SCSS-T.20151118.004	DEC M792E Unibus Boot ROM Board.Early diode-array ROM for booting the popular PDP-11 series made by DEC. Date-stamped 18-Sep-1974. c.1974.
TCD-SCSS-T.20191104.002	DEC MINC-11 laboratory minicomputer. Lab computer plus instrument chassis successor to the original MIT LINC, Model: MINC11-AB, CAB 0, S/N: WF05524. c.1981.
TCD-SCSS-T.20121208.036	DEC VAX 11/780 LA120 Console Processor. LSI-11 based PDP11 console processor from VAX mainframe used by Dept.Computer Science from 1979-1988. c.1978.
TCD-SCSS-T.20191104.001	DEC PDP-8/e minicomputer, c.1970, hardware: Legendary 12-bit minicomputer.
TCD-SCSS-T.20191108.001	DEC PDP-8/I replica front panel.PiDP-8/I, modern replica of the PDP-8/I minicomputer front panel, with emulation by a Raspberry Pi. c.2019.
TCD-SCSS-T.20191108.002	DEC PDP-11/70 replica front panel.PiDP-11/70, modern replica of the PDP-11/70 minicomputer front panel, with emulation by a Raspberry Pi. c2019.

References:

1. Wikipedia, *PDP-11*, see:
<https://en.wikipedia.org/wiki/PDP-11>
Last browsed to on 30-Aug-2017.
2. Computer History Wiki, *PDP-11/34*, see:
<http://gunkies.org/wiki/PDP-11/34>
Last browsed to on 10-Jun-2018.
3. Computer History Wiki, *PDP-11 Variations on a Theme*, see:
<http://s3data.computerhistory.org/brochures/dec.pdp-11.1977.102646131.pdf>
Also see: <https://www.scss.tcd.ie/SCSSTreasuresCatalog/hardware/TCD-SCSS-T.20191108.002/DEC-PDP-11-1977-102646131-brochure-OCR.pdf>
Last browsed to on 16-Dec-2021.
4. EEVblog Electronics Community Forum, *Digital Equipment Corporation PDP11/04 & PDP11/34 Minicomputers - Teardown*, see:
https://www.youtube.com/watch?v=3YK2nhc_kUw&feature=emb_imp_woyt
Last browsed to on 16-Oct-2021.
5. Computer History Wiki, *Unibus*, see:
<http://gunkies.org/wiki/UNIBUS>
Also see: <https://www.scss.tcd.ie/SCSSTreasuresCatalog/hardware/TCD-SCSS-T.20191108.002/ComputerHistoryWiki-UNIBUS.pdf>
Last browsed to on 10-Jun-2018.
6. EEVblog Electronics Community Forum, *Digital Equipment Corporation PDP-11/04 & PDP-11/34 Minicomputers - Teardown*, see:
<https://www.eevblog.com/forum/vintage-computing/digital-equipment-corporation-pdp-1104-pdp-1134-minicomputers-teardown/>
Last browsed to on 16-Oct-2021.
7. EEVblog Electronics Community Forum, *Digital Equipment Corporation PDP-11/04 H777 Power supply testing*, see:
<https://youtu.be/MpV6pyaxZ6M>
Last browsed to on 16-Oct-2021.
8. EEVblog Electronics Community Forum, *DEC PDP11/34 Power Supply Check, Fix & Test, plus some Tips*, see:
<https://www.youtube.com/watch?v=ZkTM2mcPnRk>
Last browsed to on 16-Oct-2021.
9. PWJ26, *Inside a DEC PDP 11/34 computer from 1978*, see:
<https://www.youtube.com/watch?v=ywdSmEXIFX8>
Last browsed to on 16-Oct-2021.
10. J. Noel Chiappa, *Digital Equipment Corporation PDP-11 Recognition*, see:
http://ana-3.lcs.mit.edu/~jnc/tech/pdp11/PDP-11_Models.html
Last browsed to on 16-Oct-2021.

