

AccessionIndex: TCD-SCSS-T.20141120.007

Accession Date: 20-Nov-2014

Accession By: Dr.Brian Coghlan

Object name: NS32000 NSU-3203256T-10 Development Boards

Vintage: c.1984

Synopsis: Three NS32000 development boards in original packing boxes, including documentation and ancillaries. Board 1 S/N: H280036025, Board 2 S/N: H280036034, Board 3 S/N: H420016026.

Description:

The NS16000 series (later renamed NS32000 series) was the first microprocessor to include demand-paged virtual memory. It was based on a very attractive 32-bit architecture and program model with 8 general-purpose registers, some special 24-bit registers like the PC, two stack, a frame and an interrupt base pointer, and a complex (CISC) instruction set, including coprocessor instructions, with 2-operand instructions, memory-to-memory operations, flexible addressing modes, and variable-length byte-aligned instruction encoding. Addressing modes could involve up to two displacements and two memory indirections per operand as well as scaled indexing. Perhaps because of this, there were fewer instructions than many RISC machines. The chipset included a CPU, FPU, MMU, ICU (for interrupts) and TCU (for timing), with a multiplexed address/data bus. The principal chips were simply wired together on this bus. The CPU suffered from persistent bugs that greatly delayed full production, and was bypassed in the market. In the early 1980s a significant amount of research work in the Dept.Computer Science centred on the NS32000 series (see elsewhere in this collection), and these boards supported related testing.

Two NS32000 development boards are in one original packing box marked NSU-3203256T-10, S/N: H280036034 (and so came with development board 2), including documentation and ancillaries.

Accession Index	Object with Identification
TCD-SCSS-T.20141120.007.01	NS32000 Development Board Package 1. Marked: NS32000 Development Boards NSU-3203256T-10 970010144-110 Rev.C 980010144-110 Rev.D S/N: H280036034 D/C: 8604
TCD-SCSS-T.20141120.007.02	DB32000 Board 1. Includes: 1 x National Semiconductor NS32032E-10 1 x National Semiconductor NS32082D-10 1 x National Semiconductor NS32081D-10 1 x National Semiconductor NS32201D-10 (no NS32202 ICU chip) 2 x National Semiconductor INS2651N 1 x National Semiconductor INS8255N 1 x National Semiconductor DP84300J 4 x National Semiconductor NMC27C32Q EPROMs

	<p>32 x Fujitsu MB82644-12 DRAMs 4 x LEDs (RUN, L1, L2, L3, L4) 2 x DB25 RS232C serial I/O connectors J1, J2 1 x J3 50pin ribbon cable I/O connector J3 2 x pushbuttons (NMI0, RESET) custom wirewrap circuit 2 x DB25 RS232C serial I/O ribbon cables</p> <p>Marked: DB32000, NSC, 1984 5-47, PCB Made in Japan P/N: 990010144-110 rev D S/N: H280036025</p>
TCD-SCSS-T.20141120.007.03	<p>DB32000 Board 2. Includes: 1 x National Semiconductor NS32032E-10 (no NS32082 MMU chip) (no NS32081 FPU chip) (no NS32201 TCU chip) 1 x National Semiconductor NS32202D-10 2 x National Semiconductor INS2651N 1 x National Semiconductor INS8255N 1 x National Semiconductor DP84300J 4 x Firmware EPROMs 407272-013/014/015/016 32 x Fujitsu MB82644-12 DRAMs 4 x LEDs (RUN, L1, L2, L3, L4) 2 x DB25 RS232C serial I/O connectors J1, J2 1 x J3 50pin ribbon cable I/O connector J3 2 x pushbuttons (NMI0, RESET) unused wirewrap area 2 x DB25 RS232C serial I/O ribbon cables</p> <p>Marked: DB32000, NSC, 1984 5-47, PCB Made in Japan P/N: 990010144-110 rev D S/N: H280036034</p>
TCD-SCSS-T.20141120.007.04	<p>2 x EPROMs OFirmware SETMON 16. Marked: 308221-001/002 Rev.B, 900308221-001 Rev.B</p>
TCD-SCSS-T.20141120.007.05	<p>4 x EPROMs Firmware. Marked: 407272-013/014/015/016</p>
TCD-SCSS-T.20141120.007.06	<p>Power Cable.</p>
TCD-SCSS-V.20141120.001.01	<p>Service Information (1). Marked: 423300039-001N p.1-3</p>
TCD-SCSS-V.20141120.001.02	<p>Circuit Diagrams (1). Marked: 870010144-001 rev.A sheets 1-14</p>

A third NS32000 development board is in its original packing box marked NSX-3203256T-10, S/N: H420016026, including documentation but without ancillaries.

Accession Index	Object with Identification
TCD-SCSS-T.20141120.007.07	NS32000 Development Board Package 2. Marked: NS32000 Starter Kit NSX-3203256T-10 970010144-110 Rev.D 980010144-110 Rev.E S/N: H420016026 D/C: 8364
TCD-SCSS-T.20141120.007.08	DB32000 Board 3. Includes: (no NS32082 CPU chip) 1 x National Semiconductor NS32082D-10 1 x National Semiconductor NS32081D-10 1 x National Semiconductor NS32201D-10 1 x National Semiconductor NS32202D-10 2 x National Semiconductor INS2651N 1 x National Semiconductor INS8255A-5 1 x National Semiconductor DP84300J 4 x SGS M2764 EPROMs (407272-013C to -016C) 32 x Fujitsu MB82644-12 DRAMs 4 x LEDs (RUN, L1, L2, L3, L4) 2 x DB25 RS232C serial I/O connectors J1, J2 1 x J3 50pin ribbon cable I/O connector J3 2 x pushbuttons (NMI0, RESET) unused wirewrap area Marked: DB32000, NSC, 1984 6-08, PCB Made in Japan P/N: 990010144-110 rev E S/N: H420016026
TCD-SCSS-V.20141120.001.03	Service Information (2). Marked: 423300039-001S p.1-3
TCD-SCSS-V.20141120.001.04	Circuit Diagrams (2). Marked: 870010144-001 rev.D sheets 1-14.
TCD-SCSS-V.20141120.001.05	Congratulations & DB32016 Note p.1.
TCD-SCSS-V.20141120.001.06	NS32332 vs MC68020 Facts p.1-2.
TCD-SCSS-V.20141120.001.07	User Information, NS32032 CPU Revision F1, p.1-3.
TCD-SCSS-V.20141120.001.08	User Information, NS32016 CPU Revision N, p.1-11.
TCD-SCSS-V.20141120.001.09	DB32000 Development Board User's Manual.
TCD-SCSS-V.20141120.001.10	DB32000 Development Board Monitor Reference Manual.

