Advance Information

MPC7455ARXPXPNS/D
Rev. 1, 7/2003

MPC7455 Part Number Specification for the XC7455ARXnnnPx Series

Part Numbers Affected:

XC7455ARX1000PF
XC7455ARX1250PF
XC7455ARX1333PF

This document describes part-number-specific changes to recommended operating conditions and revised electrical specifications, as applicable, from those described in the general *MPC7455 RISC Microprocessor Hardware Specifications* (Order No. MPC7455EC/D). The products detailed here are PowerPC™ microprocessors.

Specifications provided in this document supersede those in the *MPC7455 RISC Microprocessor Hardware Specifications*, Rev. 2 or later, for the part numbers listed in Table A only. Specifications not addressed herein are unchanged. Because this document is frequently updated, refer to your Motorola 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.

Table A. Part Numbers Addressed by this Data Sheet

Motorola Part Numbers	Operating Conditions			Significant Differences from Hardware Specification
	Max. Core Frequency (MHz)	V_{DD}	T_J (°C)	
XC7455ARX1000PF	1000	1.57 V +30/–50 mV	0 to 65	Modified core voltage, temperature and system bus AC specifications, support for 167-MHz system bus in MPX mode.
XC7455ARX1250PF	1250			
XC7455ARX1333PF	1333			

Note: The X prefix in a Motorola 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.

1.1 Features

This section summarizes changes to the features of the MPC7455 described in the *MPC7455 RISC Microprocessor Hardware Specifications*.

- Power management
  - 1.57-V processor core

1.4 General Parameters

- Core power supply: 1.57 V +30/–50 mV DC nominal

1.5.1 DC Electrical Characteristics

Table 4 provides the recommended operating conditions for the MPC7455 part numbers described herein.

Table 4. Recommended Operating Conditions

Characteristic	Symbol	Recommended Value	Unit
Core supply voltage	V_{DD}	1.57 V +30/–50 mV	V
PLL supply voltage	AV_{DD}	1.57 V +30/–50 mV	V
Die-junction temperature	T_j	0 to 65	°C

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

Table 7 provides the power consumption for the MPC7455 part numbers described herein.

Table 7. Power Consumption for MPC7455

	Processor Core Frequency	Unit	Notes
	1000, 1250, 1333 MHz		
Full-Power Mode			
Typical	30.0	W	1, 3
Maximum	40.0	W	1, 2
Doze Mode			
Typical	—	W	1, 2, 4
Nap Mode			
Typical	8.0	W	1, 2
Sleep Mode			
Typical	8.0	W	1, 2
Deep Sleep Mode (PLL Disabled)			
Typical	8.0	W	1, 3

Notes:

1. These values apply for all valid processor bus and L3 bus ratios. The values do not include I/O supply power (OV_{DD} and GV_{DD}) or PLL supply power (AV_{DD}). OV_{DD} and GV_{DD} power is system dependent, but is typically <5% of V_{DD} power. Worst case power consumption for AV_{DD} < 3 mW.
2. Maximum power is measured at nominal V_{DD} while running an entirely cache-resident, contrived sequence of instructions which keep the execution units, with or without AltiVec, maximally busy.
3. Typical power is an average value measured at nominal V_{DD} and 65°C in a system while running a typical code sequence.
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.

1.5.2.1 Clock AC Specifications

Table 9. Clock AC Timing Specifications

At recommended operating conditions. See Table 4.

Characteristic	Symbol	Processor Core Frequency						Unit
		1000 MHz		1250 MHz		1333 MHz		
		Min	Max	Min	Max	Min	Max	
Processor frequency	f_{core}	500	1000	500	1250	500	1333	MHz
VCO frequency	f_{VCO}	1000	2000	1000	2500	1000	2666	MHz
SYSCLK frequency	f_{SYSCLK}							MHz
MPX bus mode		33	167	33	167	33	167	
60x bus mode		33	133	33	133	33	133	
SYSCLK cycle time	t_{SYSCLK}							ns
MPX bus mode		6.0	30	6.0	30	6.0	30	
60x bus mode		7.5	30	7.5	30	7.5	30	

1.5.2.2 Processor Bus AC Specifications

Table 10. Processor Bus AC Timing Specifications

At recommended operating conditions. See Table 4.

