

AccessionIndex: TCD-SCSS-T.20121208.089

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Object name: VAX 8530 module

Vintage: c.1989

Synopsis: Central module from this departmental system, successor to VAX 11/780.

Description:

In c.1989 the Dept.Computer Science, Trinity College Dublin, introduced a specialised course-based M.Sc. in Computer Systems Design. This was run on a part-time basis over two years in response to a suggestion from Digital Equipment Corp (DEC) in Galway. In support DEC installed a VAX 8530 in 1989, allowing the department's VAX 11/780 to be retired.

The VAX 8000 series numbering can be confusing. Paraphrasing Wikipedia:

The VAX 8800 *Nautilus* was the high-end model in the VAX 8800 family, with two KA88 32-bit CPUs and two VAXBI buses as standard. Development of the VAX 8800 began in 1982. It was introduced on 29-Jan-1986. The VAX 8700 *Nautilus* was introduced in early-Aug-1986. It was similar to the VAX 8800, but with only one KA88 32-bit CPU and VAXBI bus, although it was upgradable to a VAX 8800.

The VAX 8550 *Skipjack*, introduced in early-Aug-1986, was similar to the VAX 8700, but was not upgradable to the VAX 8800, and had the lower-performance KA85 32-bit CPU. The VAX 8500 *Flounder* was an even lower-performance variant of the VAX 8550, with microcode used to insert NOPS during operation to limit performance. The VAX 8530 *Skipjack*, introduced in early March 1987, was an upgraded VAX 8500 with the NOPS removed for improved performance.

When *Polarstar* systems (variant of *Nautilus* with one to four processors and an updated console processor) were introduced in Mar-1988, the VAX 8800 was renamed to VAX 8820N to distinguish it from the VAX 8820 *Polarstar*. After the name adjustments and upgrading to full SMP capability, the former VAX 8700 and VAX 8800 models became VAX 88x0 machines, where "x" represented the number of CPUs, i.e. VAX 8810, 8820, 8830 and 8840. The upgrade kit included replacement numbers affixed to the front of the machine to reflect the new designation. In many respects the VAX 8810 was an 8550 in a larger cabinet to allow for the extra CPUs needed to allow it to be upgraded to a VAX 8820, 8830 or 8840.

The KA85 CPU operated at 22.22MHz (45ns cycle time) and was implemented with discrete ECL on eight modules. The majority of the ECL devices were macrocell arrays with 1,200 logic gates, while the general-purpose registers and floating-point units were custom devices developed by DEC. The CPU was heavily pipelined, slightly predating the first commercial MIPS and SPARC designs, and had a 64kB cache implemented with 10ns and 15ns ECL RAMs. It also had a TLB and a writeable control store (WCS). The NMI backplane was a 32-bit synchronous bus with a usable bandwidth of 64 MB/s. The VAX-BI busses (a split-cycle bus inherited from the VAX 11/780) operated asynchronously to the NMI backplane, with a usable bandwidth of 13MB/s [1][2][3]. The technical details of the 8800 system family are well described in [5]. See especially the first article [6].

The department's VAX 8530 ('*swift*', 134.226.32.6) consisted of two anonymous 8550-sized cabinets. The additional 8550-sized cabinets usually held disks. It had 68MB (expandable to 320MB) of ECC memory and 2.4GB of disk.

Unfortunately this (large) system was decommissioned in Sep-1993 and disposed of later. However on 27-Apr-2023 Gerry O'Brien donated an 8530 module he had preserved for many years, the NBIA module (KA88 System I/O Interface, i.e. the NMI to VAX-BI bus interface, DEC part number F1011) [4], see the figures below. It is essentially an autonomous direct memory access (DMA) controller. Four modules in the 8800 system could access memory: two CPUs and two NBIAs, with as many as eight simultaneous requesters of memory data accessing three memory modules in parallel. The NBIA is a central module in the 8530 system (the VAX-BI modules are much smaller). It is described in [7], see especially pages 74 onwards, see also in the related folder.

If any other VAX 8530 modules survive elsewhere the department would very much welcome donation back into the Collection.

Many thanks to Gerry O'Brien for preserving this VAX 8530 module and for donating it to the Collection.

