

AccessionIndex: TCD-SCSS-T.20250919.010

Accession Date: 19-Sep-2025

Accession By: Dr.Brian Coghlan

Object name: Texas Instruments TMS9900 and associated chips

Vintage: 1976

Synopsis: A 16-bit single-chip version of the TI 990 minicomputer.

Description:

The Texas Instruments TMS9900 was introduced in June 1976 as a 16-bit single-chip version of the TI-990 minicomputer, and used in simpler 990 models. It was not very widely adopted beyond T.I., largely due to its expensive 64-pin DIP package.

The TMS9900 was a 16-bit big-endian machine, addressing up to 64kB of memory organized as 32k x 16-bit words. Most of its 69 instructions could use any of the immediate, relative, indirect or indexed addressing modes, although some user registers served special purposes. A curiosity was instructions to shift an internal CRU register to/from an external shift register. It had three internal 16-bit registers: a program counter PC, status ST, and a *workspace pointer* WP to sixteen 16-bit user registers in memory. Context consisted of the PC and WP pair. Like the TI 990 and some other minicomputers, instead of a stack, branches saved the PC to a branch-and-link BL register, while interrupts and context switches used a BLWP register.

It was implemented in silicon gate nMOS with +5 V, -5 V and +12 V power supplies and a four-phase non-overlapping 3MHz clock generated by the TIM9904 clock generator. Most instructions executed in about 12 clock cycles. The 64-pin package did allow dedicated 15-bit word-address, 16-bit data pins, 4-bit interrupt pins, and DMA pins.

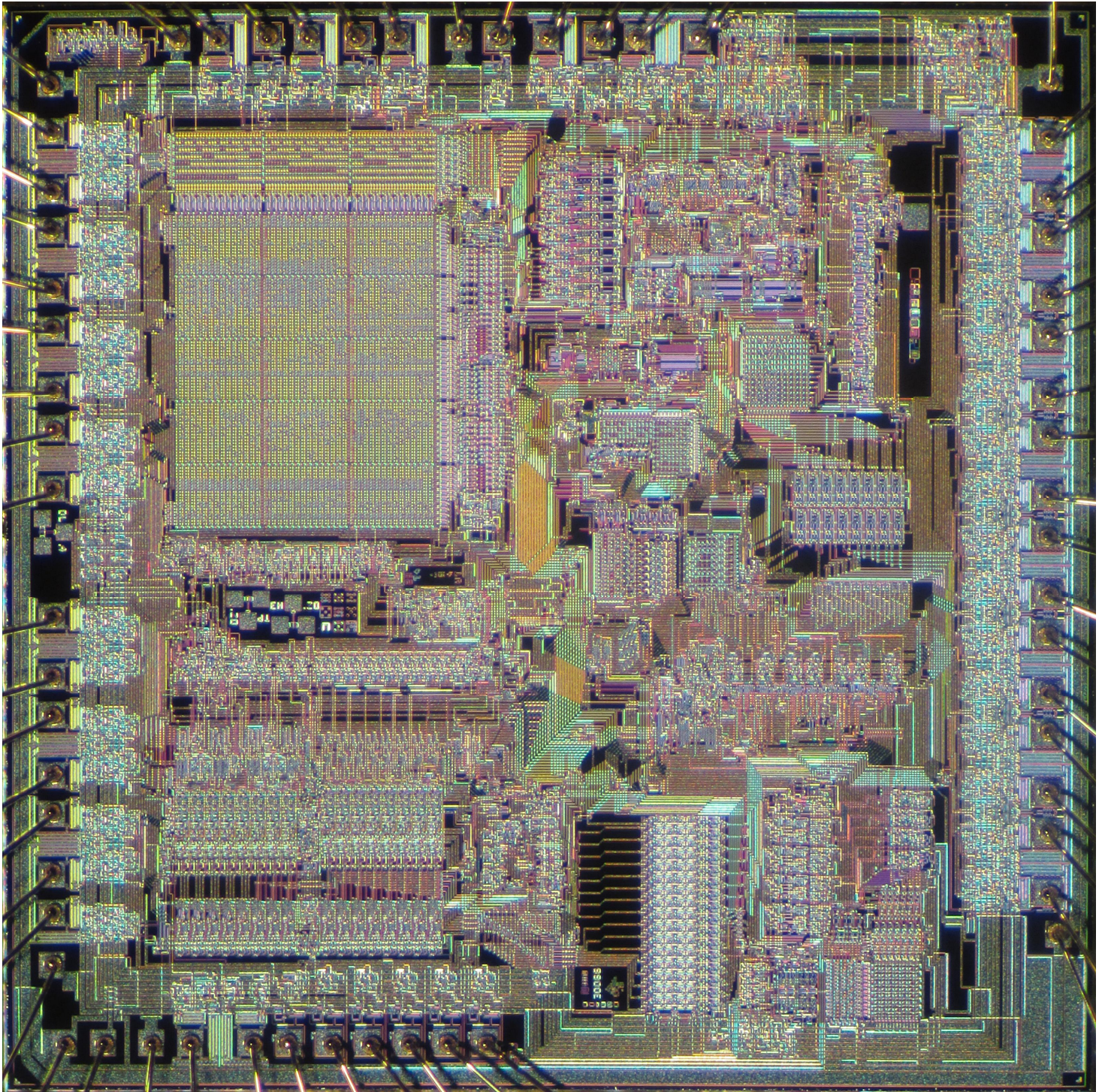
Many thanks to Brian Coghlan for donating these items.

