

AccessionIndex: TCD-SCSS-T.20150615.002

Accession Date: 15-Jun-2015

Accession By: Paul Harrington

Object name: DEC PDP 11/24

Vintage: c.1981

Synopsis: Rackmounted minicomputer, with associated cartridge disks and documentation. S/N: GA06424.

Description:

Digital Equipment Corporation produced its PDP-11 series from Jun-1970 into the 1990s [1]. These had a very popular general-purpose architecture with an attractively orthogonal instruction set in comparison to many of its competitors; for example a general move instruction with memory or register source and destination operands and multiple addressing modes eliminated I/O instructions (I/O became memory-mapped, with I/O registers in the top 8kB of address space), and relative addressing enabled position-independent programs.

The PDP 11/24 was introduced in Mar-1981 [2], DEC's first PDP-11 for Unibus [3] that implemented the CPU in large-scale integrated circuits, using their F11 chipset ('FONZ-11') with up to seven 40-pin chips containing the CPU and microcode for the instruction set. Unibus was an asynchronous backplane bus with 18-bit address and 16-bit data designed c.1969 by Gordon Bell and Harold McFarland. The CPU could address up to 4MB of memory over a private Extended Unibus (EUB) 22-bit address path. All DMA I/O devices used the standard Unibus, where a Unibus mapping adapter managed the reverse address translation from an 18-bit Unibus address to a 22-bit memory address. It was effectively a version of the PDP-11/23plus for the Unibus, based on the 11/23 KDF11-U processor module.

Unlike many previous models there was no manual control from front panel switches; the RS232C serial console needed to work to do anything.

The 11/24 in this collection appears to have belonged to the Distributed Systems Group (DSG) in the Dept.Computer Science in Pearse Street. It had a rackmounted CPU with 1MB of memory and two RL02 disk drives in a system (half-)rack, two more RL02 disk drives in a linked second (half-)rack which included a very heavy 240VAC-to-110VAC transformer, an LA36 DECwriter-II printer, and disk cartridges and documentation. The latter two items pertained to system software such as RSX11 and Berkeley BSD 2.x, as well as system backups.

This system used an RL11 disk controller [4] for 1-4 RL01 or RL02 disk drives. An RL01 formatted single-platter cartridges with 256byte sectors, 40 sectors/track, 256 tracks/side, a capacity of 5MB; RL02 doubled the tracks/side for 10MB capacity [5]. This system also included a DEC DEUNA Unibus to Ethernet adapter [6] consisting of the M7792 Unibus to Ethernet microprocessor card plus the M7793 Ethernet bus (CSMA/CD) line unit, interconnected by two flat cables.

The CPU chassis contained a Unibus cardcage plus a H740 'Modular Regulator' (switchmode power supply).

Warning: this is a 110VAC power supply !!!

One curiosity is that when the chassis was fully extended from the rack, the front could be rotated upwards through 45 degrees or 90 degrees to allow the Unibus wiring to be modified. The cardcage had slots in six segments, so cards of single, double, quad or hex width could be accommodated. The 11/24 in this collection contains the following Unibus modules:

Slot	Type	Width	Function	Comment
1	M7133	hex	KDF11-UA PDP 11/24 CPU	has 2 x DL11-type serial lines, one is for console
2	M7134	hex	KT24 Unibus map and boot ROMs	memory management option
3	M8743	hex	1MB MOS DRAM	
4	M77xx	quad	<??>	quad-width card
5	M7792	hex	Port module	1 st part of DEUNA Unibus to Ethernet adapter
6	M7793	hex	Link module	2 nd part of DEUNA Unibus to Ethernet adapter
7	M7762	hex	Unibus RL11 disk controller	for RL01 and/or RL02 drives
8.LHS				
8.MID	G7273	double	Unibus grant and non-processor grant module	for arbitration of bus master requests
8.RHS				
9.LHS	M9302	double	Unibus terminator	transmission line terminator, plus SACK return, must be in last slot
9.MID				
9.RHS				

