Motorola Part Numbers Affected:

XPC755BRX300LD
XPC755BRX350LD
XPC755BRX400LD
XPC755BPX300LD
XPC755BPX350LD
XPC755BPX400LD
XPC745BPX300LD
XPC745BPX350LD

Application-Specific Information

MPC755 Part Number Specification

This document describes part number specific changes to recommended operating conditions and revised electrical specifications, as applicable, from those described in the general *MPC755 Hardware Specifications*.

Specifications provided in this Part Number Specification supersede those in the *MPC755 Hardware Specifications* (order #: MPC755EC/D) for these part numbers only; specifications not addressed herein are unchanged. Because this document is frequently updated, refer to the website at http://www.motorola.com/PowerPC/ for the latest version.

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

Table A lists the part numbers having specifications that differ from the *MPC755 Hardware Specifications*. Part numbers not listed in Table A do not differ from the *MPC755 Hardware Specifications.* For more detailed ordering information see Table B.

Table A. Significant Differences from Hardware Specification by Part Number

Motorola Part Number	Operating Conditions			Significant Differences from Hardware Specification
	CPU Frequency	Vdd	T_J (°C)	
XPC755BRX300LD	300 MHz	2.0V±100mV	0 to 105	2.0V/1.8V I/O voltage supported, 2.5V I/O not supported; all nominal core voltages are 2.0V±100mV; AC timing different for processor bus and L2 bus interfaces; L2 bus interface AC timing not guaranteed in 1.8V/2.0V mode.
XPC755BRX350LD	350 MHz			
XPC755BRX400LD	400 MHz			
XPC755BPX300LD	300 MHz			
XPC755BPX350LD	350 MHz			
XPC755BPX400LD	400 MHz			
XPC745BPX300LD	300 MHz	2.0V±100mV	0 to 105	2.0V/1.8V I/O voltage supported, 2.5V I/O not supported; all nominal core voltages are 2.0V±100mV; AC timing different for processor bus interface.
XPC745BPX350LD	350 MHz			

Note: The X prefix in a Motorola PowerPC part number designates a “Pilot Production Prototype” as defined by Motorola 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.

Errata

There are currently no known errata for the part numbers addressed by this data sheet.

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1.3 General Parameters

The following general parameters apply to all part numbers described herein:

Core power supply:	2.0 V ± 100 mV dc (nominal; see Table 3 for recommended operating conditions)
I/O power supply	1.8 V ± 100 mV dc (processor bus interface only; not supported on L2 interface) or
	2.0 V ± 100 mV dc (processor bus interface only; not supported on L2 interface) or
	3.3 V ± 165 mV dc (input thresholds are configuration pin selectable)

Note that part revisions prior to Rev 2.8 (Rev E) do not support core voltages down to 1.8 V.

1.4.1 DC Electrical Characteristics

All part numbers affected by this specification support 3.3V and 1.8V/2.0V I/O voltages but do not support 2.5V I/O voltages. Table 2 describes the input threshold voltage settings. These settings apply to all device revisions prior to Rev. 2.8 (Rev E), including all part numbers described herein. Note that the MPC745 does not provide an L2 interface.

Table 2 Input Threshold Voltage Settings

BVSEL Signal	L2VSEL Signal		Processor Bus Interface Voltage	L2 Bus Interface Voltage
0	0		1.8V or 2.0V	1.8V or 2.0V
0	1		1.8V or 2.0V	3.3V
1	0		3.3V	1.8V or 2.0V
1	1		3.3V	3.3V

Caution: The input threshold selection must agree with the OVdd/L2OVdd voltages supplied.

Table 3 provides the recommended operating conditions for all device revisions prior to Rev. 2.8 (Rev E), including all part numbers described herein.

Table 3 Recommended Operating Conditions

Characteristic		Symbol	Recommended Value	Unit
Core supply voltage		Vdd	2.0 ± 100 mV	V
PLL supply voltage		AVdd	2.0 ± 100 mV	V
L2 DLL supply voltage		L2AVdd	2.0 ± 100 mV	V
Processor bus supply voltage	BVSEL = 0	OVdd	1.8 ± 100 mV or 2.0 ± 100 mV	V
	BVSEL = 1	OVdd	3.3 ± 165 mV	V
L2 bus supply voltage	L2VSEL = 0	L2OVdd	1.8 ± 100 mV or 2.0 ± 100 mV	V
	L2VSEL = 1	L2OVdd	3.3 ± 165 mV	V

Note: These are the recommended and tested operating conditions. Proper device operation outside of these conditions is not guaranteed.

Table 6 provides the DC electrical specifications for all device revisions prior to Rev. 2.8 (Rev E), including all part numbers described herein.

Table 6 DC Electrical Specifications

At recommended operating conditions (see Table 3)

Characteristic	Nominal Bus Voltage[1]	Symbol	Min	Max	Unit	Notes
Input high voltage (all inputs except SYSCLK)	1.8/2.0	V_{IH}	0.65 * (L2)OVdd	(L2)OVdd + 0.3	V	2,3
	3.3	V_{IH}	2.0	(L2)OVdd + 0.3	V	2,3
Input low voltage (all inputs except SYSCLK)	1.8/2.0	V_{IL}	-0.3	0.35 * (L2)OVdd	V	2
	3.3	V_{IL}	-0.3	0.8	V	
SYSCLK input high voltage	1.8/2.0	KV_{IH}	1.5	OVdd + 0.3	V	
	3.3	KV_{IH}	2.4	OVdd + 0.3	V	
SYSCLK input low voltage	1.8/2.0	KV_{IL}	-0.3	0.2	V	
	3.3	KV_{IL}	-0.3	0.4	V	
Output high voltage, I_{OH} = -6 mA	1.8/2.0	V_{OH}	(L2)OVdd - 0.45	—	V	
	3.3	V_{OH}	2.4	—	V	
Output low voltage, I_{OL} = 6 mA	1.8/2.0	V_{OL}	—	0.45	V	
	3.3	V_{OL}	—	0.4	V	

Notes:
1. Nominal voltages; see Table 3 for recommended operating conditions.
2. For processor bus signals, the reference is OVdd. L2OVdd is the reference for the L2 bus signals.
3. Excludes test signals (LSSD_MODE, L1_TSTCLK, L2_TSTCLK) and IEEE 1149.1 boundary scan (JTAG) signals.