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.

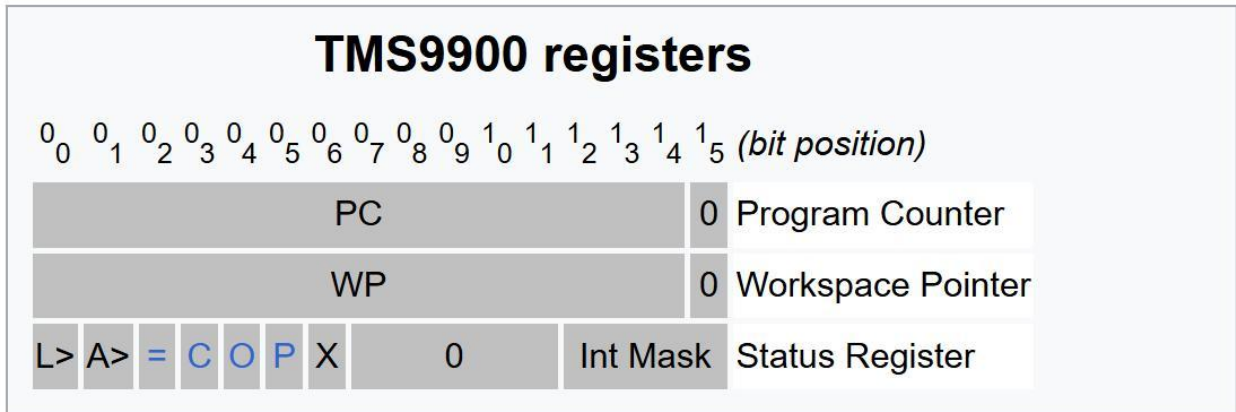
Accession Index	Object with Identification
TCD-SCSS-T.20250919.010	Texas Instruments TMS9900 and associated chips. A 16-bit single-chip version of the TI 990 minicomputer. 1976.
TCD-SCSS-T.20250919.010.01	Texas Instruments TMS9900JL microprocessor.
TCD-SCSS-T.20250919.010.02	Texas Instruments TMS9900NL microprocessor.
TCD-SCSS-T.20250919.010.03	Texas Instruments TMS9901NL-40 interrupt & I/O support.
TCD-SCSS-T.20250919.010.04	Texas Instruments TMS9902ANL-40 UART & timer support.
TCD-SCSS-T.20250919.010.05	Texas Instruments TIM9904N 4-phase clock generator.
TCD-SCSS-X.20250916.001	Dr. Brian Coghlan's Collection of Early Microprocessors. An extensive and nearly complete set of unused 1970s microprocessor chips, most accompanied with documentation, some with demonstration boards. 1971.

References:

1. Wikipedia, *TMS9900*, see:
<https://en.wikipedia.org/wiki/TMS9900>
 Last browsed to on 19-Sep-2025.
2. Wikipedia, *TMS9900 Microprocessor Data Manual*, May 1976, see:
<https://www.scss.tcd.ie/SCSSTreasuresCatalog/hardware/TCD-SCSS-T.20250919.010/TMS9900-Microprocessor-DataManual-May1976.pdf>
 Last browsed to on 19-Sep-2025.
3. Wikipedia, *TMS9901 Programmable Systems Interface datasheet*, July 1978, see:
<https://www.scss.tcd.ie/SCSSTreasuresCatalog/hardware/TCD-SCSS-T.20250919.010/TMS9901-ProgrammableSystemsInterface-datasheet-Jul1978.pdf>
 Last browsed to on 19-Sep-2025.
4. Wikipedia, *TMS9902 Asynchronous UART dataSheet*, January 1977, see:
<https://www.scss.tcd.ie/SCSSTreasuresCatalog/hardware/TCD-SCSS-T.20250919.010/TMS9902-dataSheet-Jan1977.pdf>
 Last browsed to on 19-Sep-2025.
5. Wikipedia, *TIM9904 Clock Generator datasheet*, see:
<https://www.scss.tcd.ie/SCSSTreasuresCatalog/hardware/TCD-SCSS-T.20250919.010/TIM9904-clockGenerator-datasheet-Sep1982.pdf>
 Last browsed to on 19-Sep-2025.