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.20121208.089	VAX 8530 module, Central module from this departmental system, successor to VAX 11/780, c.1989.

References:

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https://en.wikipedia.org/wiki/VAX_8000
Last browsed to 25-Feb-2018.
2. Wikipedia, *VAXBI Bus*, see:
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3. Computer History Wiki, *VAX 8530*, see:
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6. Robert M. Burley, *An Overview of the Four Systems in the VAX 8800 Family*, *Digital Technical Journal*, Digital Equipment Corporation, No.4, pp.10-19, February 1987, see:
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7. James P. Janetos, *The VAX 8800 Input/Output System*, *Digital Technical Journal*, Digital Equipment Corporation, No.4, pp.72-80, February 1987, see:
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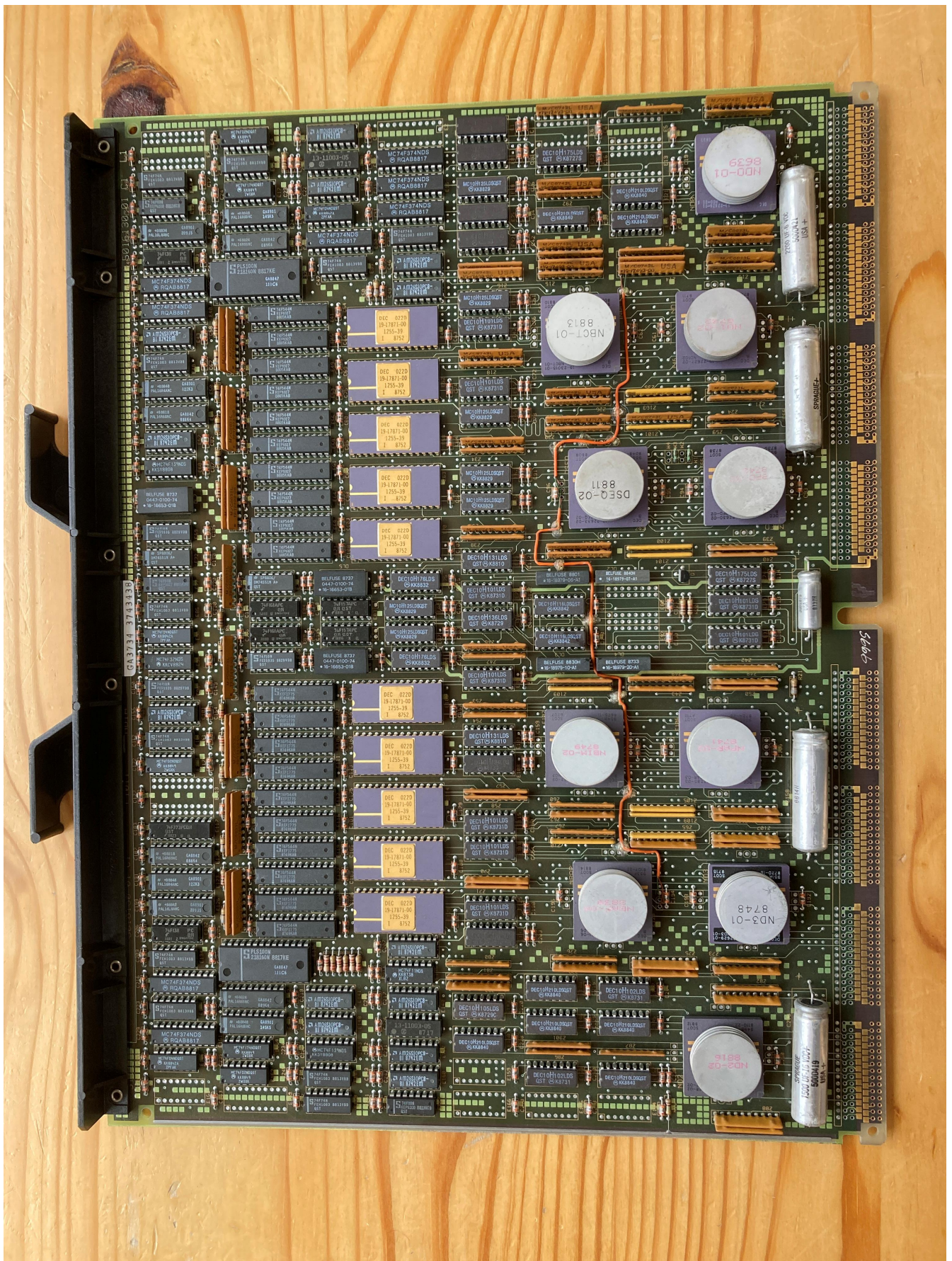