TCD-SCSS-V.20141120.001.11	TDS: Tiny Development Systems User's Manual.
TCD-SCSS-V.20141120.001.12	NSX Cross-Support Utilities Reference Manual.
TCD-SCSS-V.20141120.001.13	Cross-Utilities Reference Manual.
TCD-SCSS-V.20141120.001.14	ASM32K Cross-Assembler Reference Manual.
TCD-SCSS-V.20141120.001.15	Instruction Set Reference Manual.
TCD-SCSS-W.20141120.001	NSX-32 Cross-Assembler & Utilities Package. (2 x MSDOS floppy disks) S/N: 850801-500153)

The boards were supplied with documentation and software, which are properly part of the literature and software categories of this catalog, but are listed here too for convenience.

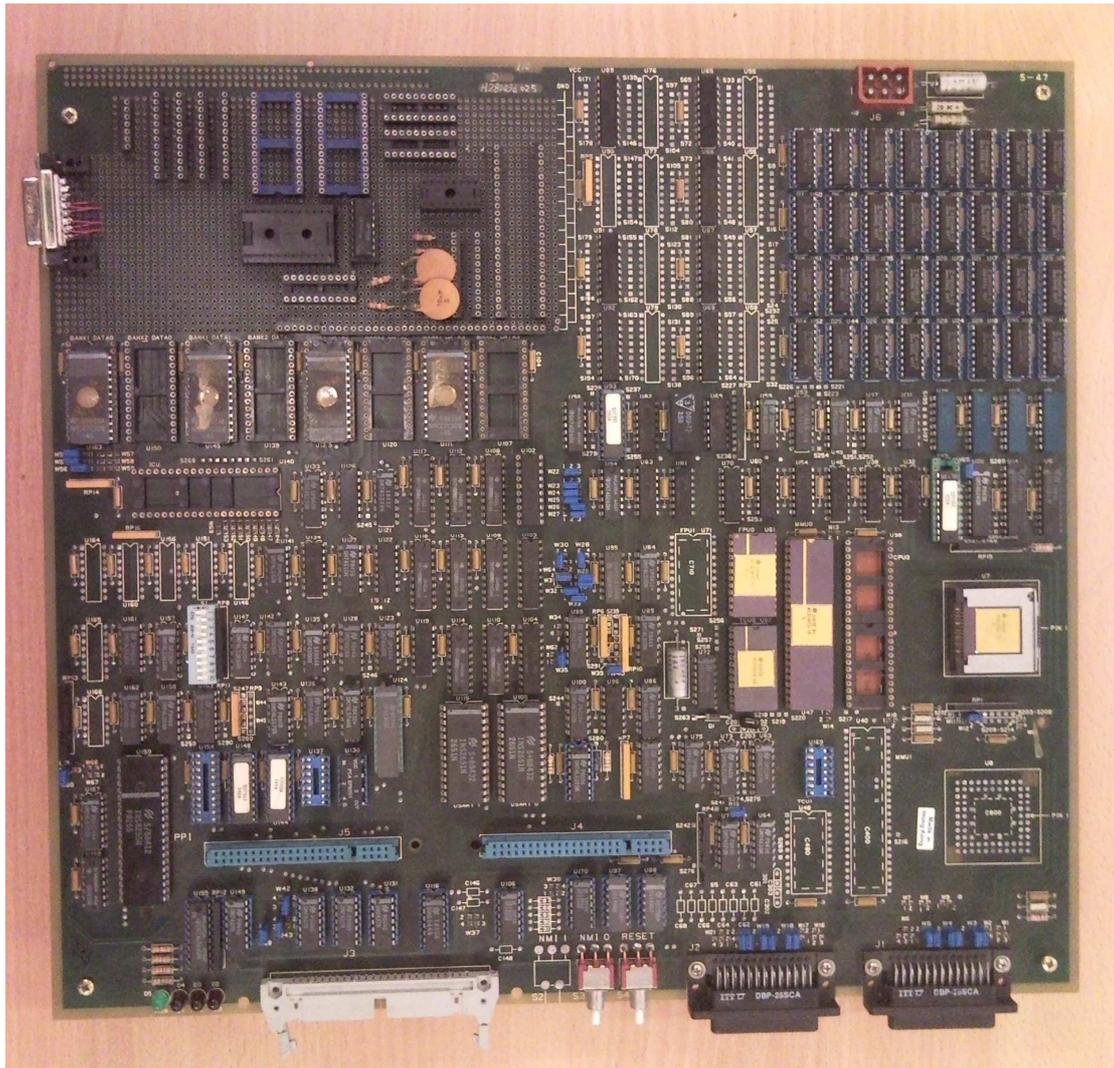


Figure 1: NS32000 Development Board 1 top view

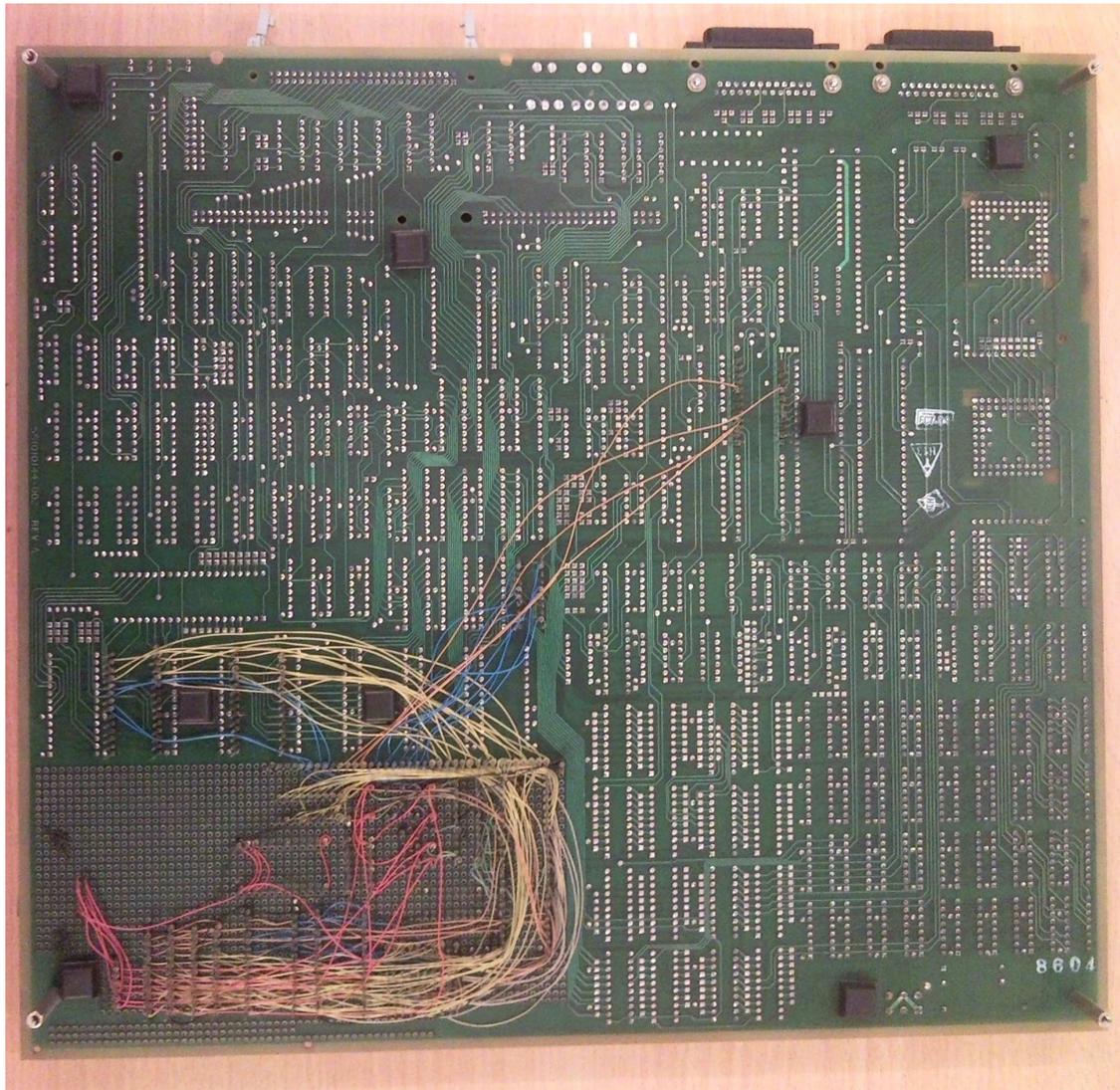


Figure 2: NS32000 Development Board 1 bottom view

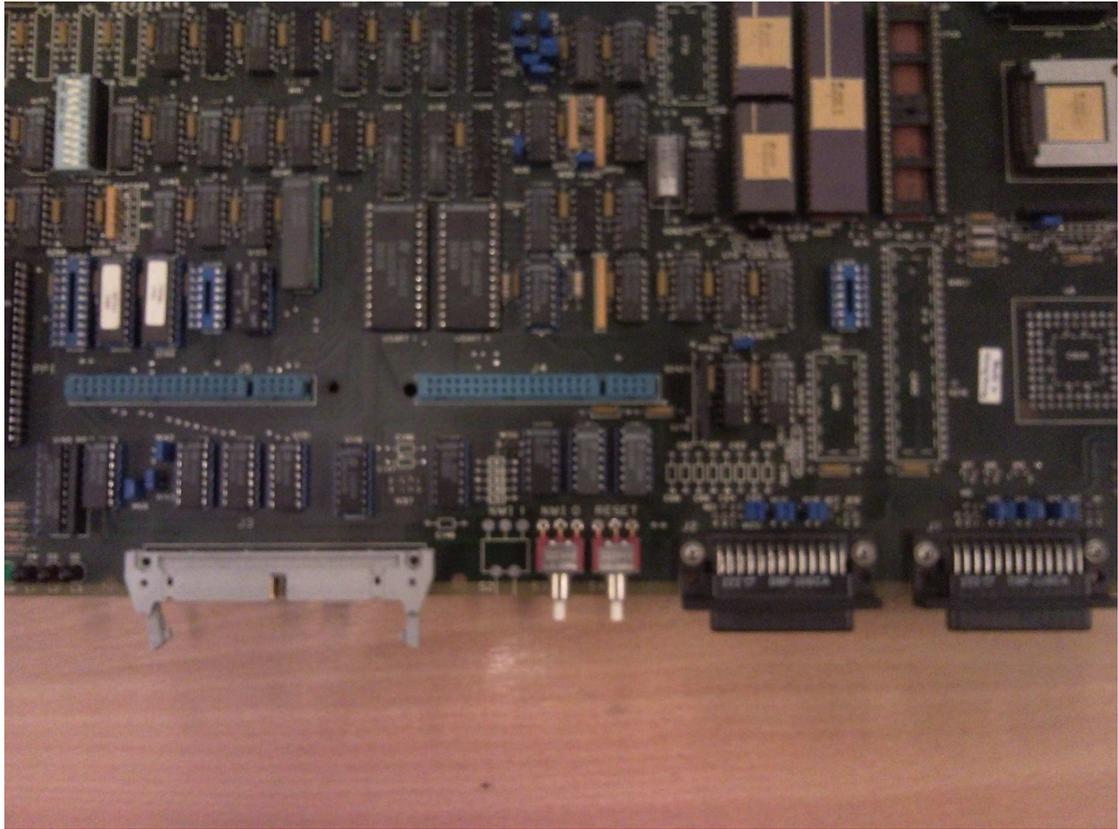


Figure 3: NS32000 Development Board 1 I/O ports

