
System Level Integration

V30xx 16 bit CISC CPU Cores

Overview

- **Family Overview**
- **V30HL**
- **V30MX**
- **V30MT**
- **V30MZ**
- **Appendix:**
 - V20 CISC CPU Core
 - Z80 CISC CPU Core

V30xx - 80186 compatible CISC Controller Overview

Core	CB-C7	CB-C8x	CB-C9x	CB-C10x	Comment
V30HL	20MHz	-	-	-	Compatible with μ PD70116
V30MX	25MHz	33MHz 1mA/MHz	33MHz	(Note 1)	Enhanced V30ML product
V30MT		20MHz 0.6mA/MHz (note 2)	(Note 1)	(Note 1)	Low-power Version
V30MZ	-	-	66MHz 1.4mA/MHz 35MIPS	(Note 1)	High performance version (0.53MIPS/MHz)

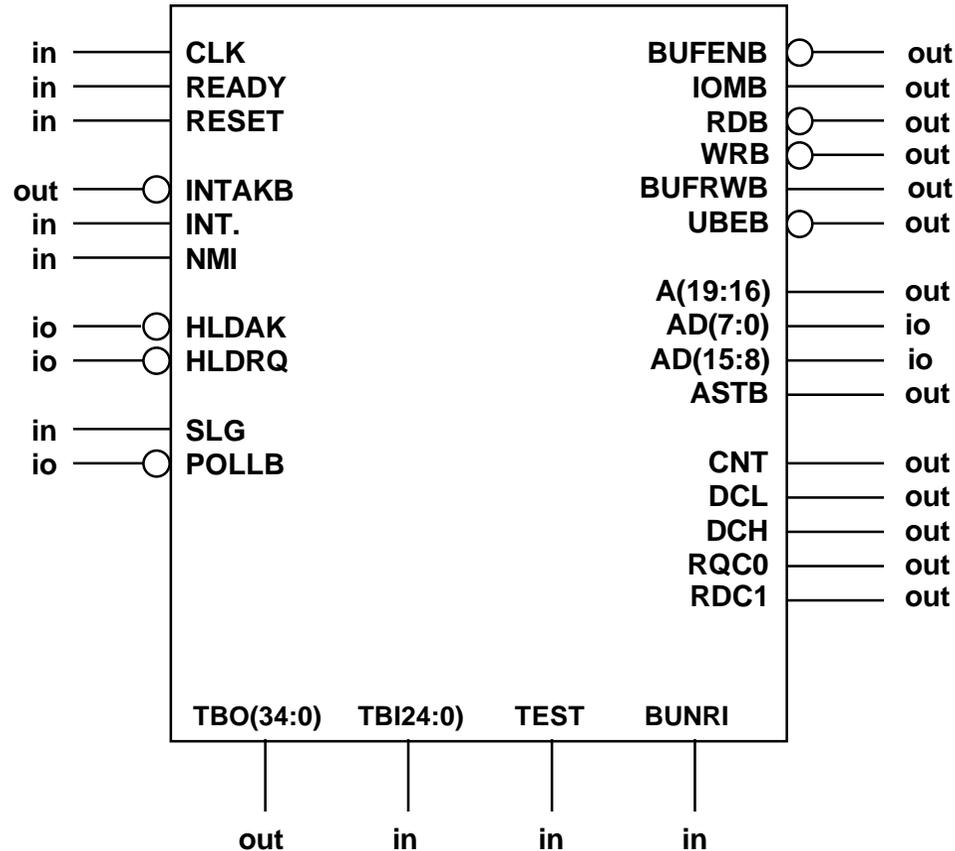
Note 1: on request

Note 2: available on request; Database completed

Features of V30HL

- **Fully static circuit configuration, the standby mode and clock-stop mode can be easily initiated**
- **Low power consumption**
- **Memory addressing size: 1M bytes**
- **Fourteen 16-bit registers**
- **101 different instructions (fully compatible with μ PD70116 standard part)**
- **Widely available emulators and development software**
- **Example: CB-C7 Implementation**
 - 0.8 μ m CMOS process
 - 20 MHz operation - 2.6MIPS
 - 0,13 MIPS/MHz

NA70116H 16-Bit CPU Macro (CB-C7)



Features of V30MX

- **Software code compatible with xx286 CPUs**
- **Fully compatible with V30HL macro and μ PD70116H**
- **1.67X performance increase over V30HL at same frequency**
- **2.8X performance increase at 33 MHz over V30HL at 20 MHz**
- **LIM EMS 4.0 Register support**
- **286 compatible address pipelining allows low cost memory interface**
- **Example: CB-C8VX/VM Implementation**
 - Power consumption 1 mA/MHz
 - 33 MHz operation at 3V - 4.3MIPS
 - 0.13 MIPS/MHz
 - 2.42 x 3.12mm²

Major Differences V30HL vs. V30MX

■ Address/Data bus

➤ V30HL:

- Address and data bus are multiplexed sharing the same pins
- 24 bit address bus