11. SCSS Treasures Catalog, *PDP-11/34 System User's Manual*, see:
<https://www.scss.tcd.ie/SCSSTreasuresCatalog/hardware/TCD-SCSS-T.20191108.002/PDP1134-SystemUsersManual-OCR.pdf>
Last browsed to on 7-Nov-2024.
12. SCSS Treasures Catalog, *Spare Module Handbook*, see:
<https://www.scss.tcd.ie/SCSSTreasuresCatalog/hardware/TCD-SCSS-T.20191108.002/DEC-Spare-Module-Handbook-Mar76.pdf>
Last browsed to on 7-Nov-2024.
13. SCSS Treasures Catalog, *PDP11 Unibus Design Description*, see:
<https://www.scss.tcd.ie/SCSSTreasuresCatalog/hardware/TCD-SCSS-T.20191108.002/DEC-Unibus-Specification-1979-OCR.pdf>
Last browsed to on 7-Nov-2024.



Figure 1: DEC PDP 11/34, front panel.



Figure 2: DEC PDP 11/34, keypad closeup.



Figure 3: DEC PDP 11/34, as delivered.

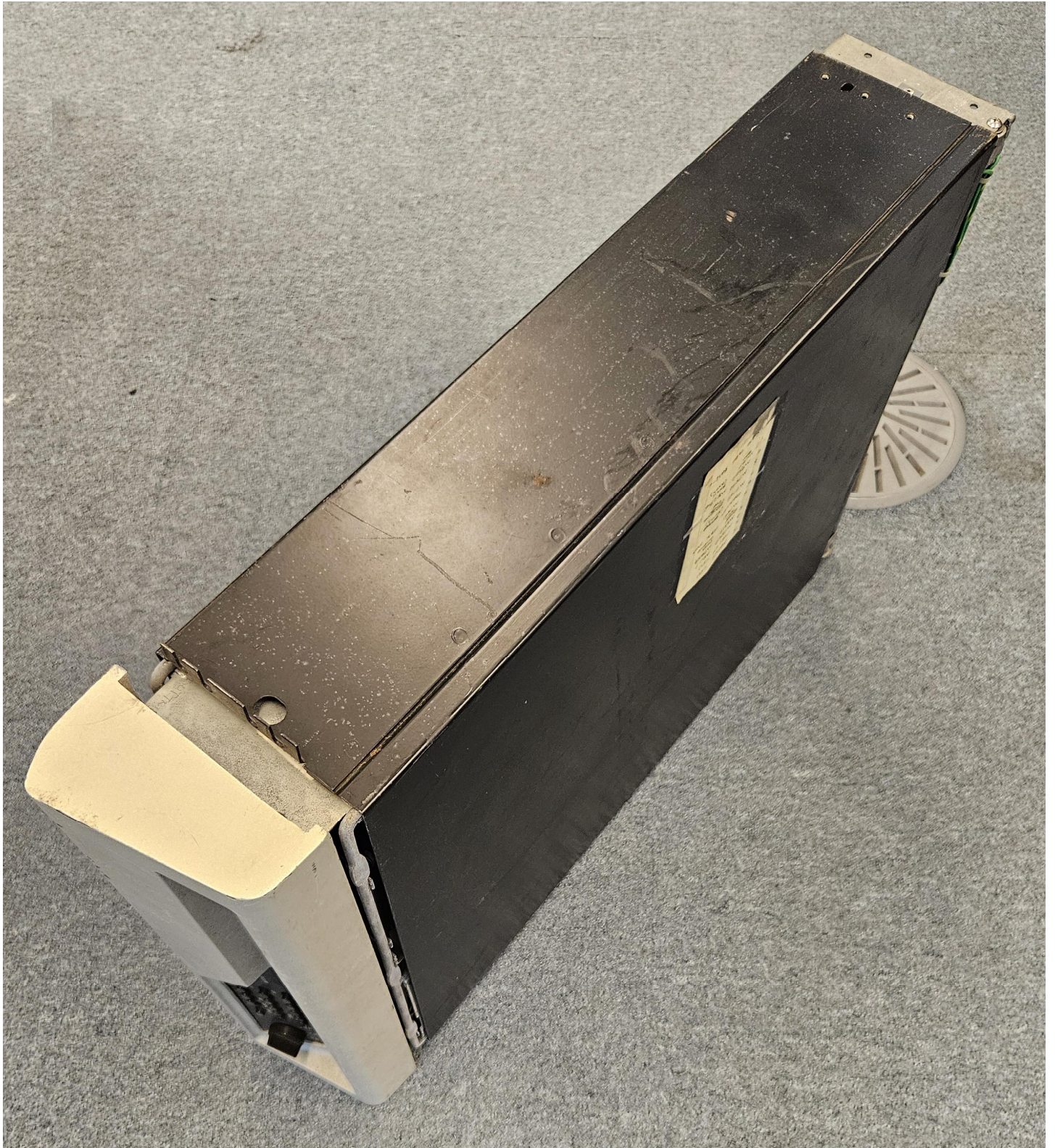


Figure 4: DEC PDP 11/34, unpacked.