Figure 1: VAX 8530 NBIA module top view

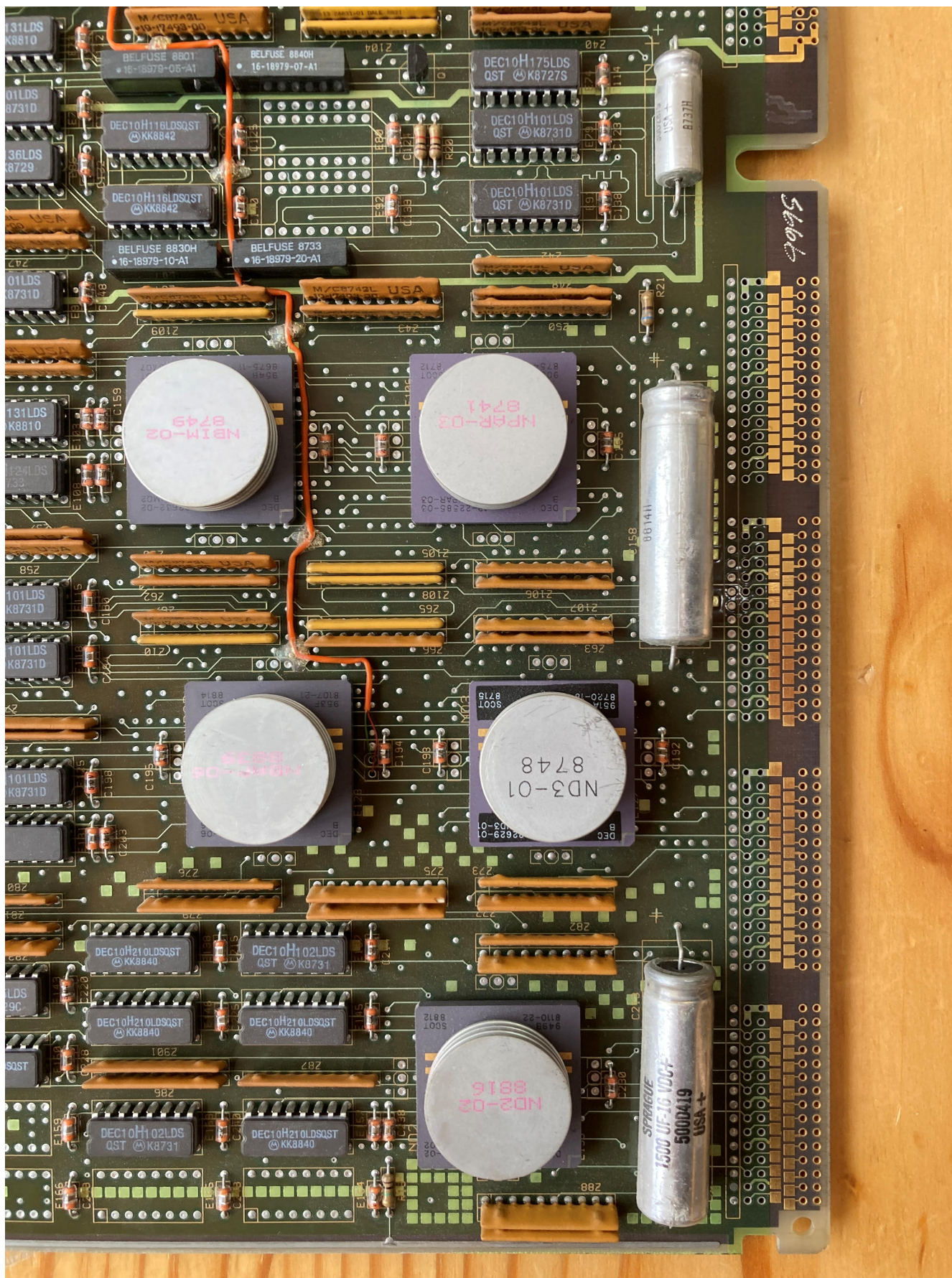


Figure 3: VAX 8530 NBIA module