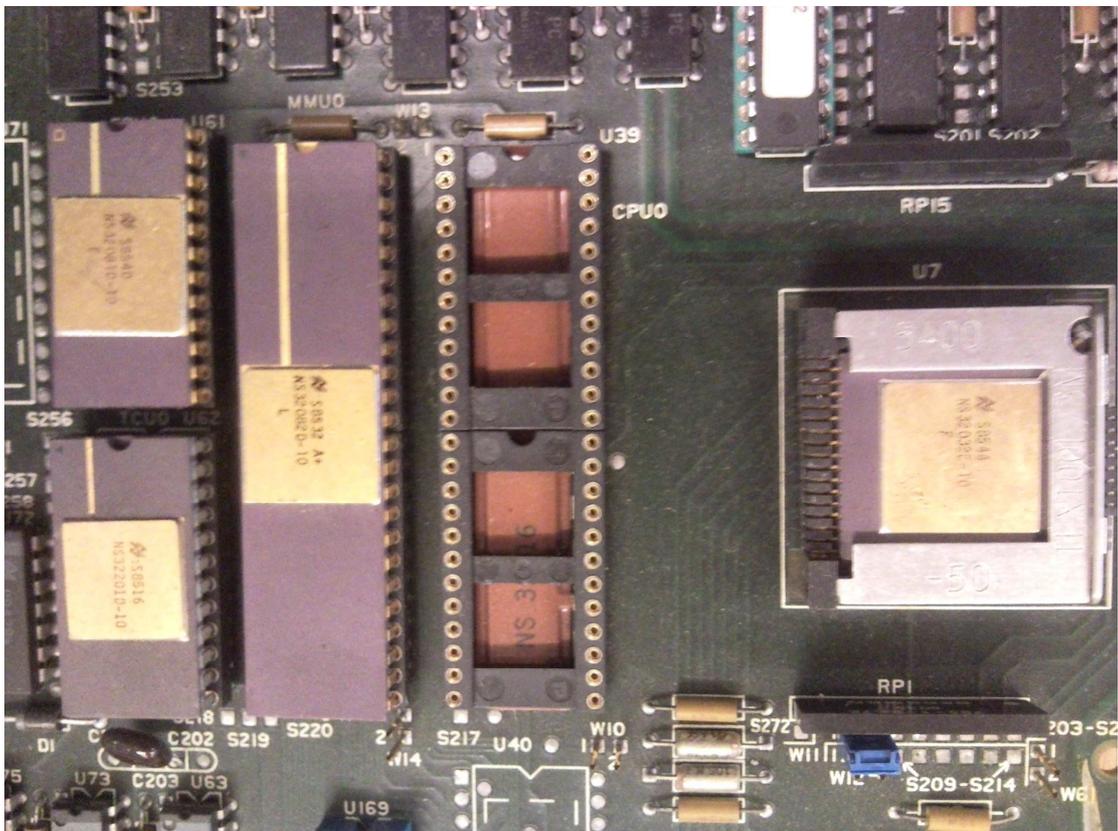


Figure 4: NS32000 Development Board 1 NS32000 chipset

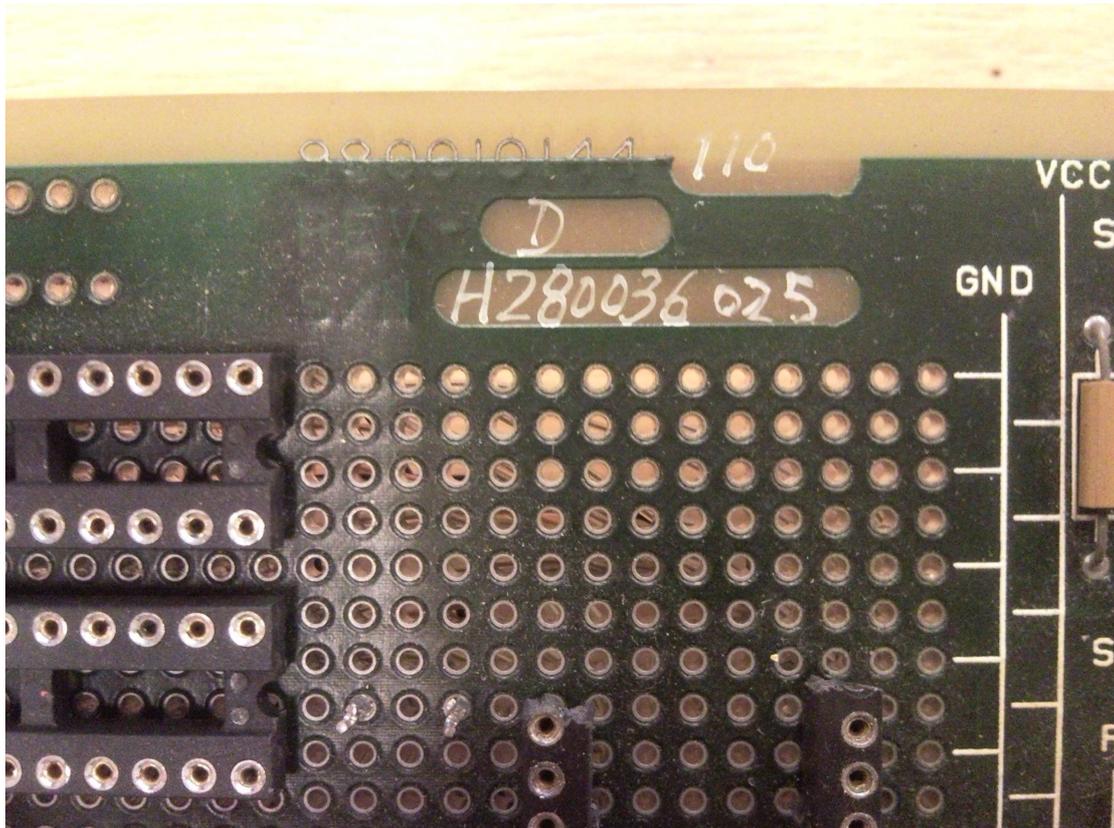


Figure 5: NS32000 Development Board 1 serial number H280036025

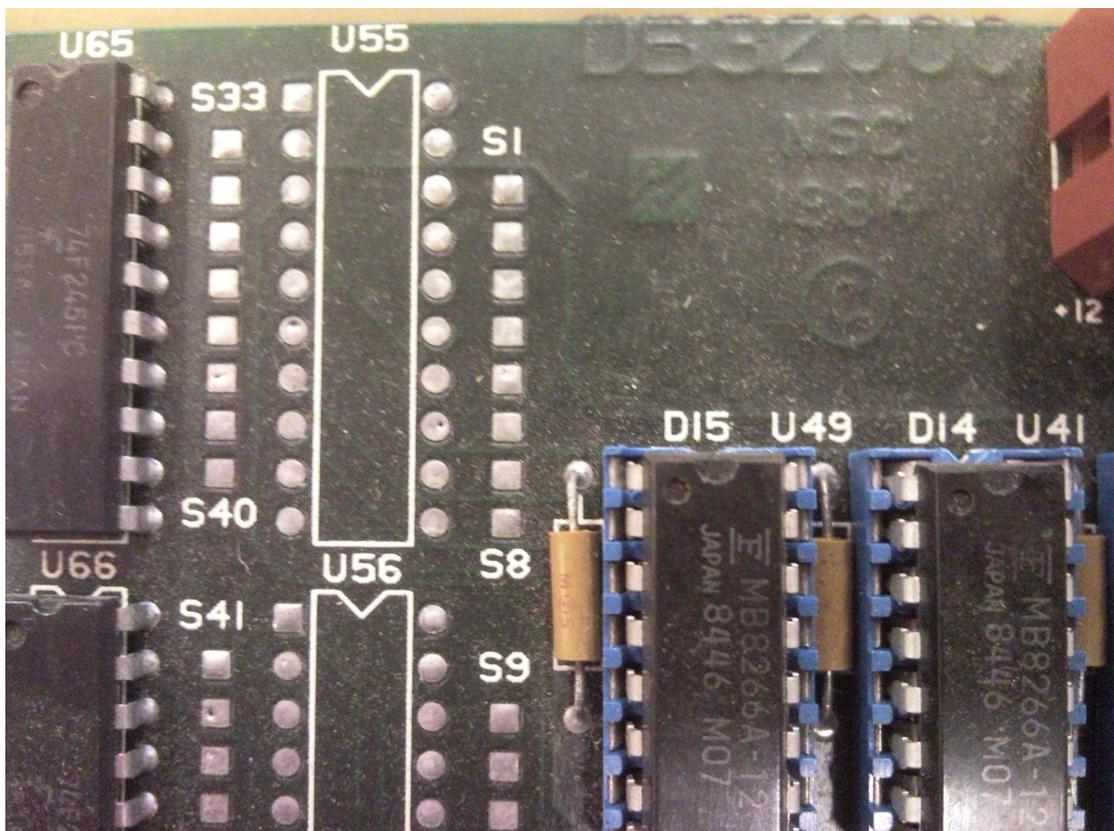


Figure 6: NS32000 Development Board 1 label