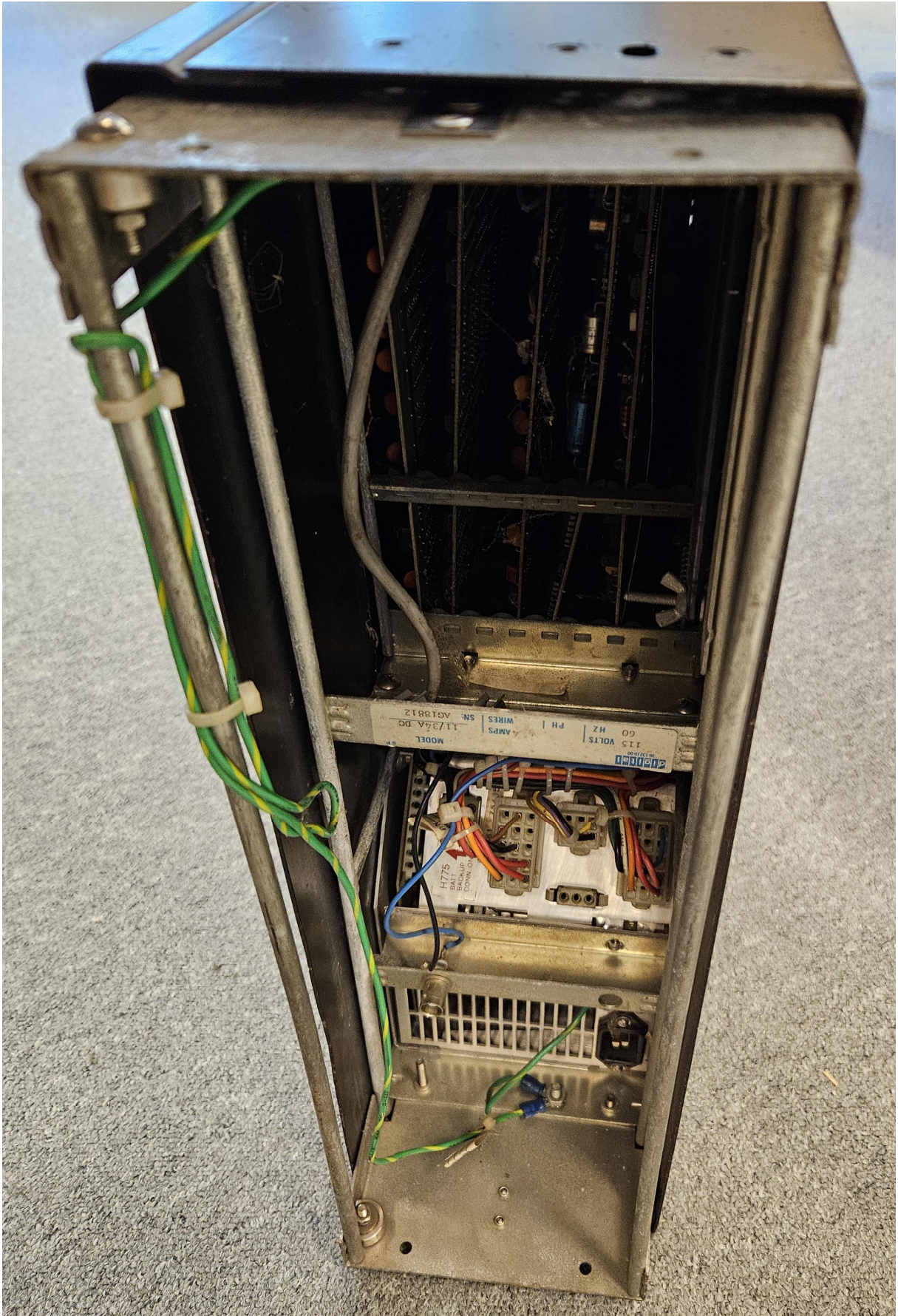


Figure 5: DEC PDP 11/34, rear view. Note the H775 power supply label.