lower left closeup

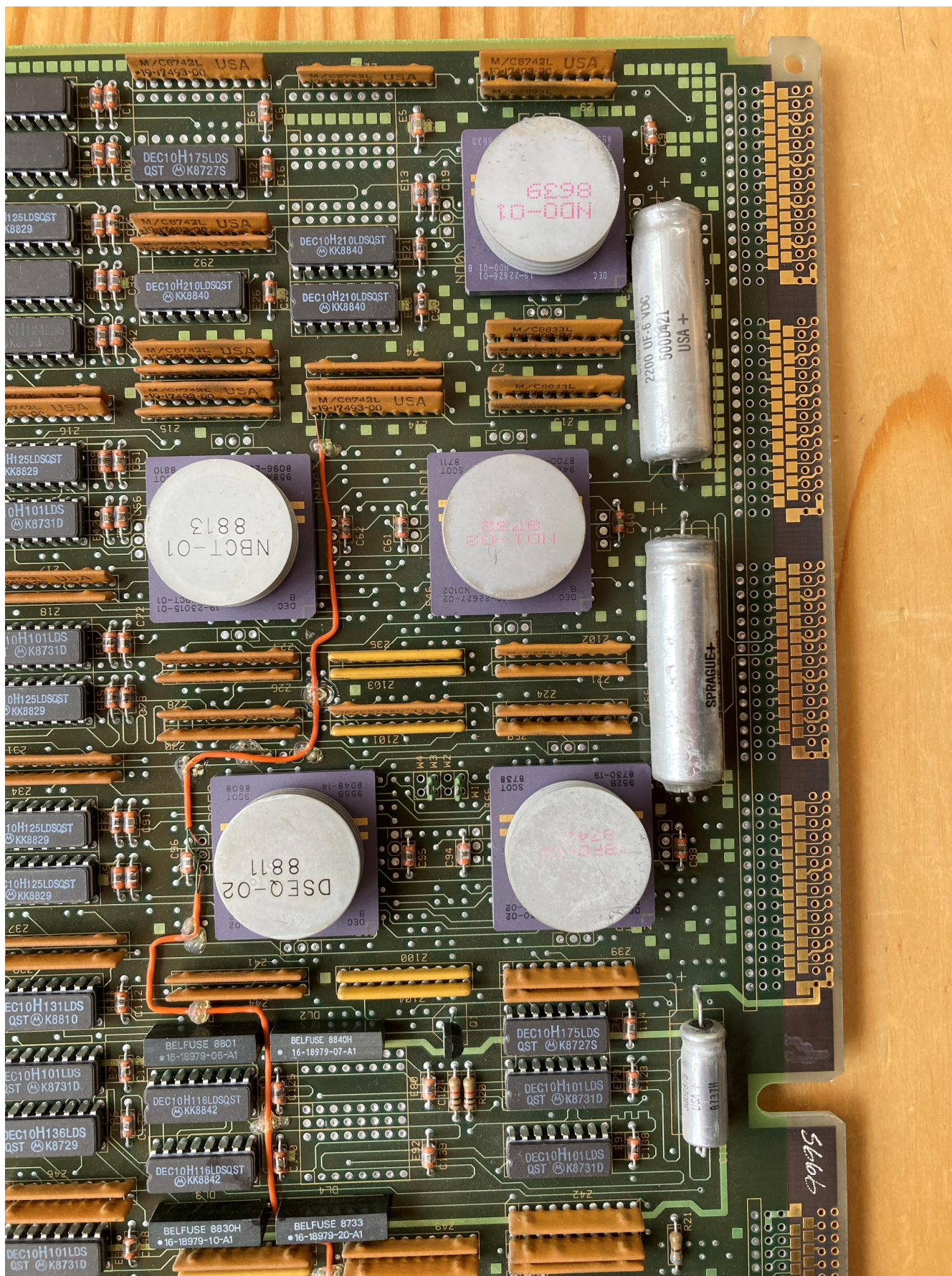


Figure 4: VAX 8530 NBIA module lower right closeup