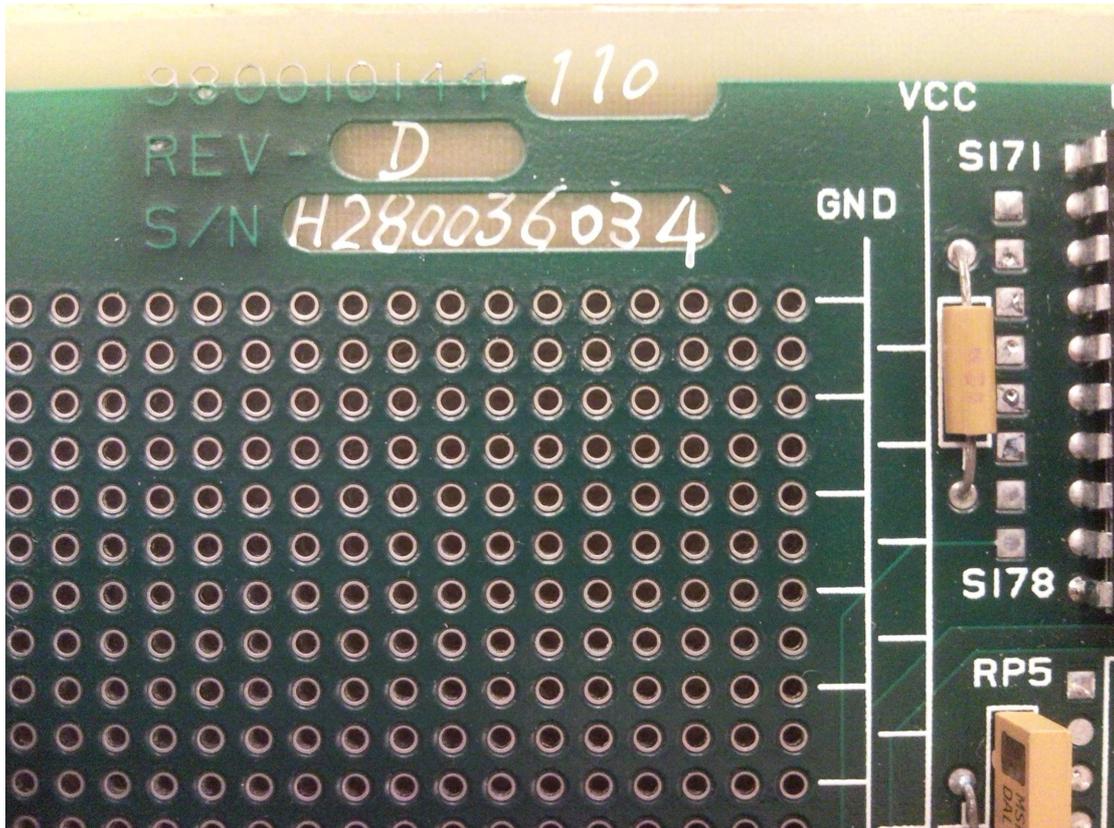


Figure 8: NS32000 Development Board 2 serial number H280036034

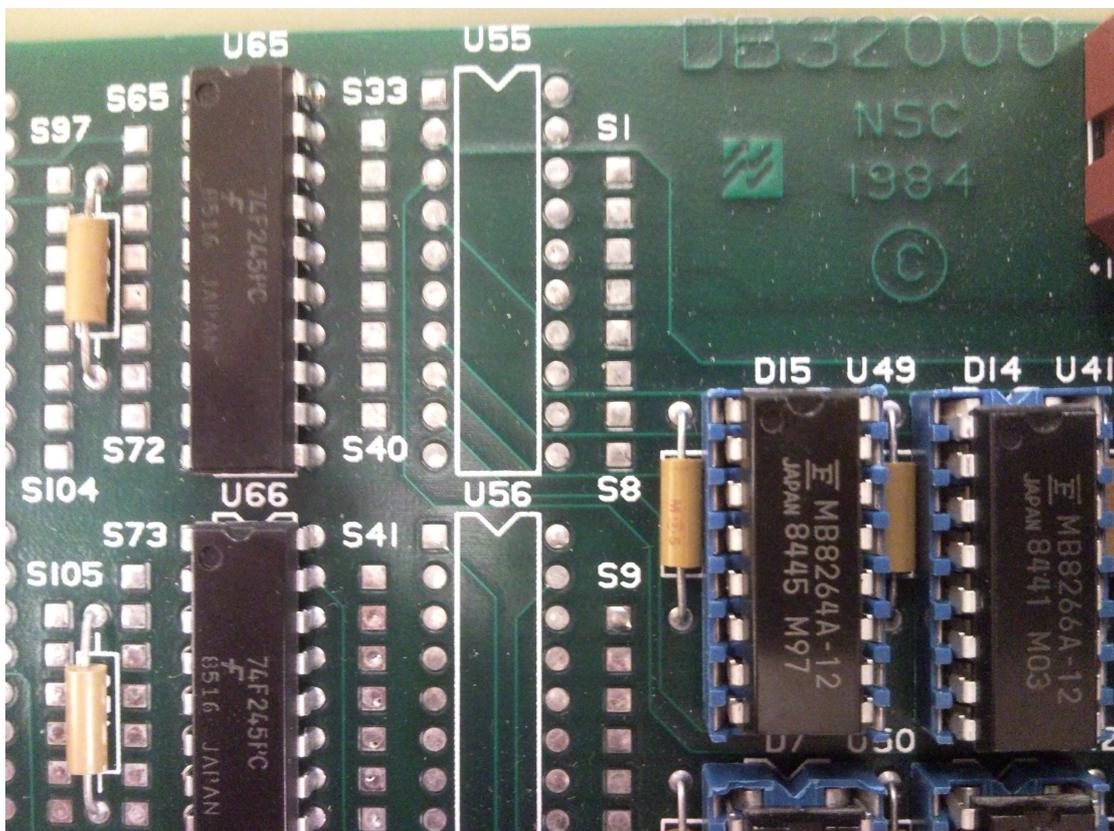


Figure 9: NS32000 Development Board 2 label



Figure 10: NS32000 Development Board 2 original packing

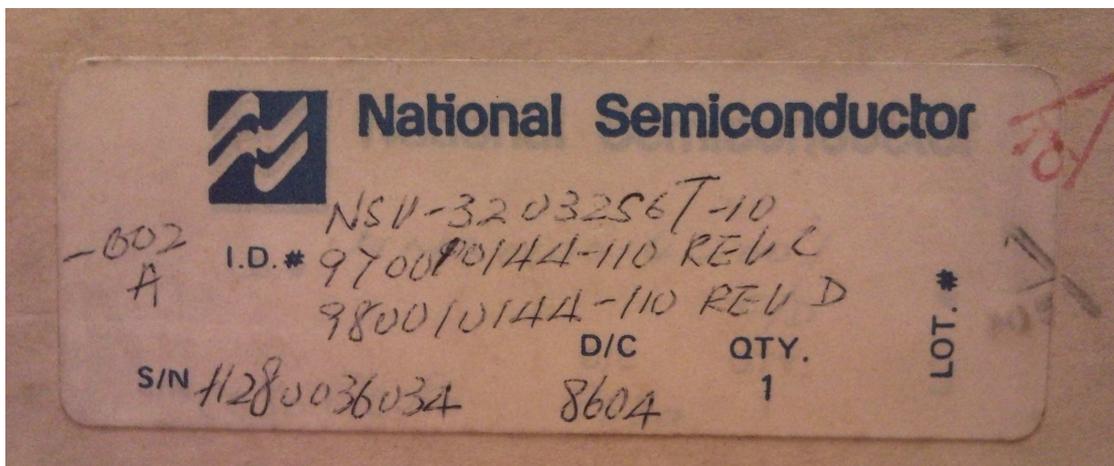


