

# MPC755 RISC Microprocessor Hardware Specifications Addendum for the XPC755xxxnnnLE Series

This document describes part-number-specific changes to recommended operating conditions and revised electrical specifications, as applicable, from those described in the general *MPC755 RISC Microprocessor Hardware Specifications* (MPC755EC). The MPC755 and MPC745 are reduced instruction set computing (RISC) microprocessors that implement the PowerPC™ instruction set architecture. The devices described in this specification are no longer in production and this document is provided for reference only. For recommended upgrades or replacement devices, contact your Freescale sales office.

Specifications provided in this document supersede those in the *MPC755 RISC Microprocessor Hardware Specifications*, Rev. 6 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.

*Freescale Part Numbers Affected:*

*XPC755BRX400LE*  
*XPC755BPX400LE*  
*XPC755CRX450LE*

Part numbers addressed in this document are listed in [Table A](#). For more detailed ordering information, see [Section 10, “Ordering Information.”](#)

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

Freescale Part Number	Operating Conditions			Significant Differences from Hardware Specification
	CPU Frequency (MHz)	V <sub>DD</sub>	T <sub>J</sub> (°C)	
XPC755BRX400LE	400	2.0 V ±100 mV	0 to 105	Modified power specifications. These devices are no longer in production.
XPC755BPX400LE				
XPC755CRX450LE	450			

**Note:** The X prefix in a Freescale PowerPC part number designates a “Pilot Production Prototype” as defined by Freescale SOP 3-13. These are from a limited production volume of prototypes manufactured, tested, and Q.A. inspected on a qualified technology to simulate normal production. 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.

## 4.1 DC Electrical Characteristics

**Table 3. Recommended Operating Conditions <sup>1</sup>**

Characteristic	Symbol	Recommended Value		Unit	Notes
		400 MHz, 450 MHz			
		Min	Max		
Core supply voltage	V <sub>DD</sub>	1.90	2.10	V	2
PLL supply voltage	AV <sub>DD</sub>	1.90	2.10	V	2
L2 DLL supply voltage	L2AV <sub>DD</sub>	1.90	2.10	V	2

**Notes:**

1. These are the recommended and tested operating conditions. Proper device operation outside of these conditions is not guaranteed.
2. 2.0 V nominal.

**Table 7. Power Consumption for MPC755**

	Processor (CPU) Frequency		Unit	Notes
	400 MHz	450 MHz		
<b>Full-Power Mode</b>				
Typical	4.0	4.6	W	1, 3, 4
Maximum	6.0	8.0	W	1, 2
<b>Doze Mode</b>				
Maximum	2.3	2.8	W	1, 2, 4
<b>Nap Mode</b>				
Maximum	1.0	1.0	W	1, 2, 4
<b>Sleep Mode</b>				
Maximum	470	470	mW	1, 2, 4
<b>Sleep Mode (PLL and DLL Disabled)</b>				
Maximum	430	430	mW	1, 2

**Notes:**

1. These values apply for all valid processor bus and L2 bus ratios. The values do not include I/O supply power ( $OV_{DD}$  and  $L2OV_{DD}$ ) or PLL/DLL supply power ( $AV_{DD}$  and  $L2AV_{DD}$ ).  $OV_{DD}$  and  $L2OV_{DD}$  power is system dependent, but is typically <10% of  $V_{DD}$  power. Worst case power consumption for  $AV_{DD} = 15$  mW and  $L2AV_{DD} = 15$  mW.
2. Maximum power is measured at nominal  $V_{DD}$  (see Table 3) while running an entirely cache-resident, contrived sequence of instructions which keep the execution units maximally busy.
3. Typical power is an average value measured at the nominal recommended  $V_{DD}$  (see Table 3) and 65°C in a system while running a typical code sequence.
4. Not 100% tested. Characterized and periodically sampled.

## 4.2.1 Clock AC Specifications

**Table 8. Clock AC Timing Specifications**

At recommended operating conditions (see Table 3)

Characteristic	Symbol	Maximum Processor Core Frequency				Unit	Notes
		400 MHz		450 MHz			
		Min	Max	Min	Max		
Processor frequency	$f_{core}$	200	400	200	450	MHz	1
VCO frequency	$f_{VCO}$	400	800	400	900	MHz	1

**Note:**

1. **Caution:** The SYSCLK frequency and PLL\_CFG[0:3] 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[0:3] signal description in Section 1.8.1, “PLL Configuration,” for valid PLL\_CFG[0:3] settings.

# 10 Ordering Information

## 10.1 Part Numbers Addressed by This Specification

Table 20 provides the ordering information for the MPC755 parts described in this specification.

**Table 20. Part Numbering Nomenclature**

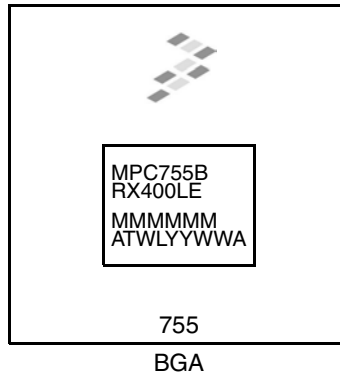
<b>XPC</b>	<b>755</b>	<b>x</b>	<b>xx</b>	<b>nnn</b>	<b>x</b>	<b>x</b>
<b>Product Code</b>	<b>Part Identifier</b>	<b>Process Descriptor</b>	<b>Package</b>	<b>Processor Frequency</b>	<b>Application Modifier</b>	<b>Revision Level</b>
XPC <sup>1</sup>	755	B = HiP4DP	RX = CBGA	400	L: 2.0 V ±100 mV 0° to 105°C	E: 2.8; PVR = 0008 3203
			PX = PBGA			
	755	C = HiP4DP	RX = CBGA	450		

**Notes:**

1. The X prefix in a Freescale part number designates a “Pilot Production Prototype” as defined by Freescale SOP 3-13. These are from a limited production volume of prototypes manufactured, tested, and Q.A. inspected on a qualified technology to simulate normal production. 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.

## 10.3 Part Marking

Parts are marked as the example shown in [Figure 29](#).



**Notes:**

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 29. Part Marking for BGA Device**

# Document Revision History

Table B provides a revision history for this hardware specifications addendum.

**Table B. Document Revision History**

Rev. No.	Date	Editor/Writer	Substantive Change(s)
0.1	02/15/2006	BM/NB	Changed document order number (was MPC755XLEPNS, Rev. 0). Updated to Freescale template. Updated section numbers to match the hardware specifications document.
0			Initial release.

**THIS PAGE INTENTIONALLY LEFT BLANK**

### **How to Reach Us:**

#### **Home Page:**

www.freescale.com

#### **email:**

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

#### **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  
+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  
(800) 441-2447  
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.

Freescale™ and the Freescale logo are trademarks of Freescale Semiconductor, Inc. The described product contains a PowerPC processor core. The PowerPC name is a trademark of IBM Corp. and used under license. All other product or service names are the property of their respective owners.

© Freescale Semiconductor, Inc., 2003, 2006.