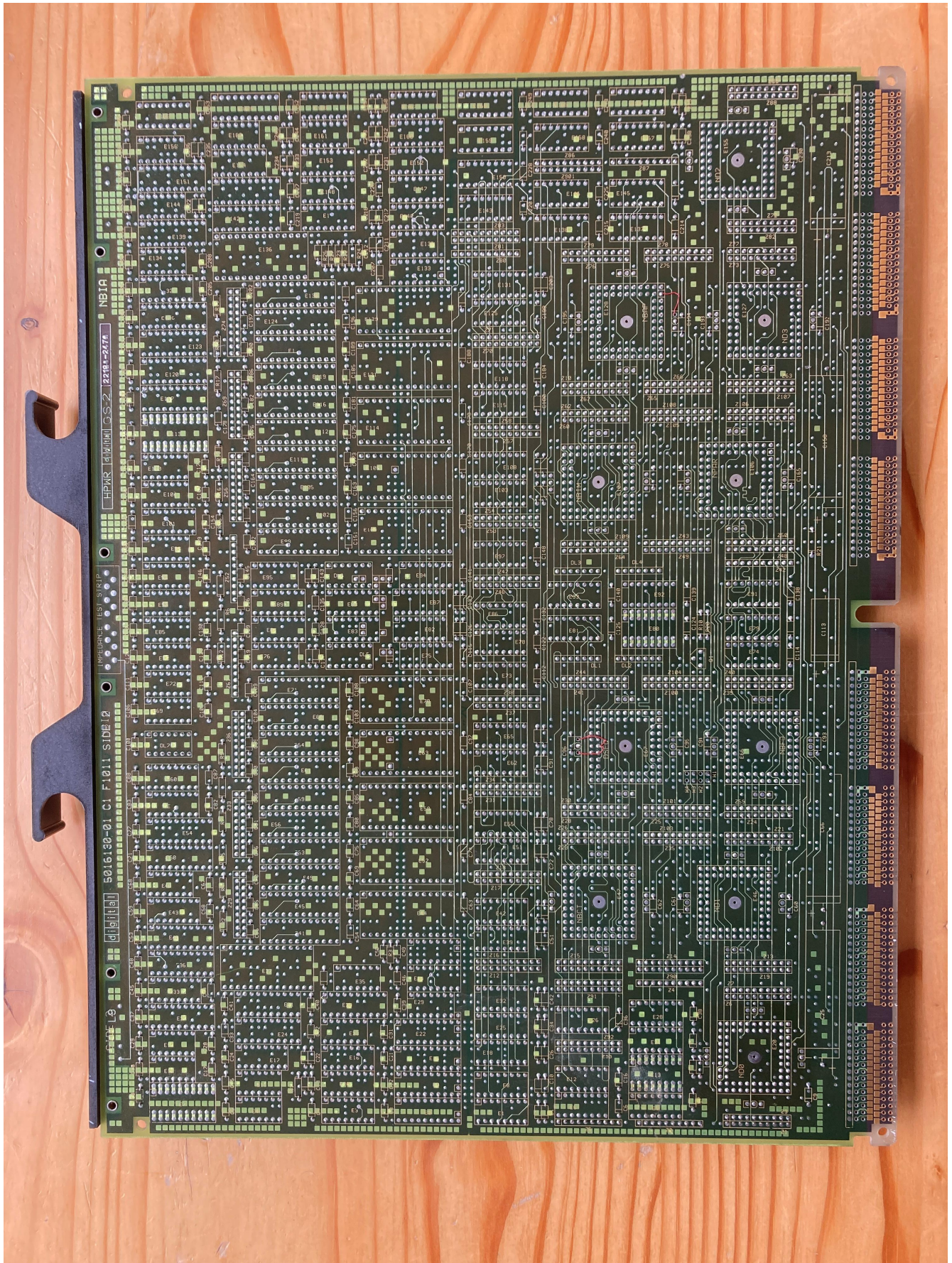


Figure 5: VAX 8530 NBIA module bottom view



Figure 6: VAX 8530 NBIA module