These items were all saved by Paul Harrington (BA Mod 1990) immediately after decommissioning, with permission from Cormac Callanan of DSG. After lots of pints in the Buttery, Paul and his friends carried the machine down the two or three flights of stairs into the back of classmate Neil Storey's Renault 5 and back to Paul's flat in Cabra. He used to boot up RSX-11 on the 11/24 and thought it was a lovely machine, and liked it so much that he asked his parents to store it in their house in Roscommon. His mother ran the house as a B&B for many years and for a while the machine was in the dining room covered with a lace tablecloth!

Neither the RL02 disk drives nor the DECwriter-II printer were able to be preserved in this collection, but the collection does include an LA36 DECwriter (predecessor of the DECwriter-II) as part of a PDP-11/34 system, as well as two RL02 disk drives as part of a PDP-11/84 system, see elsewhere in this catalog.

Special thanks to Paul Harrington for preserving these historically significant items, his mother Mrs. Agnes Harrington for storing them (and her repeated hospitality), and his family for their supporting efforts, especially John O'Toole without whose help the PDP 11/24 itself could not have been extracted from its rack. Also thanks to David McLoughlin for carefully delivering and decanting these items in person.

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.20150615.002	DEC PDP 11/24 Rack Unit. Rackmounted minicomputer, with associated cartridge disks and documentation. S/N: GA06424. c.1981.
TCD-SCSS-T.20150615.002.001	DEC PDP 11/24 Rack Unit. S/N: GA06424. c.1981.
TCD-SCSS-T.20150615.002.002	DEC RL02 disk cartridges
TCD-SCSS-T.20150615.002.003	DEC documentation
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: ??? c.1976.
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.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. Legendary 12-bit minicomputer. c.1970.
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-11/24*, see:
<http://gunkies.org/wiki/PDP-11/24>
Last browsed to on 10-Jun-2018.
3. Computer History Wiki, *Unibus*, see:
<http://gunkies.org/wiki/UNIBUS>
Last browsed to on 10-Jun-2018.
4. Computer History Wiki, *RL11 disk controller*, see:
http://gunkies.org/wiki/RL11_disk_controller
Last browsed to on 10-Jun-2018.
5. Computer History Wiki, *RL0x disk drive*, see:
http://gunkies.org/wiki/RL0x_disk_drive
Last browsed to on 10-Jun-2018.
6. Computer History Wiki, *DEUNA*, see:
<http://gunkies.org/wiki/DEUNA>
Last browsed to on 10-Jun-2018.



*Figure 1: DEC PDP 11/24 system, disk cartridges and documentation in Boyle
The unit at top right is an RL01 disk drive from TCD Library's PDP 11/34
(see elsewhere in this catalog)*



Figure 2: DEC PDP 11/24 system cabinet in Boyle



Figure 3: DEC PDP 11/24 RL02 cabinet in Boyle



Figure 4: DEC PDP 11/24, RL01 and disk cartridges and manuals packed for removal from Boyle



Figure 5: DEC PDP 11/24 CPU chassis, top three-quarter view



Figure 6: DEC PDP 11/24 CPU chassis, right and left side views



Figure 8: DEC PDP 11/24 CPU chassis, top view



Figure 9: DEC PDP 11/24 CPU chassis Unibus modules

Left, slots 1-3: CPU, Unibus map, 1MB DRAM hex-width modules

Mid-left slot 4: <unknown> quad-width module

Mid-Right slots 5-7: Ethernet controller (2-boards), disk controller hex-width modules