Figure 11: NS32000 Development Board 2 original packing label

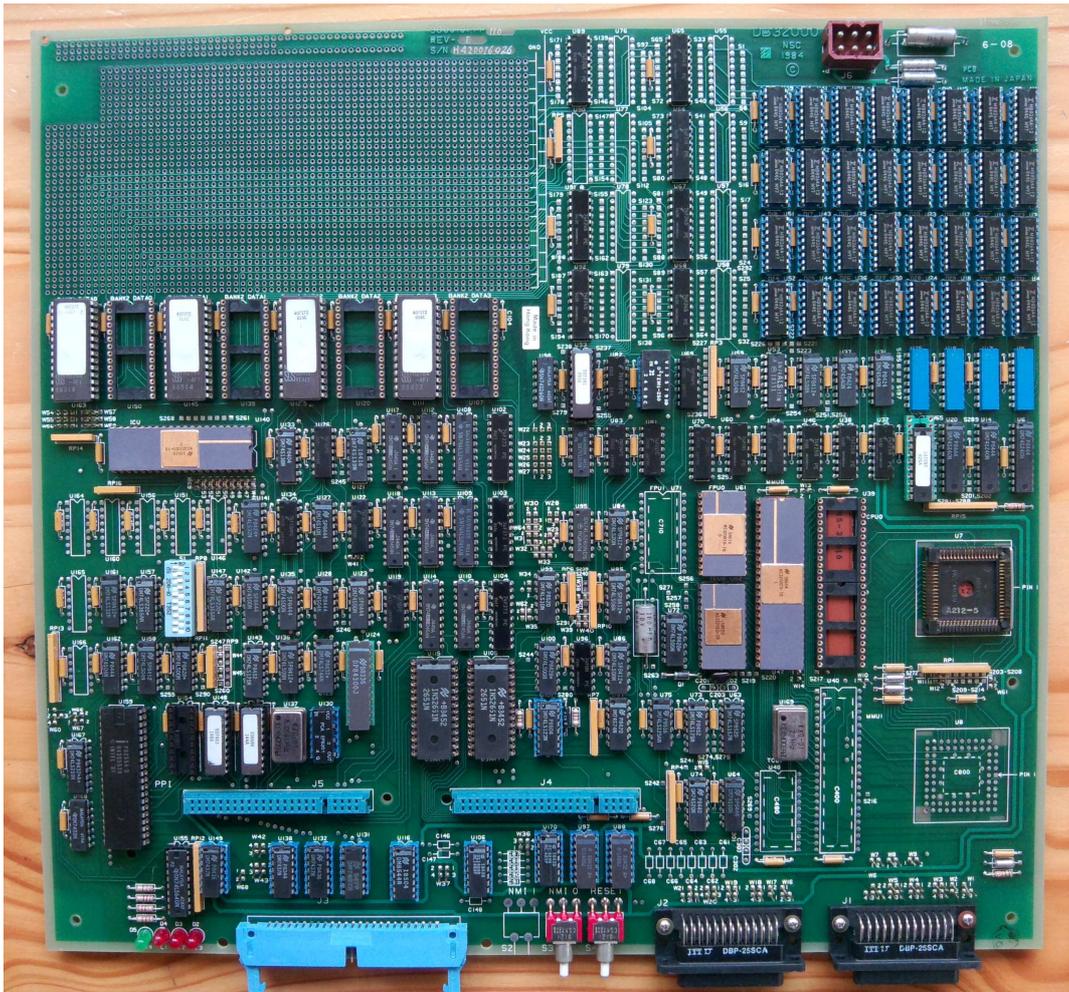


Figure 12: NS32000 Development Board 3 top view

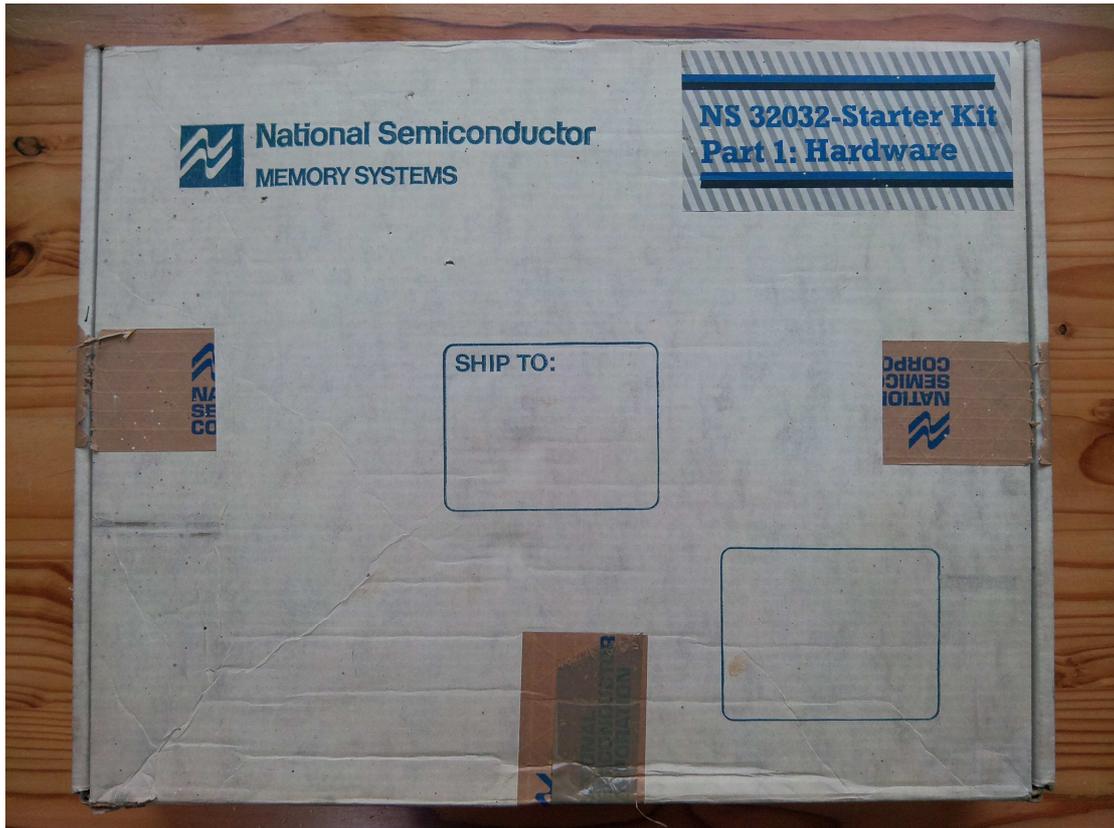


Figure 13: NS32000 Development Board 3 original packing

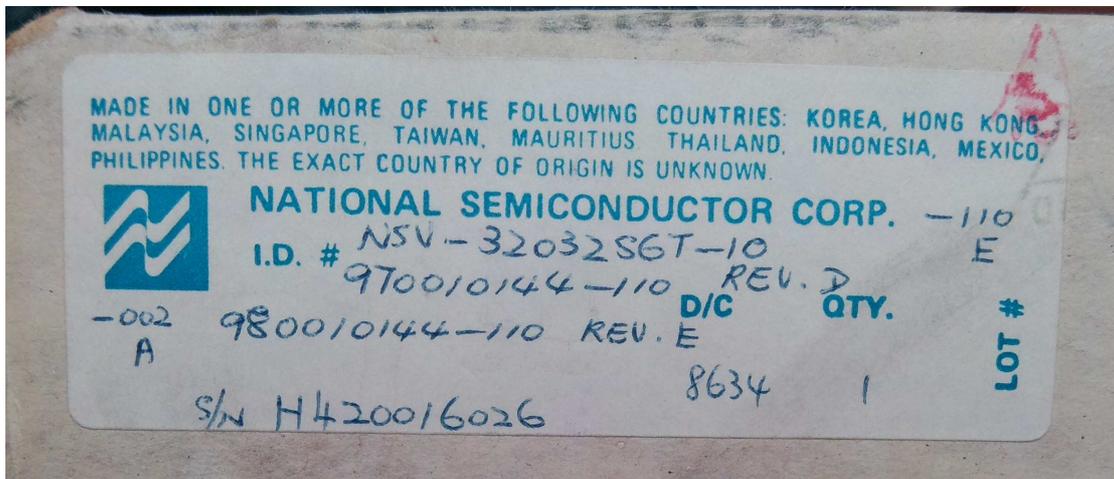