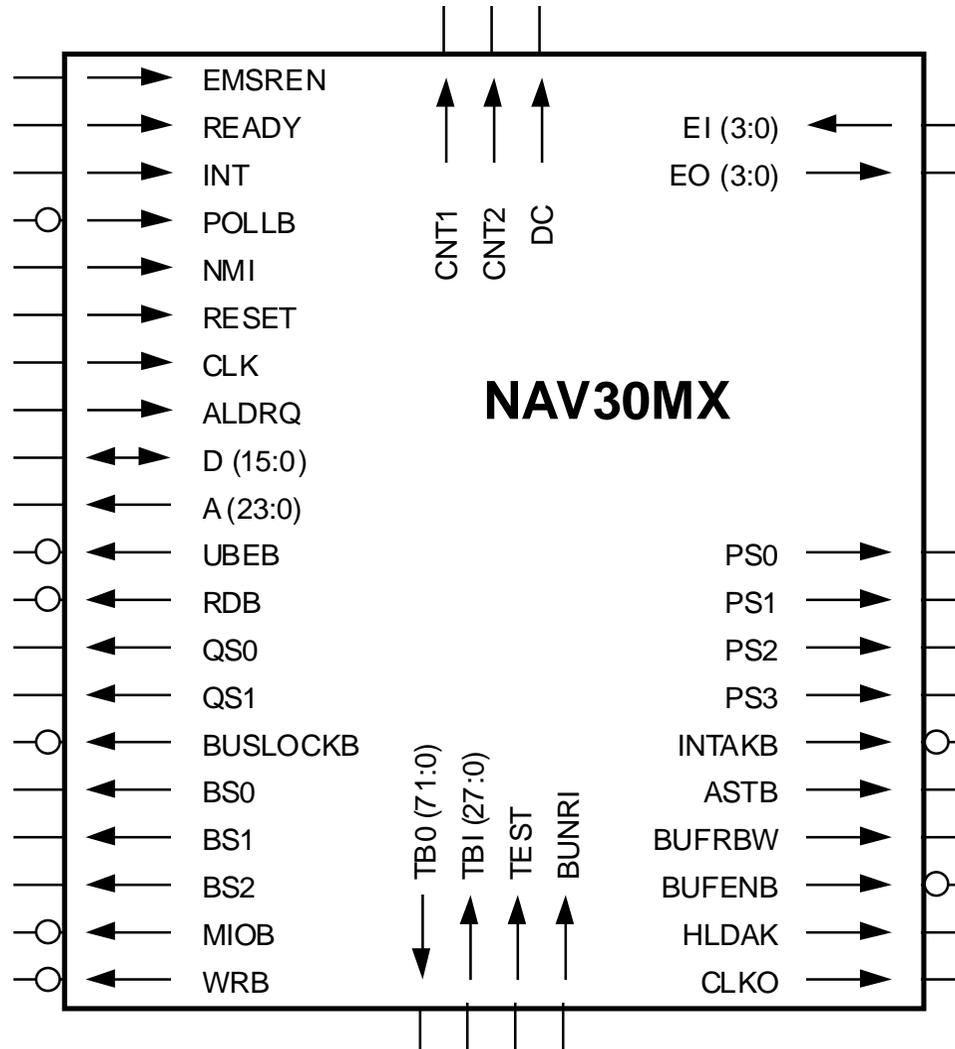
➤ V30MX:

- separate pins for address and data bus
- extended address bus (24 bit)

■ μ PD8080AF Emulation Function

- V30HL: support for μ PD8080AF Emulation
- V30MX : no support for μ PD8080AF Emulation

V30MX 16-Bit CPU Macro (CB-C8VX)



Features of V30MT

- **Functionally equivalent to V30MX**
- **Advantages:**
 - Reduced power consumption
 - Reduced area
- **Disadvantage: Reduced maximum computing performance**
- **Example: CB-C8VX/VM Implementation (target data)**
 - 20 MHz operation - 2.6MIPS
 - 0.6 mA/MHz
 - 0.13 MIPS/MHz
 - 2.08mm x 2.08mm

Features of V30MZ

- **High performance 16bit CISC controller**
- **Completely new design based on internal RISC machine**
- **Fully static circuit configuration, the standby mode and clock-stop mode can be easily initiated**
- **Memory addressing size: 1M bytes**
- **0.53 MIPS/MHz instead of 0.13 MIPS/MHz for V30MT/MX**
- **Instruction set is the same one as 80186 of Intel Inc.**
 - Support for expanded instruction set of V30HL/MX/MT, EMS 4.0 and 8080 emulation mode have been skipped to optimize cost efficiency
- **Widely available emulators and development software**
- **Example: CB-C9 Implementation**
 - 66 MHz operation - 35 MIPS
 - 1.4mA/MHz power consumption
 - 2.3mm x 2.3mm

Appendix: V20

- **For NEC's 0.8 and 0.5 micron CB-IC families (CB-C7 and CB-C8VX/VM) also the Intel 8086 compliant V20 CPU core is available**
 - 16 bit microprocessor
 - 8 bit databus
- **CB-C7 implementation**
 - Size: 3.7 x 3.9 mm²
 - Clock: 8 MHz
 - Performance: 0.4 MIPS
- **CB-C8 implementation**
 - Size: 1.7 x 1.7 mm²
 - Clock: 20 MHz
 - Performance: 1 MIPS

Appendix: Z80

- **For general low-end controller application or for flexible software implementations of fixed functions NEC offers Zilog Z80 compatible CISC CPU cores in all cell-based technologies**
- **CB-C8VX/VM**
 - Size: 1.7 x 1.7 mm²
 - Clock: 20 MHz
- **CB-C9**
 - Size: 1.1 x 1.1 mm²
 - Clock: 33 MHz