

Nicolet 1080 Series (Lab-80, BNC-80, NMR-80, Med-80) Overview

The Nicolet 1080 Series minicomputers are dual-purpose instruments that facilitate the acquisition and ensemble-averaging of a signal from an experiment as well as for its subsequent analysis. Their genesis lay in bringing together the (previously separate) hardware for signal-averaging and computation: see Jack Kisslinger's web page

<http://www.versci.com/index.html>

from which some of the following overview information is taken –

Manufacturer: Nicolet Instrument Corporation, Madison, Wisconsin, USA.

Era. The 1970s. The first 1080 was shipped to Indiana University in 1971.

Total number: About 270 were manufactured.

Construction: ICs soldered to PCBs in sockets connected by a wire-wrap (no mother board).

Memory: Ferrite core memory, fitted internally in either 2 or 3 stacks (i.e. 8K or 12K of words). Additional memory (up to 32K) could be added externally.

Speed: The processor took $4\mu\text{s}$ or $6\mu\text{s}$ for direct or indirect instructions, respectively.

Word length: 20-bit, conferring huge advantages in comparison with the 8-bit and 16-bit competitors of the 1970s.

Number convention: Octal, with bit-19 (the leftmost bit) treated as the sign bit. Thus the largest integers were 1777777 (+524,287 decimal) and 2000000 (–524,288).

Integer multiply/divide: Done in hardware utilising an additional 20-bit register, the MQ. It enabled multiplication with 40-bit precision and division with 20-bit precision (with 20-bit remainder).

Decimal numbers: Processed in software.

Signal acquisition: The memory to be used was set by buttons on the front panel.

Parameter adjustments: Two multi-turn knobs on the front panel facilitate fine manual adjustments, usually related to the CRT display.

Internal ADC speed: Digitised at 100 kHz. For higher speeds, an external transient recorder was used.

Internal ADC resolution: Up to 12-bit, adjustable with buttons or under software control.

Vertical display scale: A multi-position switch brought the displayed data within the vertical range seen on the CRT.

LEDs: Three rows of LEDs on the front panel show the contents of the Accumulator, Instruction Register and Program Counter, respectively.

Switch register: Together with the associated buttons, the switch register enabled the contents of any address or register (except the MQ) to be read, or to be set to a chosen value.

Standard input/output: ASR 33 Teletype plus high-resolution Tektronix CRT display.

Enhanced input/output: Provision for RS232 A-channel for computer control with VDU, Channel-B for external connectivity; external disk drives (8" floppies and Diablo 30 hard drive).

Programming: Assembly language was needed for efficiency (but BASIC was also available).

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