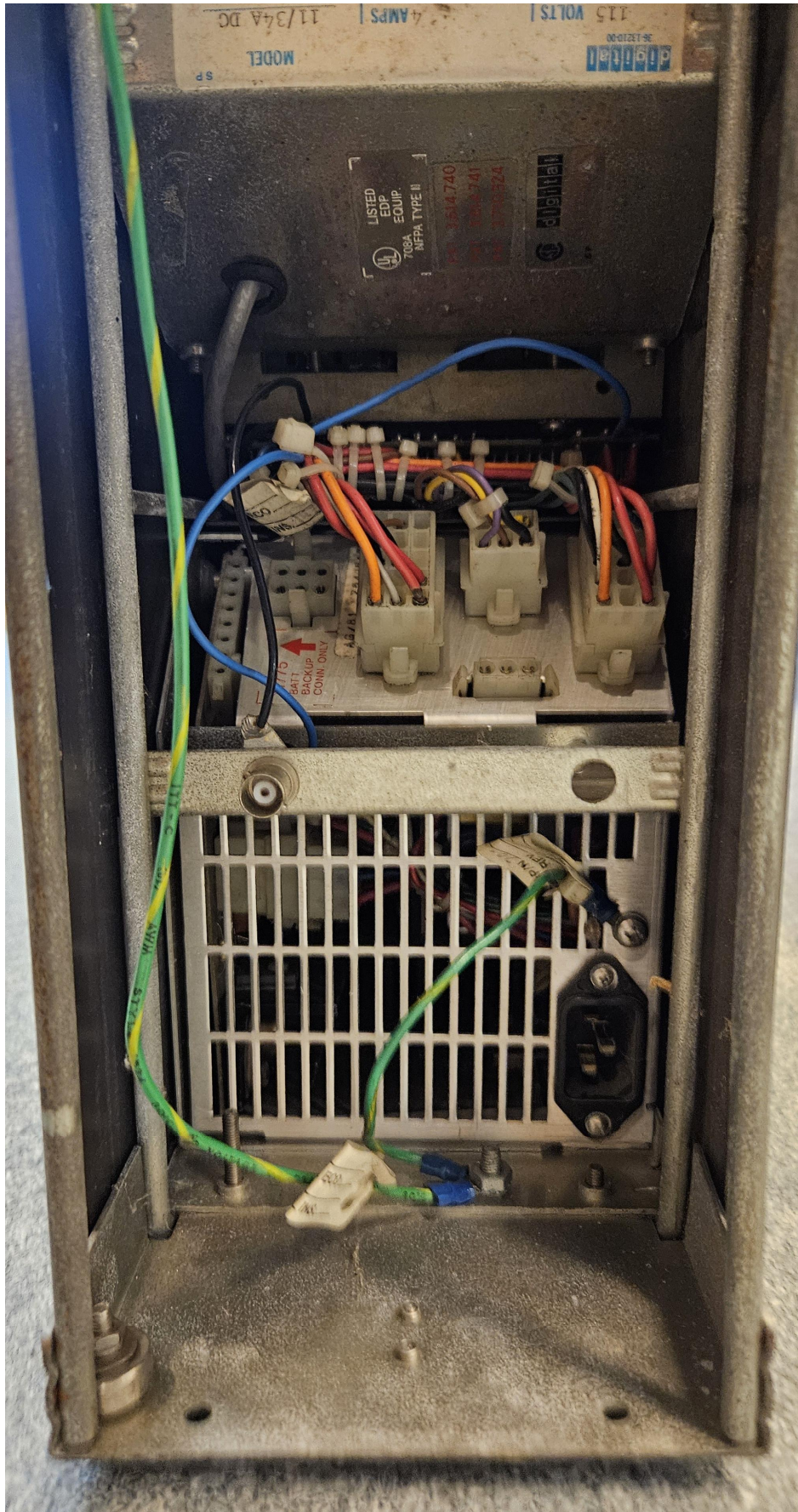


Figure 6: DEC PDP 11/34, lower rear view.