Parameter	Symbol	MPX bus mode		60x bus mode		Unit
		Min	Max	Min	Max	
Input setup times: A[0:35], AP[0:4], GBL, TBST, TSIZ[0:2], WT, CI, D[0:63], DP[0:7] AACK, ARTRY, BG, CKSTP_IN, DBG, DTI[0:3], HRESET, INT, MCP, QACK, SMI, SRESET, TA, TBEN, TEA, TS, EXT_QUAL, PMON_IN, SHD[0:1]	t_{AVKH} t_{IVKH}	1.5 1.5	— —	2.0 2.0	— —	ns
Input hold times: A[0:35], AP[0:4], GBL, TBST, TSIZ[0:2], WT, CI, D[0:63], DP[0:7] AACK, ARTRY, BG, CKSTP_IN, DBG, DTI[0:3], HRESET, INT, MCP, QACK, SMI, SRESET, TA, TBEN, TEA, TS, EXT_QUAL, PMON_IN, SHD[0:1]	t_{AXKH} t_{IXKH}	0 0	— —	0 0	— —	ns
Output valid times: A[0:35], AP[0:4], GBL, TBST, TSIZ[0:2], WT, CI TS D[0:63], DP[0:7] ARTRY/SHD0/SHD1 BR, CKSTP_OUT, DRDY, HIT, PMON_OUT, QREQ]	t_{KHAV} t_{KHTSV} t_{KHDV} t_{KHARV} t_{KHOV}	— — — — —	2.0 2.0 2.0 2.0 2.0	— — — — —	2.5 2.5 2.5 2.5 2.5	ns
Output hold times: A[0:35], AP[0:4], GBL, TBST, TSIZ[0:2], WT, CI TS D[0:63], DP[0:7] ARTRY/SHD0/SHD1 BR, CKSTP_OUT, DRDY, HIT, PMON_OUT, QREQ	t_{KHAX} t_{KHTSX} t_{KHDX} t_{KHARX} t_{KHOX}	0.5 0.5 0.5 0.5 0.5	— — — — —	0.5 0.5 0.5 0.5 0.5	— — — — —	ns

1.11 Ordering Information

1.11.1 Part Numbers Addressed by this Specification

Table 20 provides the ordering information for the MPC7455 parts described in this document.

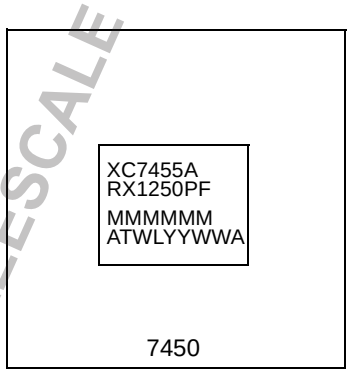
Table 20. Part Marking Nomenclature

XC	7455	A	RX	*nnn*	*x*	*x*
Product Code	**Part Identifier**	**Process Descriptor**	**Package**	**Processor Frequency [1]**	**Application Modifier**	**Revision Level**
XC [2]	7455	A	RX = CBGA	1000 1250 1333	P: 1.57 V +30/–50 mV 0 to 65°C	F: 3.3; PVR = 8001 0303

Notes:
1. Processor core frequencies supported by parts addressed by this specification only. Parts addressed by other specifications may support other maximum core frequencies.
2. The X prefix in a Motorola 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.

1.11.3 Part Marking

Parts are marked as the example shown in Figure 27.



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 27. Motorola 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.
1	Removed 1400 MHz speed grade from all specifications; this was a documentation error only and does not reflect a change in the test regime or supported core frequencies.
	Corrected core frequency specifications and column headings in Table 9.

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

RoHS-compliant and/or Pb- free versions of Freescale products have the functionality and electrical characteristics of their non-RoHS-compliant and/or non-Pb- free counterparts. For further information, see http://www.freescale.com or contact your Freescale sales representative.

For information on Freescale.s Environmental Products program, go to http://www.freescale.com/epp.

MPC7455ARXPXPNS/D