

Advance Information

MPC7447ANXPNS
Rev. 0, 2/2004

MPC7447A Part Number
Specification for the
MC7447AnnnNx Series

*Motorola Part
Numbers Affected:*

MC7447AHX1000NB
MC7447AHX1167NB

This document describes part-number-specific changes to recommended operating conditions and revised electrical specifications, as applicable, from those described in the general *MPC7447A RISC Microprocessor Hardware Specifications*. The MPC7447A is a PowerPC™ microprocessor.

Specifications provided in this document supersede those in the *MPC7447A RISC Microprocessor Hardware Specifications*, Rev. 0 or later, for the part numbers listed in Table A only. Specifications not addressed herein are unchanged.

Note that headings and table numbers in this document are not consecutively numbered. They are intended to correspond to the heading or table affected in the general hardware specification.

Part numbers addressed in this document are listed in Table A.

Table A. Part Numbers Addressed by this Data Sheet

Motorola Part Number	Operating Conditions			Significant Differences from Hardware Specification
	CPU Frequency (MHz)	V _{DD}	T _j (°C)	
PPC7447AHX1000NB	1000	1.1 V ± 50 mV	0 to 105	Modified core frequency and voltage to reduce power consumption, modified processor bus clock frequency and AC timing.
PPC7447AHX1167NB	1167			

Note: The P prefix in a Motorola part number designates a "Pilot Production Prototype" as defined by Motorola SOP 3-13. These parts have only preliminary reliability and characterization data. Before pilot production prototypes may be shipped, written authorization from the customer must be on file in the applicable sales office acknowledging the qualification status and the fact that product changes may still occur while shipping pilot production prototypes.

1.2 Features

This section summarizes changes to the features of the MPC7447A described in the *MPC7447A RISC Microprocessor Hardware Specifications*.

- Power management
 - 1.1-V processor core

1.4 General Parameters

- Core power supply: 1.1 V \pm 50 mV DC nominal

1.5.1 DC Electrical Characteristics

Table 4 provides the recommended operating conditions for the MPC7447A part numbers described herein.

Table 4. Recommended Operating Conditions ¹

Characteristic	Symbol	Recommended Value	Unit	Notes
Core supply voltage	V _{DD}	1.1 V \pm 50 mV	V	
PLL supply voltage	AV _{DD}	1.1 V \pm 50 mV	V	2

Note:

1. These are the recommended and tested operating conditions. Proper device operation outside of these conditions is not guaranteed.
2. This voltage is the input to the filter discussed in *MPC7447A RISC Microprocessor Hardware Specifications*, Section 1.9.2, “PLL Power Supply Filtering,” and not necessarily the voltage at the AV_{DD} pin, which may be reduced from V_{DD} by the filter.

Table 7 provides the power consumption for the MPC7447A part numbers described herein. For information regarding power consumption when dynamic frequency switching (DFS) is enabled, see the *MPC7447A RISC Microprocessor Hardware Specifications*.

Table 7. Power Consumption for MPC7447A

	Processor (CPU) Frequency		Unit	Notes
	1000 MHz	1167 MHz		
Full-Power Mode				
Typical	8.0	9.2	W	1, 2
Maximum	11.5	13.0	W	1, 3
Nap Mode				
Typical	1.3	1.3	W	1, 2
Sleep Mode				
Typical	1.3	1.3	W	1, 2
Deep Sleep Mode (PLL Disabled)				
Typical	1.2	1.2	W	1, 2

Notes:

1. These values apply for all valid processor buses. The values do not include I/O supply power (OV_{DD}) or PLL supply power (AV_{DD}). OV_{DD} power is system dependent but is typically < 5% of V_{DD} power. Worst case power consumption for AV_{DD} < 3 mW.
2. Typical power is an average value measured at the nominal recommended V_{DD} (see Table 4) and 65°C while running the Dhrystone 2.1 benchmark and achieving 2.3 Dhrystone MIPS/MHz.
3. Maximum power is the average measured at nominal V_{DD} and maximum operating junction temperature (see Table 4) while running an entirely cache-resident, contrived sequence of instructions which keep all the execution units maximally busy.
4. Doze mode is not a user-definable state; it is an intermediate state between full-power and either nap or sleep mode. As a result, power consumption for this mode is not tested.

1.5.2 AC Electrical Characteristics

Table 8 provides the clock AC timing specifications for the MPC7447A part numbers described herein.

Table 8. Clock AC Timing Specifications

At recommended operating conditions. See Table 4.

Characteristic	Symbol	Maximum Processor Core Frequency				Unit	Notes
		1000 MHz		1167 MHz			
		Min	Max	Min	Max		
Processor frequency	f_{core}	500	1000	500	1167	MHz	1, 2
VCO frequency	f_{VCO}	1000	2000	1000	2333	MHz	1

Notes:

1. **Caution:** The SYSCLK frequency and PLL_CFG[0:4] settings must be chosen such that the resulting SYSCLK (bus) frequency, CPU (core) frequency, and PLL (VCO) frequency do not exceed their respective maximum or minimum operating frequencies. Refer to the PLL_CFG[0:4] signal description in *MPC7447A RISC Microprocessor Hardware Specifications*, Section 1.9.1, "PLL Configuration," for valid PLL_CFG[0:4] settings.
2. **Caution:** If dynamic frequency switching (DFS) is enabled, the SYSCLK frequency and PLL_CFG[0:4] settings must be chosen such that the resulting processor frequency is greater than or equal to the minimum core frequency.

