

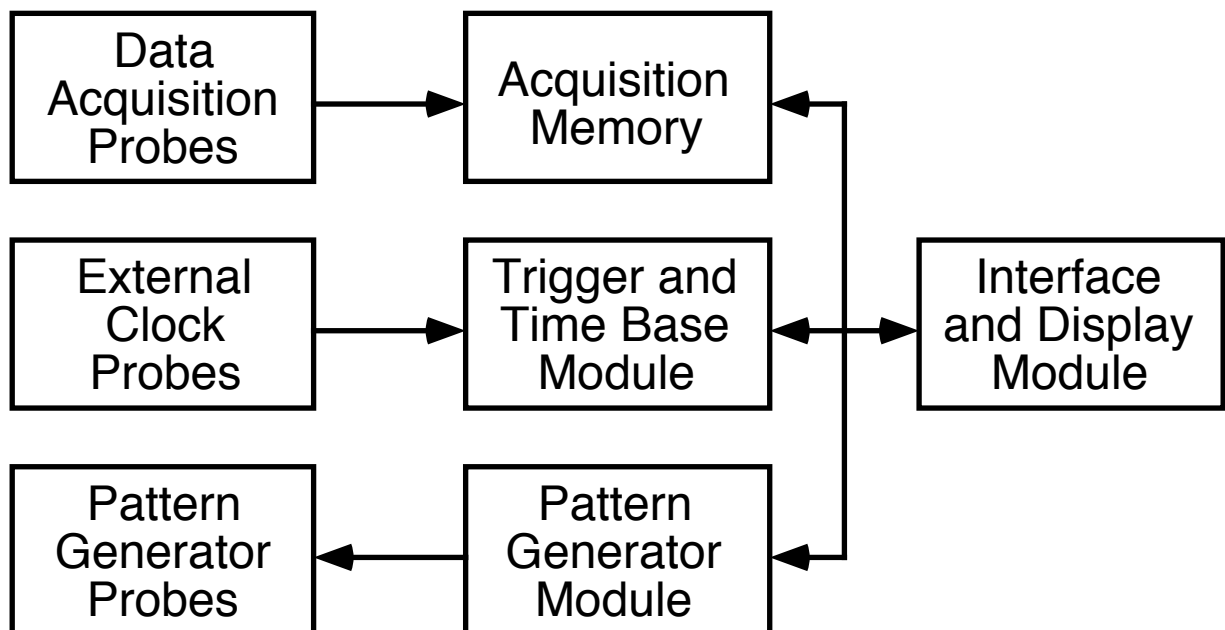
# Computer and VLSI design

Tektronix 9100 logic analyzer

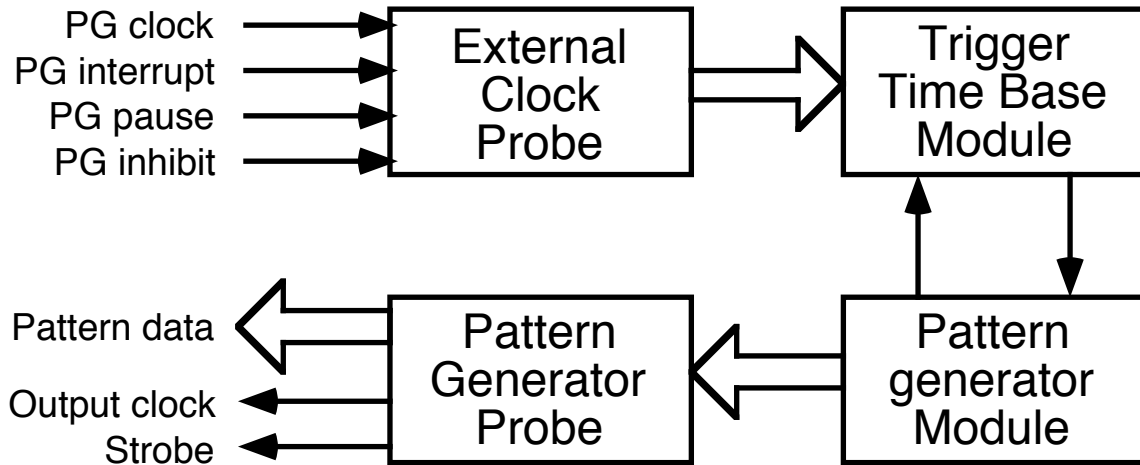
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# Tektronix 9100 Digital Analysis System

- 32 channel pattern generator (to 25 MHz)
- 32 channel data acquisition module (to 25 MHz)
- Cross software
  - Generate test patterns on host computer
  - Download patterns to DAS and execute
  - Upload results to host computer for comparison
- Clock control
  - Split clock plus multiple qualifiers
  - Synchronous and asynchronous operation
- Trigger modes
  - Word A N times
  - Word A followed by word B
  - Word A then not word B
  - Reset on word C



# Pattern Generator



- Pattern clocking
  - Output clock is derived from master clock
  - Data transitions are tied to rising edge of output clock
  - Strobe delay, width and shape are programmable
- Pattern programming
  - Sequence number (generator program step number)
  - Label (branch target or subroutine entry point)
  - Pod value (driven through pattern data output)
  - Instruction
  - Strobe (assert/enable strobe output)
  - Interrupt (specify interrupt subroutine, edge)
- Instructions
  - HALT - Stop pattern generation
  - REPEAT - Send same data value for N clock cycles
  - HOLD - Hold value for N internal clocks; No ext clock
  - COUNT - Count up N times from (initial) pod value
  - GOTO - Jump to sequence step indicated by label
  - CALL - Call subroutine (Maximum 15 levels deep)
  - RETURN - Return from subroutine

## Data display

- Acquisition memory
  - Stores acquired test results
  - Display formats
    - "State table" or sequence/data pairs
    - Timing diagram
- Reference memory
  - Holds previously acquired reference data
  - Acq is copied to ref memory by pressing "store" key
- Can display acq and ref data side by side in table
- Can compare acq and ref data sequences

## Readability features

- Acquisition and reference data formats
  - Binary
  - Octal
  - Hexadecimal
  - Mnemonic
- Mnemonic definition table
  - Value, mnemonic and trailing word specification
  - Trailing word handles multiple word instructions

# Pattern generation example

SEQ	LABEL	HEX	INSTRUCTIONS
0		0000	
1		0001	
2		0002	
3		0003	CALL SUB
4		0004	
5		0005	CALL SUB
6		0006	
7		0007	HALT
8	SUB	000A	
9		000B	REPEAT 3
10		000C	RETURN

SEQ	HEX
0	00
1	01
2	02
3	03
4	0A
5	0B
6	0B
7	0B
8	0C
9	04
10	05
11	0A
12	0B
13	0B
14	0B
15	0C
16	06
17	07