

## --- Preliminary ---

# MPC7410 RISC Microprocessor Hardware Specifications Addendum for the MPC7410xxnnnNE Series

This document describes part number-specific changes to recommended operating conditions and revised electrical specifications, as applicable, from those described in the general *MPC7410 Hardware Specifications* (Document No. MPC7410EC).

Specifications provided in this document supersede those in the *MPC7410 Hardware Specifications*, for the part numbers listed in Table A only. Specifications not addressed herein are unchanged. Because this document is frequently updated, refer to <http://www.freescale.com> or to your Freescale sales office for the latest version.

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. For more detailed ordering information see [Table 17](#).

### *Freescale Part Numbers Affected:*

*MPC7410RX400NE*  
*MPC7410HX400NE*  
*MPC7410VS400NE*  
*MC7410VU400NE*  
*MPC7410RX450NE*  
*MPC7410HX450NE*  
*MPC7410VS450NE*  
*MC7410VU450NE*

[查询"MPC7410VS450NE"供应商](#)

**Table A. Part Numbers Addressed by this Data Sheet**

Freescale Part Number	Operating Conditions				Significant Differences from Hardware Specification
	CPU Frequency	Vdd	T <sub>J</sub> (°C)	OVdd	
MPC7410RX400NE MPC7410HX400NE MPC7410VS400NE MC7410VU400NE	400 MHz	1.5V±50mV	0 to 105	1.8/2.5 V	Reduced core voltage to achieve lower power consumption. Removes 3.3V OVdd support. For all AC/DC specifications not mentioned in this document, please refer to the MPC7410(RX/HX/VS)400LE and MC7410VU400LE specifications in the general <i>MPC7410 Hardware Specifications</i> .
	450 MHz	1.8V ±100mV	0 to 105	1.8/2.5/3.3 V	The MPC7410(RX/HX/VS)400NE and MC7410VU400NE also fully conform to the MPC7410(RX/HX/VS)450LE and MC7410VU450LE specifications, respectively. Refer to the general <i>MPC7410 Hardware Specifications</i> .
MPC7410RX450NE MPC7410HX450NE MPC7410VS450NE MC7410VU450NE	450 MHz	1.5V±50mV	0 to 105	1.8/2.5 V	Reduced core voltage to achieve lower power consumption. Removes 3.3V OVdd support. For all AC/DC specifications not mentioned in this document, please refer to the MPC7410(RX/HX/VS)450LE and MC7410VU450LE specifications in the general <i>MPC7410 Hardware Specifications</i> .
	500 MHz	1.8V ±100mV	0 to 105	1.8/2.5/3.3 V	The MPC7410(RX/HX/VS)450NE and MC7410VU400NE also fully conform to the MPC7410(RX/HX/VS)500LE and MC7410VU500LE specifications, respectively. Refer to the general <i>MPC7410 Hardware Specifications</i> .

## 2 Features

This section summarizes changes to the features of the MPC7410 described in the *MPC7410 Hardware Specifications*.

- Bus interface
  - Selectable interface voltages of 1.8 V, 2.5 V (3.3 V not supported)

## 4.1 DC Electrical Characteristics

Voltage to the L2 I/Os and processor interface I/Os are provided through separate sets of supply pins and may be provided at the voltages shown in [Table 2](#).

[查询"MPC7410VS450NE"供应商](#)

**Table 2. Input Threshold Voltage Setting**

BVSEL Signal <sup>3</sup>	Processor Bus Input Threshold is Relative to:	L2VSEL Signal <sup>3</sup>	L2 Bus Input Threshold is Relative to:	Note
0	1.8 V	0	1.8 V	1
$\overline{\text{HRESET}}$	2.5 V	$\overline{\text{HRESET}}$	2.5 V	1, 2
1	Not Supported	1	2.5 V	1, 4, 5
HRESET	Not Supported	HRESET	Not Supported	—

Notes:

- Caution:** The input threshold selection must agree with the OVdd/L2OVdd voltages supplied.
- To select the 2.5-V threshold option, BVSEL and/or L2VSEL should be tied to  $\overline{\text{HRESET}}$  so that the two signals change state together. This is the preferred method for selecting this mode of operation.
- To overcome the internal pull-up resistance, a pull-down resistance less than 250 ohms should be used.
- Default voltage setting if left unconnected (internal pulled-up).
- Caution:** The XPC7410RXnnnNE does not support the default OVdd setting of 3.3 V. The BVSEL input must be tie either low or to  $\overline{\text{HRESET}}$ .

Table 3 provides the recommended operating conditions for the MPC7410 part numbers described herein.

**Table 3. Recommended Operating Conditions**

Characteristic		Symbol	Recommended Value	Unit
Core supply voltage		Vdd	1.5V ± 50mV	V
PLL supply voltage		AVdd	1.5V ± 50mV	V
L2 DLL supply voltage		L2AVdd	1.5V ± 50mV	V
Processor bus supply voltage	BVSEL = 0	OVdd	1.8V ± 100mV	V
	$\overline{\text{BVSEL}} = \overline{\text{HRESET}}$	OVdd	2.5V ± 100mV	V
	BVSEL = HRESET or BVSEL = 1	OVdd	Not Supported	V
L2 bus supply voltage	L2VSEL = 0	L2OVdd	1.8V ± 100mV	V
	$\overline{\text{L2VSEL}} = \overline{\text{HRESET}}$ or L2VSEL = 1	L2OVdd	2.5V ± 100mV	V
Input voltage	Processor bus and JTAG Signals	V <sub>in</sub>	GND to OVdd	V
	L2 Bus	V <sub>in</sub>	GND to L2OVdd	V
Die-junction temperature		T <sub>j</sub>	0 to 105	°C
Note: These are the recommended and tested operating conditions. Proper device operation outside of these conditions is not guaranteed.				