*Figure 1: Texas Instruments TMS9900 die micrograph.
From Wikipedia.*



*Figure 2: Texas Instruments TMS9900 registers.
From Wikipedia.*

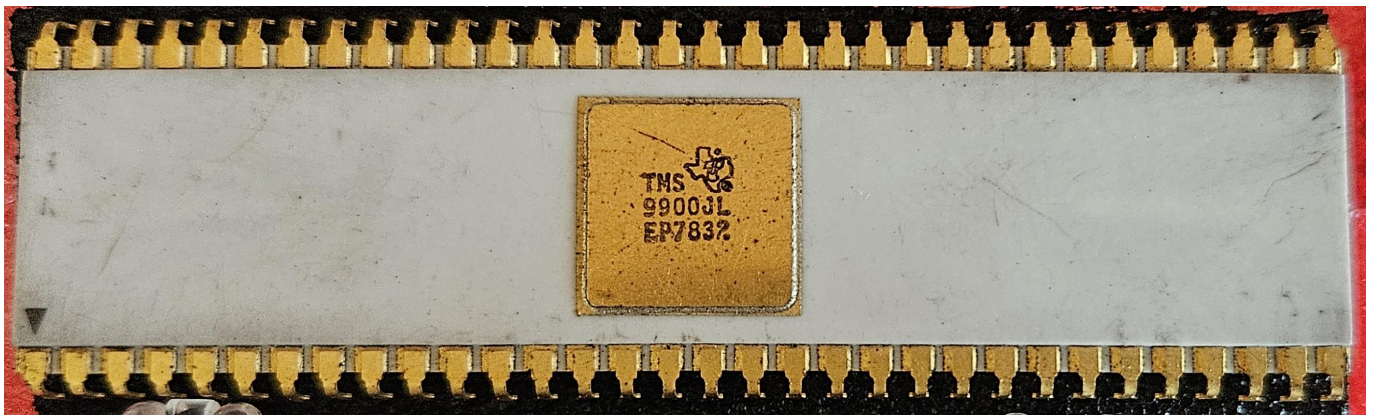


Figure 3: Texas Instruments TMS9900JL front view.

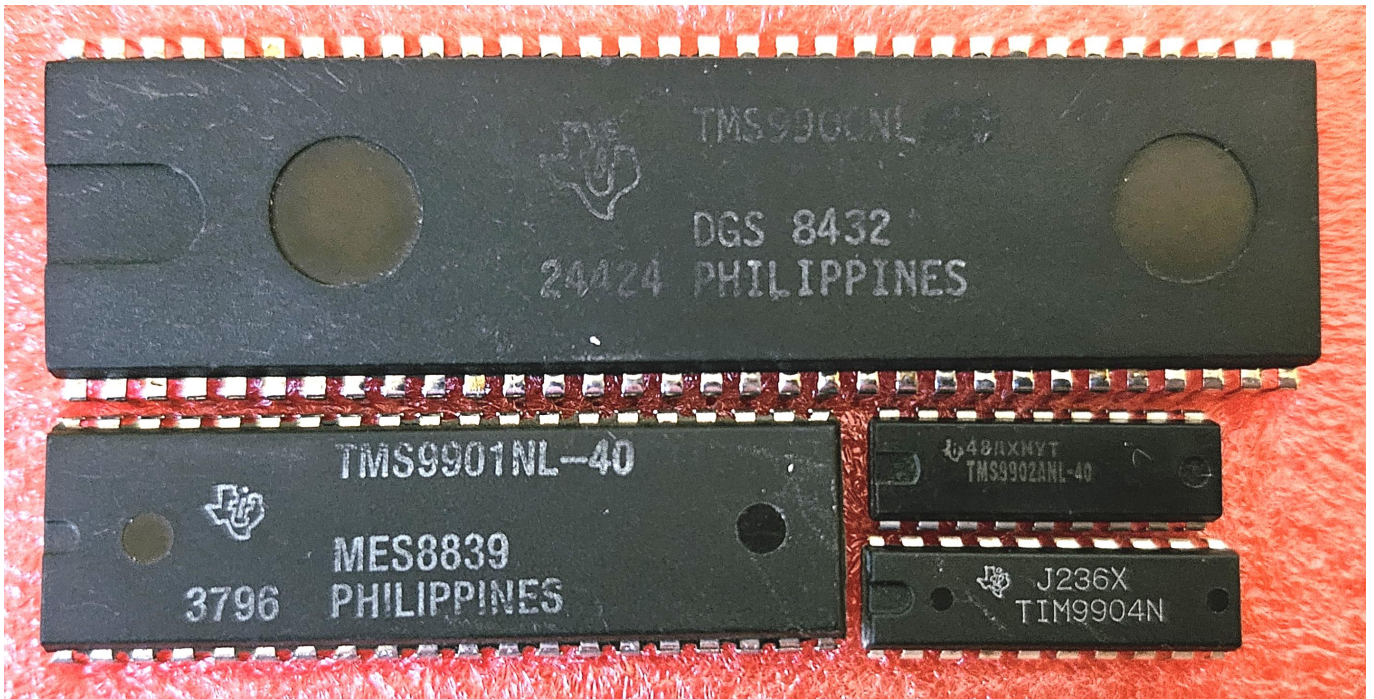


Figure 4: Texas Instruments TMS9900NL, TMS9901, TMS9902 and TIM9904 front views.



Figure 4: Texas Instruments TMS9902 and TIM9904 closeup views.