Motorola Part Numbers Affected:

MPC603ERX100LN	MPC603ERX133LN
MPE603ERX100LN	MPE603ERX133LN
MPC603EFE100LN	MPC603EFE133LN
MPE603EFE100LN	MPE603EFE133LN
MPC603ERX100TN	MPC603ERX133TN
MPC603EFE100TN	MPC603EFE133TN

PowerPC™

Application-Specific Information

PowerPC 603e™ RISC Microprocessor Family: PID6-603e (Stretch) Part Number Specifications

This document defines a unique part number for a PowerPC™ 603e microprocessor manufactured by Motorola. It describes changes to recommended operating conditions and revised electrical specifications, as applicable, from those described in the *PID6-603e Hardware Specification*.

Specifications provided in this data sheet supercede those in Revision 1 (11/96) of the *PID6-603e Hardware Specifications* (order #: MPC603EC/D); specifications not addressed herein are unchanged.

Note that headings and tables in this data sheet are not numbered; however, they are intended to correspond directly to the heading or table affected in the general hardware specifications. Any additional information (including tables) not included in the hardware specifications are noted.

Part numbers addressed in this document and a summary of their differences from the general specification are listed in the following table. For more detailed ordering information see “Ordering Information for the PowerPC 603e” on page 4.Feature Changes

Part Numbers Addressed by this Part Number Specification

Motorola Part Number	Operating Conditions			Significant Differences
	CPU Frequency	Vdd	T_J (°C)	
MPC603ERX100LN	100 MHz	3.3 V ± 5%	0 to 105	Modified AC spec, BGA package (low frequency operation restricted to 80MHz minimum)
MPC603ERX133LN	133 MHz	3.3 V ± 5%	0 to 105	Modified AC spec, BGA package (low frequency operation restricted to 120MHz minimum)
MPC603EFE100LN	100 MHz	3.3 V ± 5%	0 to 105	Modified AC spec, QFP package (Low frequency operation restricted to 80MHz minimum)
MPC603EFE133LN	133 MHz	3.3 V ± 5%	0 to 105	Modified AC spec, QFP package (low frequency operation restricted to 120MHz minimum)
MPE603ERX100LN	100 MHZ	3.3 V ± 5%	0 to 105	Modified AC spec, BGA package (floating point not supported, low frequency operation restricted to 80MHz minimum)
MPE603ERX133LN	133 MHz	3.3 V ± 5%	0 to 105	Modified AC spec, BGA package (floating point not supported, low frequency operation restricted to 120MHz minimum)
MPE603EFE100LN	100 MHz	3.3 V ± 5%	0 to 105	Modified AC spec, QFP package (floating point not supported, low frequency operation restricted to 80MHz minimum)
MPE603EFE133LN	133 MHz	3.3 V ± 5%	0 to 105	Modified AC spec, QFP package (floating point not supported, low frequency operation restricted to 120MHz minimum)
MPC603ERX100TN	100 MHz	3.3 V ± 5%	-40 to 105	Modified thermal spec, extended temperature range, BGA package
MPC603ERX133TN	133 MHz	3.3 V ± 5%	-40 to 105	Modified thermal spec, extended temperature range, BGA package

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Part Numbers Addressed by this Part Number Specification (Continued)

Motorola Part Number	Operating Conditions			Significant Differences
	CPU Frequency	Vdd	T_J (°C)	
MPC603EFE100TN	100 MHz	3.3 V ± 5%	-40 to 105	Modified thermal spec, extended temperature range, QFP package
MPC603EFE133TN	133 MHz	3.3 V ± 5%	-40 to 105	Modified thermal spec, extended temperature range, QFP package

Feature Changes

This section summarizes significant feature changes between the revision of the 603e addressed by this document and the previous widely available revision 1.4.1 (XPC603ERXnnnLJ or XPC603EFEnnnLJ where nnn is the core frequency).

This revision fixes numerous errata which existed on the earlier revision but added no new features.

Errata

This section summarizes design defects or errors (errata) that are known to exist on this revision of the 603e. There may be additional errata that are not known or are not yet documented here which may cause the part to deviate from the functional description provided in the *MPC603e & EC603e™ RISC Microprocessor User's Manual* (order # MPC603EUM/AD Rev 1). Refer to the website at http://www.mot.com/SPS/PowerPC/ for the latest version of this Part Number Specification or to your local Motorola sales office for later and/or more detailed description of the errata.

The known errata as of the date of this document are summarized below.

#	Problem	Description	Impact	Solutions
1	Snoop causes cancelled speculative load to corrupt GPR/FPR.	A snoop that hits to a pending but cancelled copy back address can cause wrong data to be loaded into a GPR/FPR.	All systems that use hardware coherency along with speculative loads.	Set G=1 to pages loaded from during snooping.
2	Snoop copyback causes every tenth dcbi to fail.	A snoop which causes a copyback and occurring in a one cycle window near every tenth dcbi causes the dcbi to fail to invalidate the cache.	Only systems using both software and hardware coherency simultaneously are affected.	After each dcbi, place an additional dcbi to the same address.