bottom view, upper left closeup

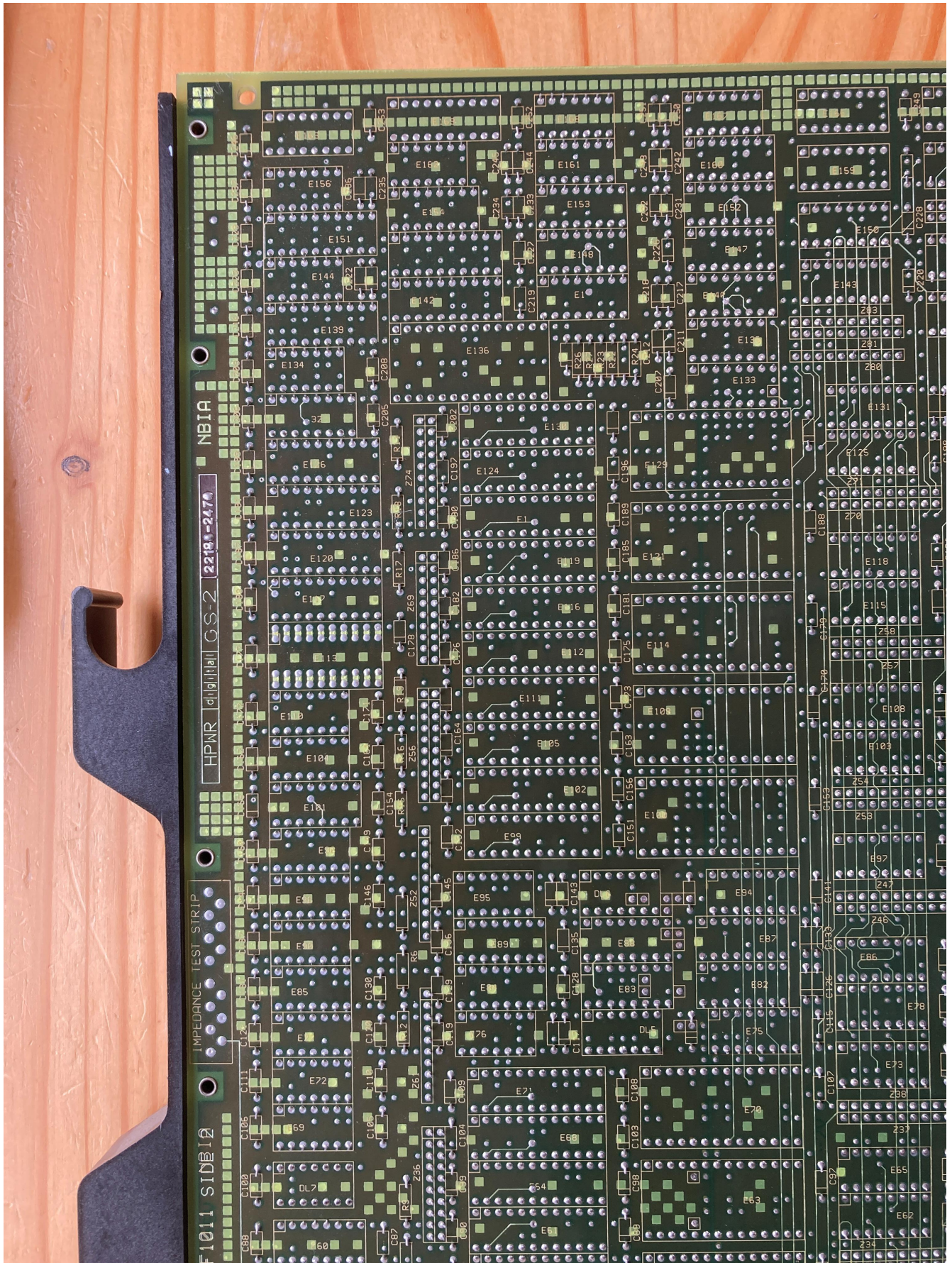


Figure 7: VAX 8530 NBIA module bottom