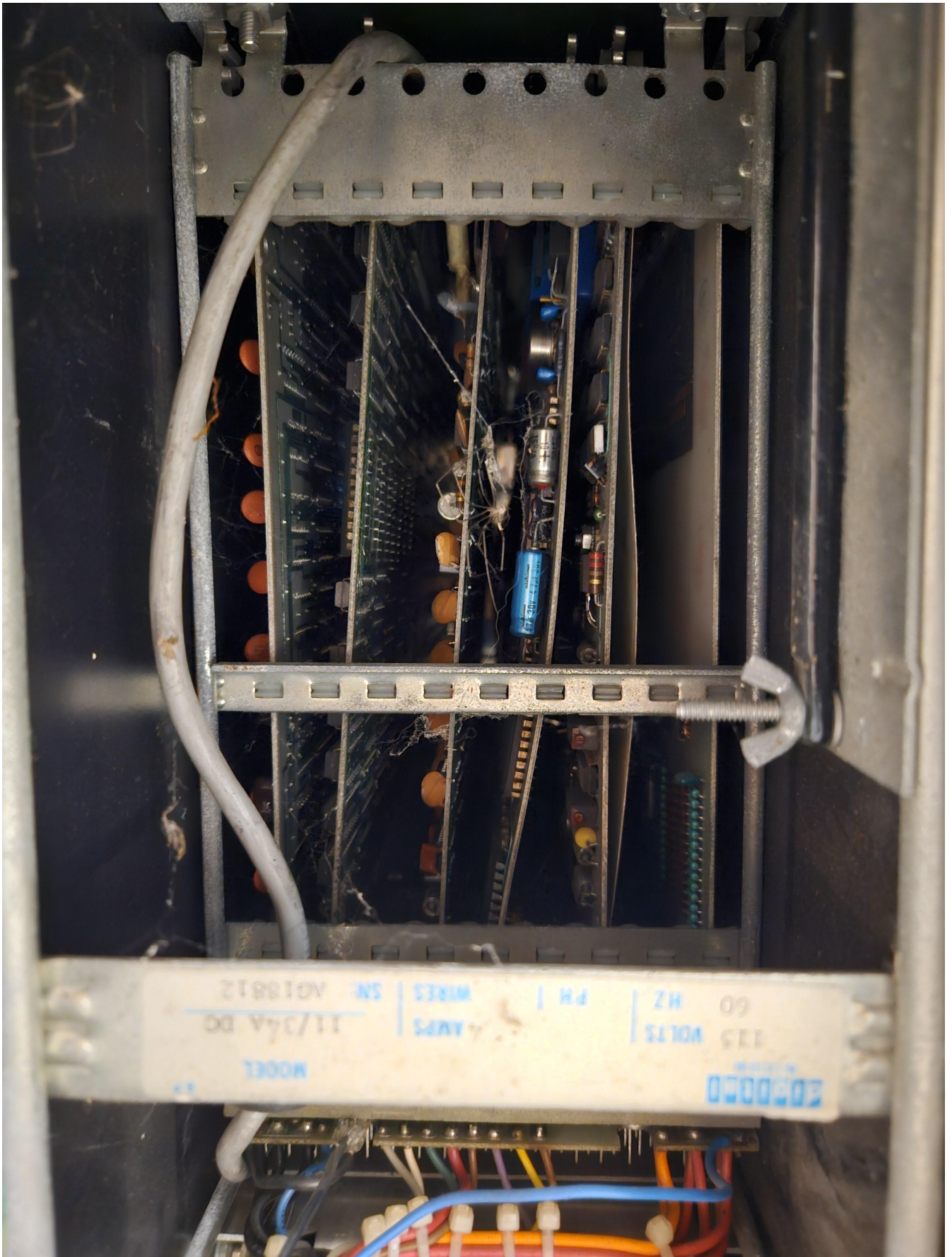
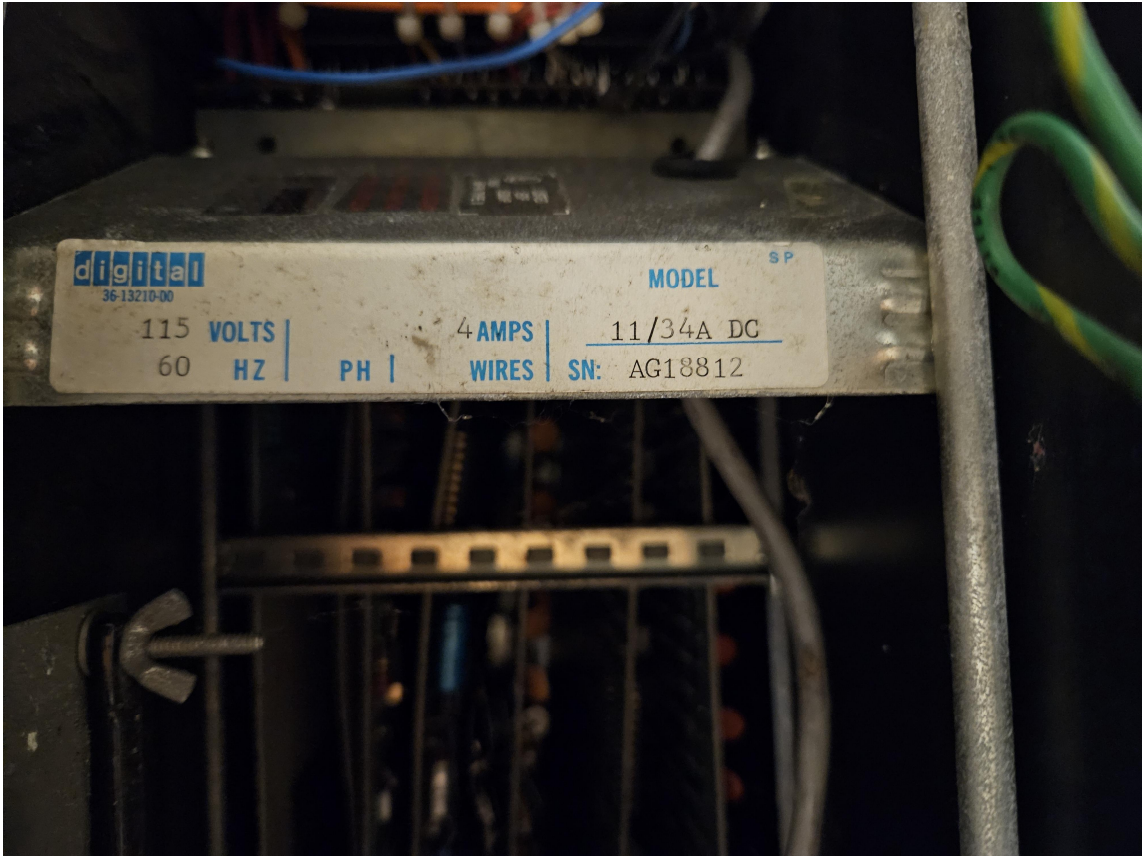
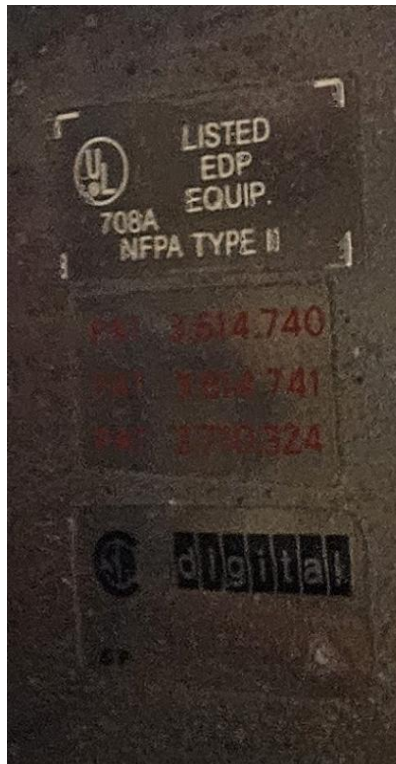


Figure 7: DEC PDP 11/34, upper rear view. Note twisted Unibus boards.



*Figure 8: DEC PDP 11/34 manufacturing label.
“115 Volts, 60 Hz, 4 Amps, Model: 11/34A DC, S/N: AG18812”.*



*Figure 9: DEC PDP 11/34 manufacturing label, appears to list patent numbers.
“Listed EDP Equip. 708A NFPA TYPE II, 3,614,740, 3,812,741, 3,710,324”.*

1 M8266 CPU
2 M8265 CPU
3 M7840 ARU?
4 M9312 M7859
BSTRAP PROG.
TERM CONSOLE
5 M7891 128K MOS
6 PARALLEL
7 M7762 ~~PL01~~
(PL01)
8 M7856 REALTIME
CLOCK.
TTφ:
9 M9302 M8256
UNIBUS RX211
TERM (RX02)
CASE TYPE BA11-L

Figure 10: DEC PDP 11/34, handwritten label showing configuration.