Electrical and Thermal Characteristics

This section provides any changes to the AC and DC electrical specifications and thermal characteristics for the PID6-603e parts described herein.

DC Electrical Characteristics

The following table describes the changed thermal operating conditions for the PID6-603e part numbers described herein.

Recommended Operating Conditions

Characteristic	Symbol	Value	Unit	Notes
Junction temperature	Tj	-40 to 105	ºC	1

Note: 1. Parts with TN suffix only.

AC Electrical Characteristics

The AC timing specifications described in the *PID6-603e Hardware Specification*s include 100MHz, 120MHz, and 133MHz. Motorola has discontinued the 120MHz offering for the revision described herein. Customers desiring to operate at 120MHz are encouraged to purchase the 133MHz part. This section provides any other AC electrical characteristics that have been changed for this revision.

Clock AC Specifications

The following table provides the revised clock AC timing specifications for the parts described herein

Note that the minimum core frequency has been raised from the 16.67MHz value in the Hardware Specification to 80MHz. Some parts of this revision manufactured recently will not operate that slowly.

Clock AC Timing Specifications

Vdd = AVdd = 3.3 ± 5% V dc, OVdd = 3.3 ± 5% V dc, GND = 0 V dc, $0 \le T_j \le 105$ °C

Num	Characteristic	100 MHz		133.33 MHz		Unit	Notes
		Min	Max	Min	Max		
	Processor frequency	80	100	120	133.33	MHz	1
	VCO frequency	100	200	133.33	266.66	MHz	1
	SYSCLK (bus) frequency	16.67	66.67	16.67	66.67	MHz	
1	SYSCLK cycle time	15.0	60.0	15.0	60.0	ns	
2,3	SYSCLK rise and fall time	—	2.0	—	2.0	ns	2
4	SYSCLK duty cycle measured at 1.4 V	40.0	60.0	40.0	60.0	%	3
	SYSCLK jitter	—	±150	—	±150	ps	4
	Internal PLL relock time	—	100	—	100	μs	3, 5

Notes:

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 the hardware specifications for valid PLL_CFG[0–3] settings.
2. Rise and fall times for the SYSCLK input are measured from 0.4 V to 2.4 V.
3. Timing is guaranteed by design and characterization, and is not tested.
4. Cycle-to-cycle jitter, and is guaranteed by design.
5. Relock timing is guaranteed by design and characterization, and is not tested. PLL-relock time is the maximum amount of time required for PLL lock after a stable Vdd and SYSCLK are reached during the power-on reset sequence. This specification also applies when the PLL has been disabled and subsequently re-enabled during sleep mode. Also note that $\overline{\text{HRESET}}$ must be held asserted for a minimum of 255 bus clocks after the PLL-relock time during the power-on reset sequence.

Ordering Information

The following table provides the ordering information for the PID6-603e part numbers described herein.

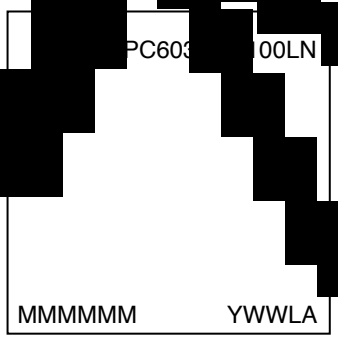
Ordering Information for the PowerPC 603e

Package Type	Device Rev	Process	Mask Code	CPU Frequency (MHz)	Motorola Part Number
240 CQFP	4.1	PPC1.3	01H49P	100	MPC603EFE100LN
				133	MPC603EFE133LN
				100	MPE603EFE100LN
				133	MPE603EFE133LN
				100	MPC603EFE100TN
				133	MPC603EFE133TN
255 CBGA	4.1	PPC1.3	71H49P	100	MPC603ERX100LN
				133	MPC603ERX133LN
				133	MPE603ERX133LN
				100	MPE603ERX100LN
				100	MPC603ERX100TN
				133	MPC603ERX133TN

Part Marking

This section provides information on Mot[illegible]device marking standards. Parts are m[illegible]e shown below.

CQFP



BGA

Notes:

MMMMMM is the 6-digit mask code
ATWLYYWWA or YWWLA is the traceability code
CCCCC is the country of assembly (this space is left blank if par[illegible]ssembled in the United States)

Motorola Part Marking for CQFP and BG[illegible]

Extended temperature parts are marked as shown below.

CQFP

BGA

Notes:

MMMMMM is the 6-digit mask code
ATWLYYWWA or YWWLA is the traceability code
CCCCC is the country of assembly (this space is left blank if parts are assembled in the United States)

Motorola Part Marking for Extended Temperature CQFP and BGA Devices