view, upper right closeup

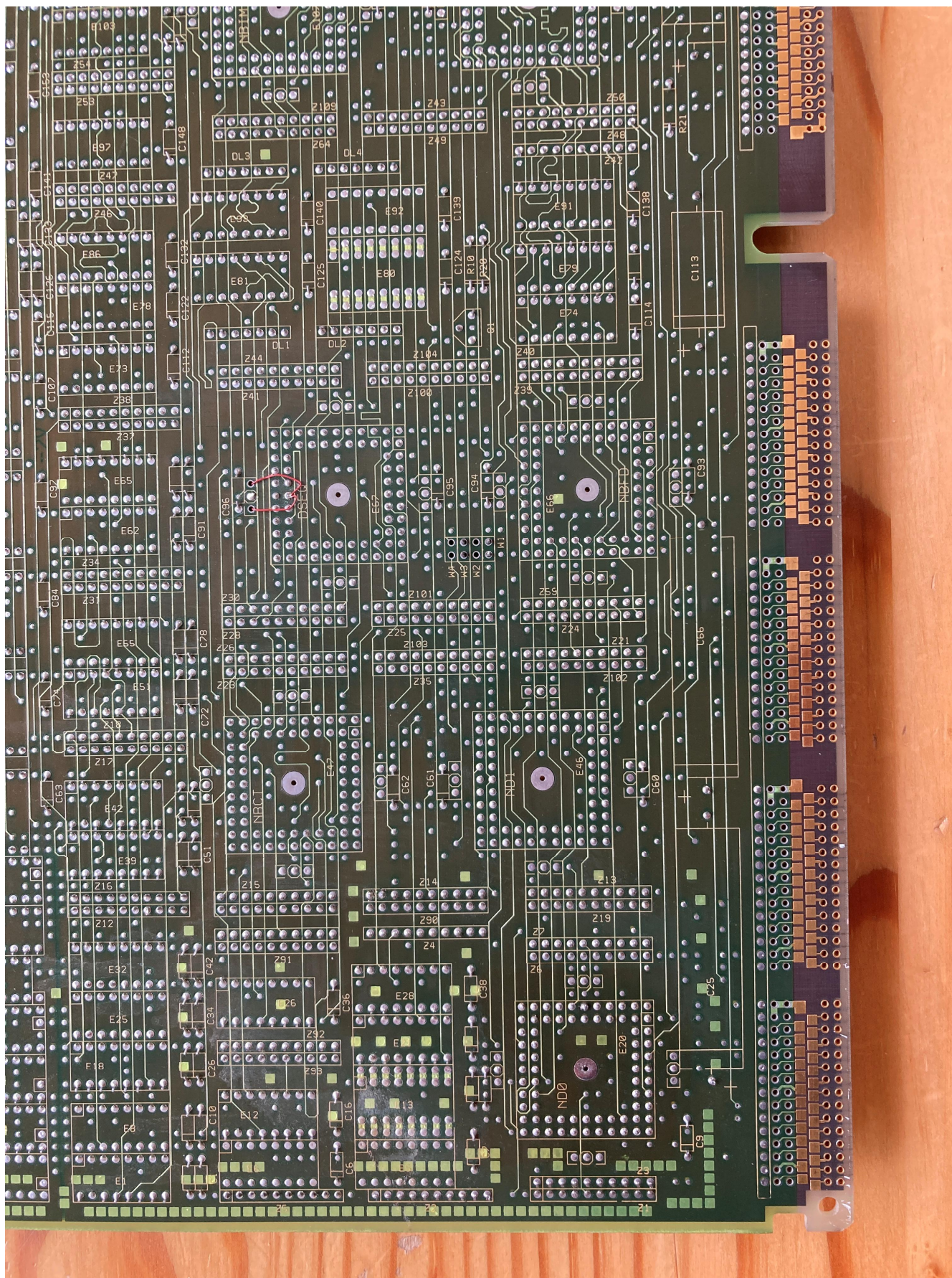


Figure 8: VAX 8530 NBIA module bottom view, lower left closeup