1.5.2.2 Processor Bus AC Specifications

Devices described by this part number specification conform to the processor bus AC timing specifications provided in the *MPC7447A RISC Microprocessor Hardware Specifications*. Please refer to that document for this information.

1.11 Ordering Information

1.11.1 Part Numbers Addressed by This Specification

Table 16 provides the ordering information for the MPC7447A parts described in this document.

Table 16. Part Marking Nomenclature

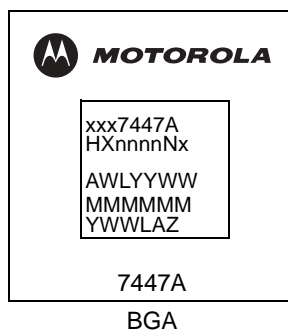
<i>xxx</i>	<i>7447A</i>	<i>HX</i>	<i>nnnn</i>	<i>N</i>	<i>X</i>
Product Code	Part Identifier	Package	Processor Frequency ¹	Application Modifier	Revision Level
MC	7447A	HX = HCTE	1000 1167	N: 1.1 V ± 50 mV 0 to 105°C	B:1.1: PVR = 8003 0101

Notes:

1. Processor core frequencies supported by parts addressed by this specification only. Parts addressed by other specifications may support other maximum core frequencies.

1.11.3 Part Marking

Parts are marked as the example shown in Figure 22.



Notes:

- AWYYYYWW is the test code.
- MMMMMM is the M00 (mask) number.
- YWWLAZ is the assembly traceability code.

Figure 22. Part Marking for BGA Device



Document Revision History

Table B provides a revision history for this part number specification.

Table B. Document Revision History

Rev. No.	Substantive Change(s)
0	Initial release.



THIS PAGE INTENTIONALLY LEFT BLANK

How to Reach Us:

Home Page:

www.freescale.com

E-mail:

support@freescale.com

USA/Europe or Locations Not Listed:

Freescale Semiconductor
 Technical Information Center, CH370
 1300 N. Alma School Road
 Chandler, Arizona 85224
 +1-800-521-6274 or +1-480-768-2130
support@freescale.com

Europe, Middle East, and Africa:

Freescale Halbleiter Deutschland GmbH
 Technical Information Center
 Schatzbogen 7
 81829 Muenchen, Germany
 +44 1296 380 456 (English)
 +46 8 52200080 (English)
 +49 89 92103 559 (German)
 +33 1 69 35 48 48 (French)
support@freescale.com

Japan:

Freescale Semiconductor Japan Ltd.
 Headquarters
 ARCO Tower 15F
 1-8-1, Shimo-Meguro, Meguro-ku,
 Tokyo 153-0064
 Japan
 0120 191014 or +81 3 5437 9125
support.japan@freescale.com

Asia/Pacific:

Freescale Semiconductor Hong Kong Ltd.
 Technical Information Center
 2 Dai King Street
 Tai Po Industrial Estate
 Tai Po, N.T., Hong Kong
 +800 2666 8080
support.asia@freescale.com

For Literature Requests Only:

Freescale Semiconductor Literature Distribution Center
 P.O. Box 5405
 Denver, Colorado 80217
 1-800-441-2447 or 303-675-2140
 Fax: 303-675-2150
LDCForFreescaleSemiconductor@hibbertgroup.com

Information in this document is provided solely to enable system and software implementers to use Freescale Semiconductor products. There are no express or implied copyright licenses granted hereunder to design or fabricate any integrated circuits or integrated circuits based on the information in this document. Freescale Semiconductor reserves the right to make changes without further notice to any products herein. Freescale Semiconductor makes no warranty, representation or guarantee regarding the suitability of its products for any particular purpose, nor does Freescale Semiconductor assume any liability arising out of the application or use of any product or circuit, and specifically disclaims any and all liability, including without limitation consequential or incidental damages. "Typical" parameters which may be provided in Freescale Semiconductor data sheets and/or specifications can and do vary in different applications and actual performance may vary over time. All operating parameters, including "Typicals" must be validated for each customer application by customer's technical experts. Freescale Semiconductor does not convey any license under its patent rights nor the rights of others. Freescale Semiconductor products are not designed, intended, or authorized for use as components in systems intended for surgical implant into the body, or other applications intended to support or sustain life, or for any other application in which the failure of the Freescale Semiconductor product could create a situation where personal injury or death may occur. Should Buyer purchase or use Freescale Semiconductor products for any such unintended or unauthorized application, Buyer shall indemnify and hold Freescale Semiconductor and its officers, employees, subsidiaries, affiliates, and distributors harmless against all claims, costs, damages, and expenses, and reasonable attorney fees arising out of, directly or indirectly, any claim of personal injury or death associated with such unintended or unauthorized use, even if such claim alleges that Freescale Semiconductor was negligent regarding the design or manufacture of the part.



MPC7447ANXPNS

**For More Information On This Product,
 Go to: www.freescale.com**