Right slots 8-9: grant module, termination double-width modules

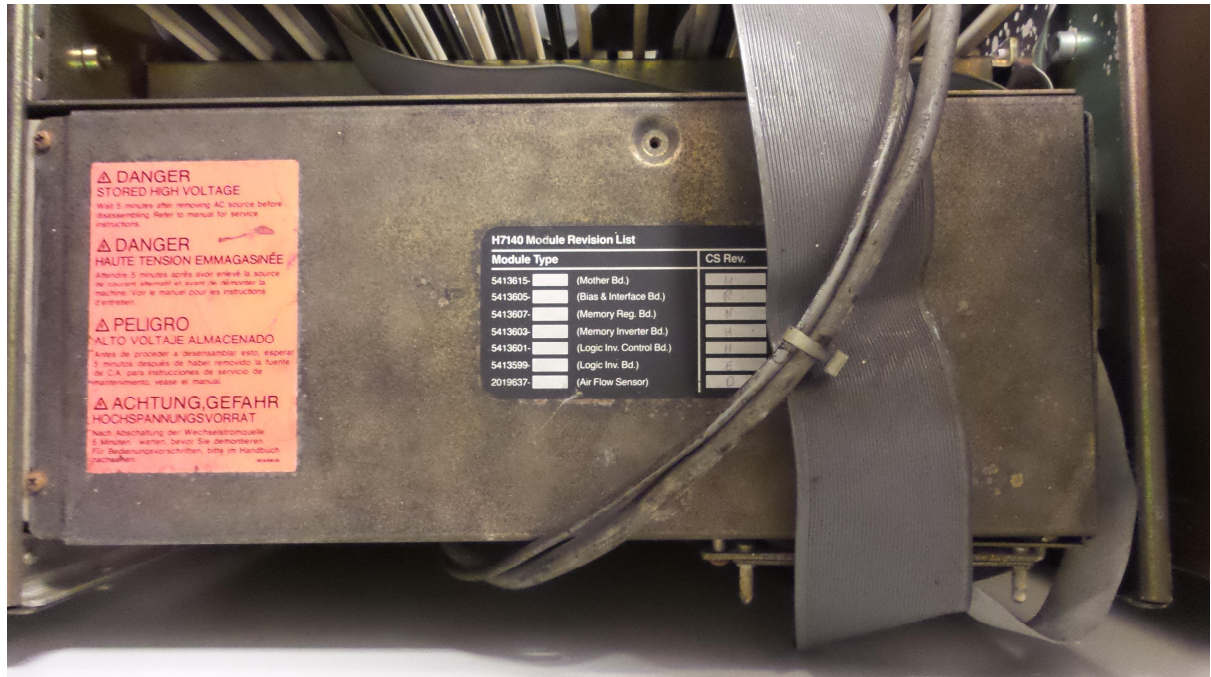


Figure 10: DEC PDP 11/24 CPU chassis H740 Modular Regulator (switchmode power supply)