查询"MPC7410VS450NE"供应商

Table 7 provides the power consumption for the MPC7410 part at the frequencies described herein.

**Table 7. Power Consumption for MPC7410**

	Processor (CPU) Frequency	Processor (CPU) Frequency	Unit	Notes
	400Mhz	450Mhz		
Full-On Mode				
Typical	2.92	3.29	W	1, 3
Maximum	6.6	7.43	W	1, 2,
Doze Mode				
Maximum	3.6	4.1	W	1, 2
Nap Mode				
Maximum	1.35	1.5	W	1, 2
Sleep Mode				
Maximum	1.3	1.45	W	1, 2
Sleep Mode—PLL and DLL Disabled				
Typical	0.6	0.6	W	1, 3
Maximum	1.1	1.1	W	1, 2
Notes:				
<p>1. These values apply for all valid processor bus and L2 bus ratios. The values do not include I/O Supply Power (OVdd and L2OVdd) or PLL/DLL supply power (AVdd and L2AVdd). OVdd and L2OVdd power is system dependent, but is typically &lt;10% of Vdd power. Worst case power consumption for AVdd = 15 mw and L2AVdd = 15 mW.</p> <p>2. Maximum power is measured at 105 °C and Vdd = 1.5V while running an entirely cache-resident, contrived sequence of instructions which keep the execution units, including AltiVec, maximally busy.</p> <p>3. Typical power is an average value measured at 65 °C and Vdd = 1.5V in a system while running typical benchmarks.</p>				

[查询"MPC7410VS450NE"供应商](#)

## 9 Document Revision History

Table 16 provides a revision history for this Hardware Specification Addendum.

**Table 16. Document Revision History**

Revision	Date	Substantive Changes
2.0	11/16/2007	Updated document title to remove "RX" from part number since other non-RX package devices were added to this specification. Added MPC7410HX400NE, MPC7410VS400NE, MC7410VU400NE, MPC7410HX450NE, MPC7410VS450NE, and MC7410VU450NE devices to list on cover page and to Table A. Updated <a href="#">Table 17</a> to match corresponding table in <i>MPC7410 Hardware Specifications</i>
1.1	04/19/2005	Document template update
		Document ID change from MPC7410RXNEPNS for Part Number Specification to MPC7410ECS02AD for Hardware Specification Addendum.
1	10/2002	Minor formatting.
		Added Section 1.9 Document Revision History.
		Section 1.10.1 - added <a href="#">Table 17</a> - Part Marking Nomenclature.
0		Initial release

查询"MPC7410VS450NE"供应商

# 10 Ordering Information

## 10.1 Part Numbers Addressed by this Specification

Table 17 provides the ordering information for the MPC7410 part described in this document.

Table 17. Part Marking Nomenclature.

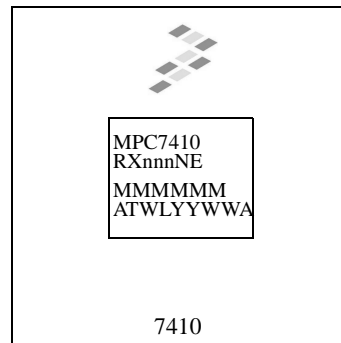
Mxx	7410	xx	nnn	N	E
Product Code	Part Identifier	Package	Processor Frequency <sup>1</sup>	Application Modifier	Revision Level
MPC	7410	RX = CBGA	400 450 500	N: 1.5 V ± 50 mV 0 to 105 °C	E: 1.4; PVR = 800C 1104
		HX = HCTE_CBGA VS = HCTE_LGA	400 450		
MC		VU = HCTE_CBGA (Lead Free C5 Solder Spheres)			

**Notes:**

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

## 10.3 Part Marking

Parts are marked as the example shown in Figure 26.



**Notes:**

- nnn is the speed grade of the part
- MMMMMM is the 6-digit mask number
- ATWLYYWWA is the traceability code
- CCCCC is the country of assembly (this space is left blank if parts are assembled in the United States)

**Figure 26. Freescale Part Marking for BGA Device**

[查询"MPC7410VS450NE"供应商](#)

THIS PAGE INTENTIONALLY LEFT BLANK

**How to Reach Us:**

**Home Page:**

[www.freescale.com](http://www.freescale.com)

**email:**

[support@freescale.com](mailto:support@freescale.com)

**USA/Europe or Locations Not Listed:**

Freescale Semiconductor  
Technical Information Center, CH370  
1300 N. Alma School Road  
Chandler, Arizona 85224  
(800) 521-6274  
480-768-2130  
[support@freescale.com](mailto: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](mailto: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  
+81 2666 8080  
[support.japan@freescale.com](mailto: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](mailto:support.asia@freescale.com)

**For Literature Requests Only:**

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

Freescale™ and the Freescale logo are trademarks of Freescale Semiconductor, Inc. All other product or service names are the property of their respective owners. The Power Architecture and Power.org word marks and the Power and Power.org logos and related marks are trademarks and service marks licensed by Power.org.

© Freescale Semiconductor, Inc., 2002, 2007. Printed in the United States of America. All rights reserved.