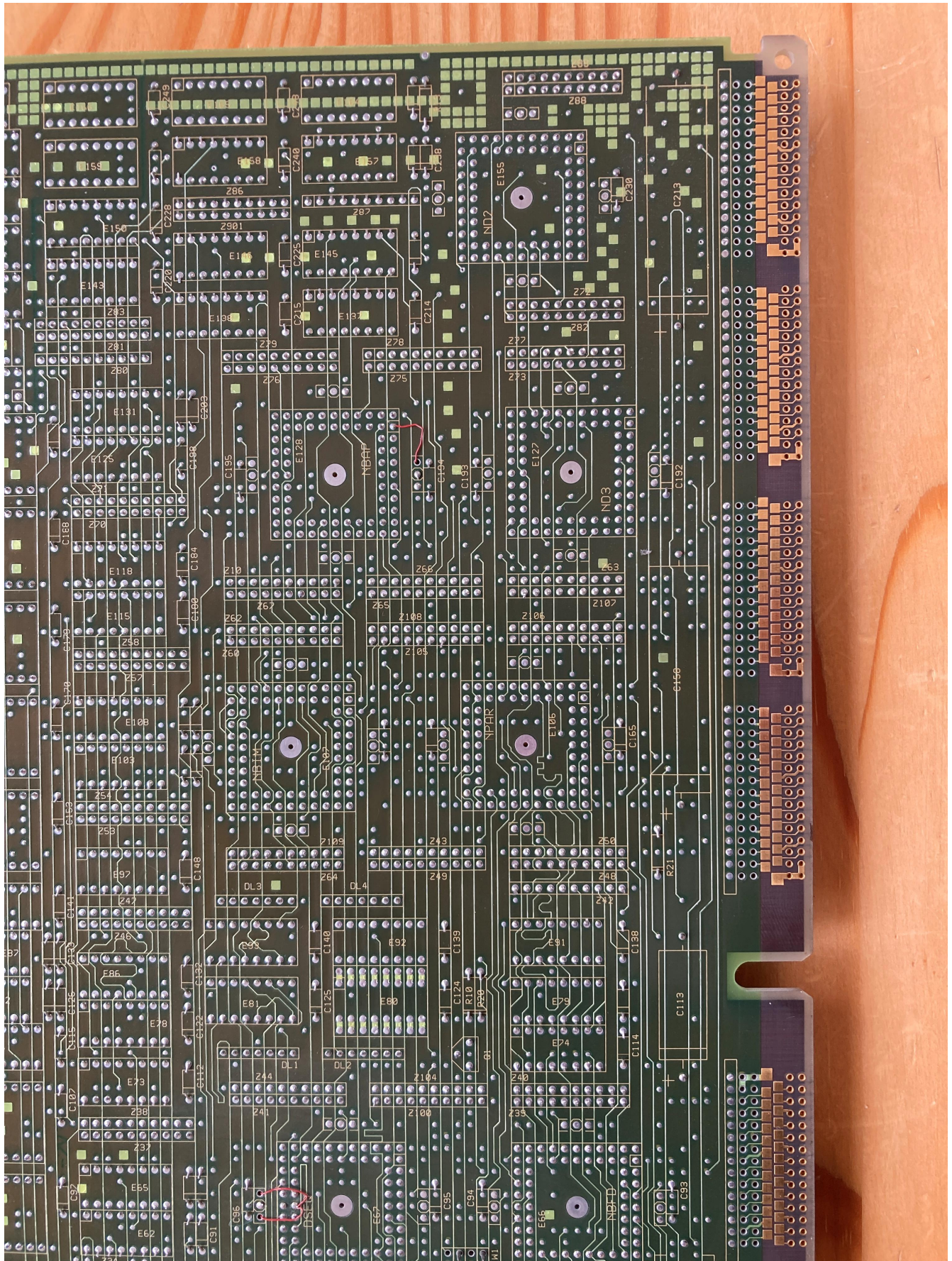


Figure 9: VAX 8530 NBIA module bottom view, lower right closeup