1.4.2.2 Processor Bus AC Specifications

All part numbers described herein have slower AC timing characteristics than later revisions of the part. The affected processor bus AC timing specifications are given in Table 10.

Table 10 Processor Bus AC Timing Specifications

At recommended operating conditions (see Table 3)

Parameter	Symbols	300, 350, 400 MHz		Unit
		Min	Max	
Input Hold Times: All Inputs	t_{IXKH}	0.6	—	ns
Valid Times: All Outputs	t_{KHOV}	—	4.5	ns

1.4.2.4 L2 Bus AC Specifications

The AC timing characteristics of the L2 bus interface in 3.3V mode are slower for parts affected by this specification than for later revisions of the part. Additionally, the AC timing of the L2 interface is not guaranteed in 1.8V/2.0V mode. These affect the following part numbers only:

- XPC755BRX300LD
- XPC755BRX350LD
- XPC755BRX400LD
- XPC755BPX300LD
- XPC755BPX350LD
- XPC755BPX400LD

Table 12 provides the L2 bus interface AC timing specifications for the MPC755 described in this Part Number Specification when the L2 bus interface is in 3.3V mode only. The L2 bus interface of the part described herein is not tested in 1.8V/2.0V mode and does not meet these specifications. The L2 interface output drivers display a non-linear, stepped behavior when switching that prolongs the rise and fall times in this mode. This delay is typically on the order of 2 ns but is not guaranteed. Motorola does not recommend or support the use of the L2 bus interface of the affected part numbers described herein in 1.8V/2.0V mode.

Table 12 L2 Bus Interface AC Timing Specifications

At recommended operating conditions (see Table 3)

Parameter	Symbol	300 MHz		350 MHz		400 MHz		Unit	Notes
		Min	Max	Min	Max	Min	Max		
Setup Times: Data and parity	t_{DVL2CH}	1.5	—	1.5	—	1.5	—	ns	2
Input Hold Times: Data and parity	t_{DXL2CH}	0.5	—	0.5	—	0.5	—	ns	2
Valid Times:	t_{L2CHOV}							ns	3,4
All outputs when L2CR[14-15] = 00		-	3.6	-	3.6	-	3.6		
All outputs when L2CR[14-15] = 01		-	3.8	-	3.8	-	3.8		
All outputs when L2CR[14-15] = 10		-	4.0	-	4.0	-	4.0		
All outputs when L2CR[14-15] = 11		-	4.2	-	4.2	-	4.2		
L2SYNC_IN to high impedance:	t_{L2CHOZ}							ns	3,5
All outputs when L2CR[14-15] = 00		-	3.5	-	3.5	-	3.5		
All outputs when L2CR[14-15] = 01		-	4.0	-	4.0	-	4.0		
All outputs when L2CR[14-15] = 10		-	4.2	-	4.2	-	4.2		
All outputs when L2CR[14-15] = 11		-	4.5	-	4.5	-	4.5		

Notes:
See General specifications.

1.10 Ordering Information

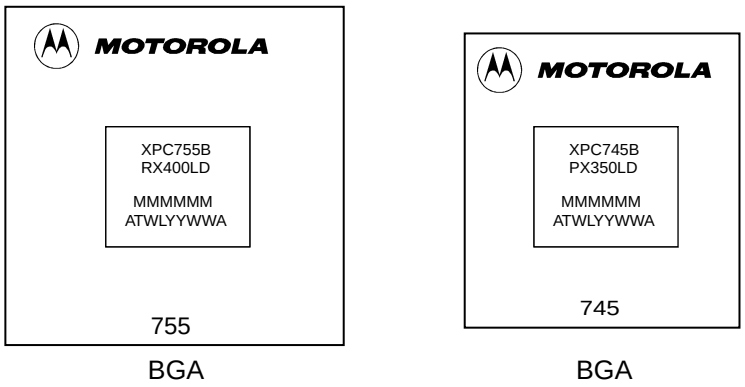
Table B provides the ordering information for the MPC755 part described in this Part Number Specification.

Table B. Ordering Information for the MPC755 Microprocessor

Package Type	Device Rev	Process	Mask Code	CPU Frequency (MHz)	Motorola Part Number
360 CBGA	2.7	HIP4DP	57K76D	300MHz	XPC755BRX300LD
				350MHz	XPC755BRX350LD
				400MHz	XPC755BRX400LD
360 PBGA	2.7	HIP4DP	57K76D	300MHz	XPC755BPX300LD
				350MHz	XPC755BPX350LD
				400MHz	XPC755BPX400LD
255 PBGA	2.7	HIP4DP	57K76D	300MHz	XPC745BPX300LD
				350MHz	XPC745BPX350LD

1.10.1 Part Marking

Parts are marked as the examples shown in Figure A.



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 A. Motorola Part Marking for BGA Device