Figure 14: NS32000 Development Board 3 original packing label

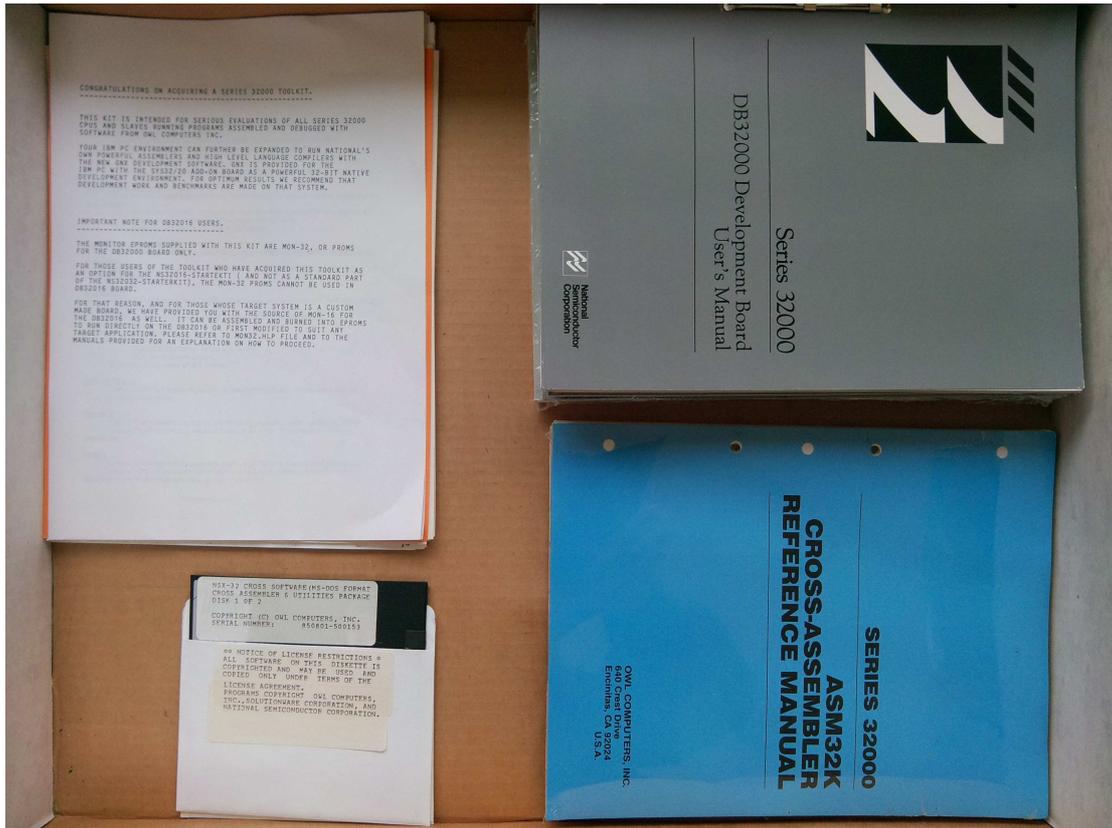


Figure 15: NS32000 Development Board 3 documentation

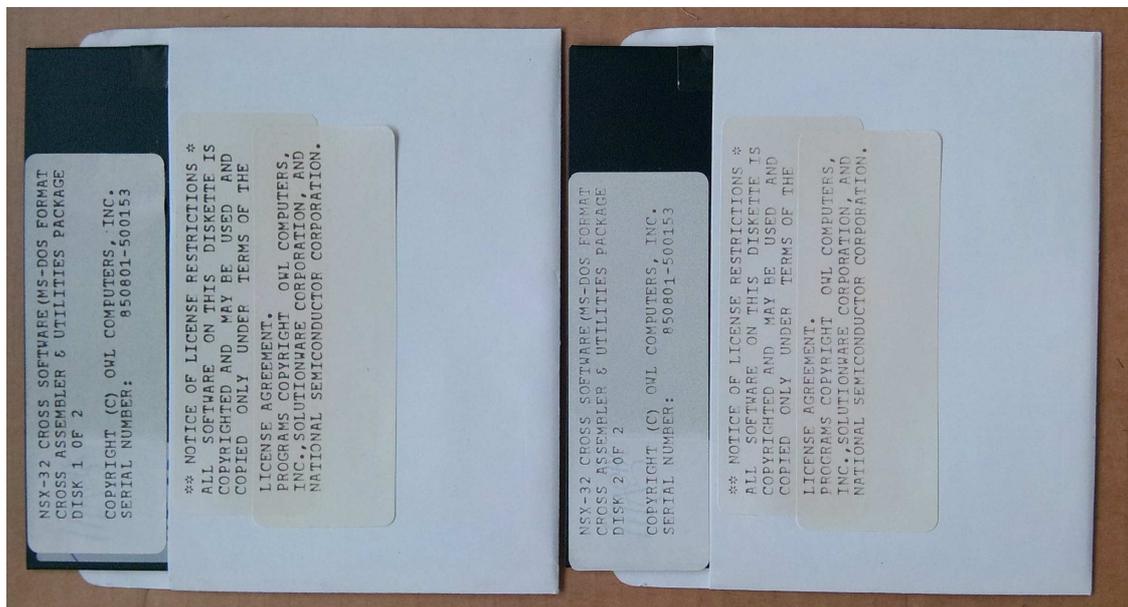


Figure 16: NS32000 Development Board 3 cross-assembler & utilities floppy disks