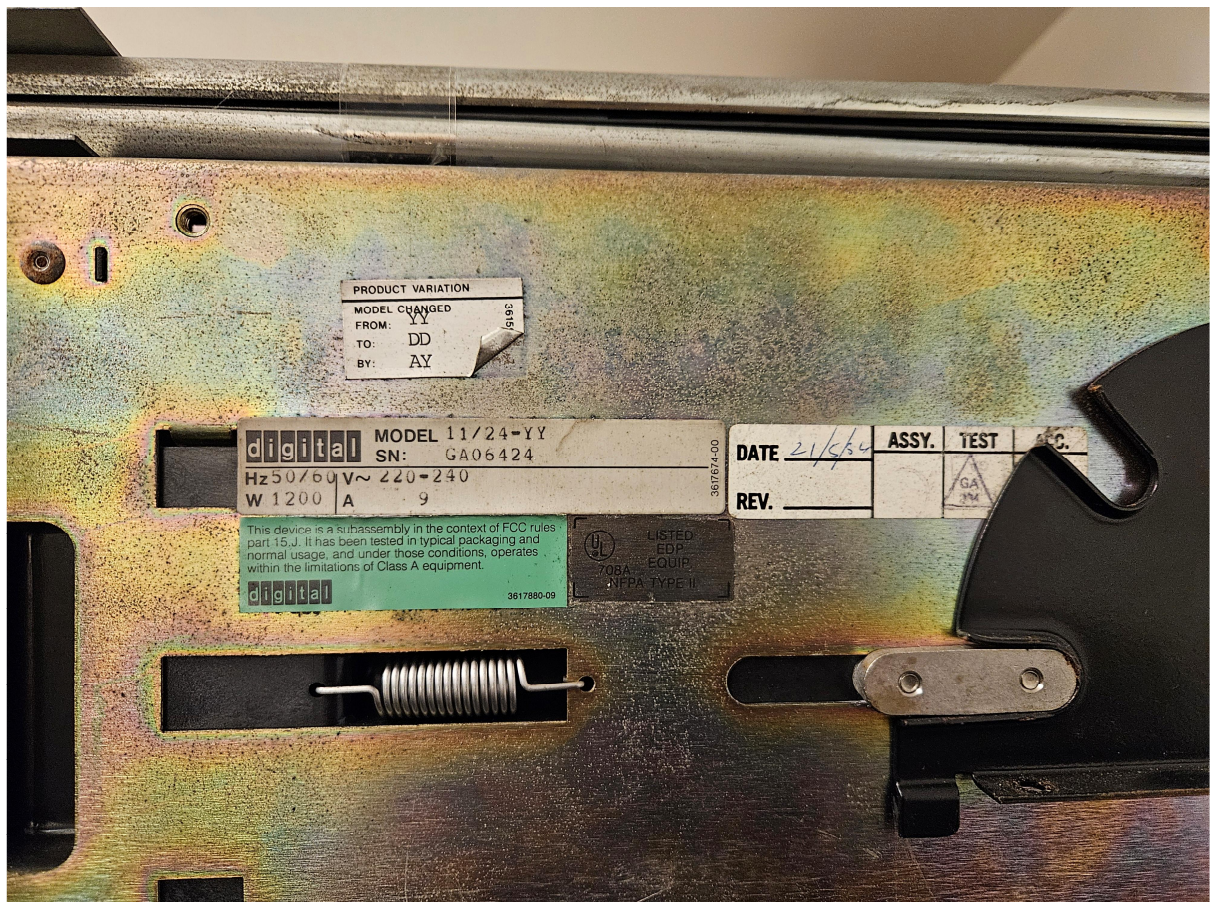


Figure 11: DEC PDP 11/24 manufacturing label
“Model: 11/24-YY [changed from YY to DD by AY], S/N: GA06424
220-240V~, 9A, 50/60Hz, 1200W, Date: 21/5/84”



Figure 12: DEC PDP 11/24 disk cartridges, including RMS-11K, in Boyle

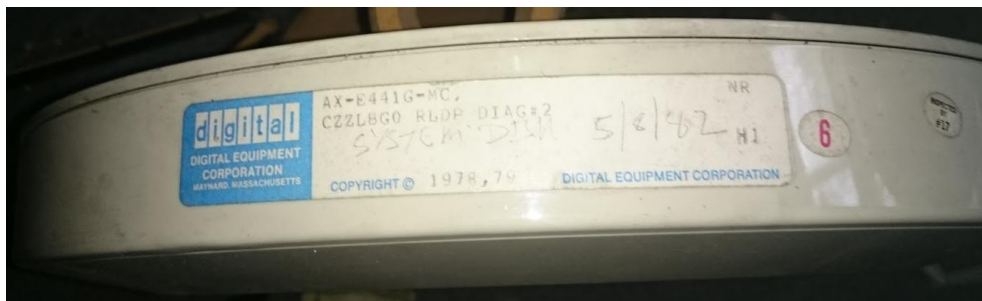


Figure 13: DEC PDP 11/24 system disk cartridge in Boyle



Figure 14: DEC PDP 11/24 disk cartridges safely in the Collection