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Understanding Embedded - Microprocessors

Embedded microprocessors are specialized computing chips designed to perform specific tasks within an embedded system. Unlike general-purpose microprocessors found in personal computers, embedded microprocessors are tailored for dedicated functions within larger systems, offering optimized performance, efficiency, and reliability. These microprocessors are integral to the operation of countless electronic devices, providing the computational power necessary for controlling processes, handling data, and managing communications.

Applications of Embedded - Microprocessors

Embedded microprocessors are utilized across a broad spectrum of applications, making them indispensable in

Details

Product Status	Obsolete
Core Processor	PowerPC 603e
Number of Cores/Bus Width	1 Core, 32-Bit
Speed	300MHz
Co-Processors/DSP	-
RAM Controllers	-
Graphics Acceleration	No
Display & Interface Controllers	-
Ethernet	-
SATA	-
USB	-
Voltage - I/O	3.3V
Operating Temperature	0°C ~ 105°C (TA)
Security Features	-
Package / Case	255-BCBGA, FCCBGA
Supplier Device Package	255-FCCBGA (21x21)
Purchase URL	https://www.e-xfl.com/product-detail/nxp-semiconductors/mpc603rrx300lc

Freescale Semiconductor, Inc.

Motorola Part Numbers Affected:

MPE603RRX166LC	MPC603RRX166LC
MPE603RRX200LC	MPC603RRX200LC
MPE603RRX233LC	MPC603RRX233LC
MPE603RRX266LC	MPC603RRX266LC
MPE603RRX300LC	MPC603RRX300LC
	MPC603RRX200TC
	MPC603RRX266TC

Application-Specific Information

PowerPC 603e™ RISC Microprocessor Family: MPC603r (Goldeneye) Part Number Specification

This document defines a unique part number for a PowerPC™ PID7t-603e microprocessor manufactured by Motorola as part number MPC603R or EC603R. It describes changes to recommended operating conditions and revised electrical specifications, as applicable, from those described in the *PowerPC 603e RISC Microprocessor Family: MPC603r Hardware Specifications*.

Specifications provided in this data sheet supercede those in the *MPC603r Hardware Specifications* (order #: MPC603REC/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 specification 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 infomation see "Ordering Information for the PID7t-603e Microprocessor".

. Part Numbers Addressed by this Data Sheet

Motorola Part Number	Operating Conditions			Significant Differences
	CPU Frequency	Vdd	T_J (°C)	
MPC603RRX166LC	166 MHz	2.5 ± 5%V	0 to 105	No electrical specification changes.
MPC603RRX200LC	200 MHz	2.5 ± 5%V	0 to 105	No electrical specification changes.
MPC603RRX233LC	233 MHz	2.5 ± 5%V	0 to 105	No electrical specification changes.
MPC603RRX266LC	266 MHz	2.5 ± 5%V	0 to 105	No electrical specification changes.
MPC603RRX300LC	300 MHz	2.5 ± 5%V	0 to 105	No electrical specification changes.
MPE603RRX166LC	166 MHz	2.5 ± 5%V	0 to 105	No spec changes. Floating point not guaranteed.
MPE603RRX200LC	200 MHz	2.5 ± 5%V	0 to 105	No spec changes. Floating point not guaranteed.
MPE603RRX233LC	233 MHz	2.5 ± 5%V	0 to 105	No spec changes. Floating point not guaranteed.
MPE603RRX266LC	266 MHz	2.5 ± 5%V	0 to 105	No spec changes. Floating point not guaranteed.
MPE603RRX300LC	300 MHz	2.5 ± 5%V	0 to 105	No spec changes. Floating point not guaranteed.
MPC603RRX200TC	200 MHz	2.5 ± 5%V	-40 to 105	Extended temperature range.
MPC603RRX266TC	266 MHz	2.5 ± 5%V	-40 to 105	Extended temperature range.

Feature Changes

This section summarizes significant feature changes between the revision of the PID7t-603e addressed by this document and the previous revision 1.0 (XPC603RRXnnnLA or XPC603RFEnnnLA where nnn is the core frequency).

This revision was for manufacturing improvements only; there are no functional differences between this revision 2.1 and the previous revision 1.0.

This revision is functionally equivalent to the PID7v-603e (Valiant) microprocessor Revision 2.1 (XPC603PFEnnnLE/ XPC603PRXnnnLE) including the following errata.

Errata

This section summarizes design defects or errors (errata) that are known to exist on this revision of the PID7t-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.

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

#	Problem	Description	Impact	Solutions
1	Snoop copyback causes dcbi to broadcast wrong address.	A snoop which causes a copy-back and occurs in a one cycle window near a dcbi causes the dcbi to broadcast the address of the snoop copyback.	Only systems using both software and hardware coherency simultaneously.	Use software semaphores rather than rely on dcbi to invalidate cache lines shared across multiple processors.
2	Competition for reservation with lwarx/stwcx may cause live-lock	The problem occurs when two processors are competing on the bus for a reservation, and the bus is operating with address pipelining	System Hang	Insert a bus clock's worth of no-ops before lwarx
3	Touch load causes incorrect address to appear on memory bus	A touch load (dcbt) preceded by an instruction that generates an exception causes a random address to appear on the memory bus	Systems issuing instructions which generate mmu exceptions one cycle before using a touch load instruction	Disable touch loads with NOOPTI bit in HID0.
4	Write-thru stores followed by dcbz followed by a snoop, all to the same cache line, may cause incoherency.	The sequence of write-thru stores followed by dcbz followed by a snoop, all to the same cache line, may cause incoherency.	The write-thru store is completed after the dcbz.	Store zeroes rather than rely on dcbz to zero cache lines in areas of memory that are marked as write-thru and can be accessed via multiple logical addresses.
5	The broadcasting of dcbz instructions may retry snoop accesses indefinately.	A sequence of broadcast bcbz instructions may retry snoop accesses indefinately.	Snoop originator may timeout.	Disable broadcasting of dcbz by marking the memory space being addressed by the dcbz instruction as not global in the BAT or PTE.

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

This section describes the changed thermal operating conditions for the PID7t-603e part numbers described herein.

. Recommended Operating Conditions

| Characteristic	Symbol	Value	Unit	Notes
Junction temperature	T_J	-40 to 105	°C	
Note: 1. Parts with TC suffix only.				

Ordering Information

The following table provides the ordering information for the PID7t-603e part numbers described herein.

Ordering Information for the PID7t-603e Microprocessor

Package Type	Device Rev	Process	Mask Code	CPU Frequency (MHz)	Motorola Part Number
255 CBGA	2.1	PPC3.0	2H93J	166	MPC603RRX166LC
				200	MPC603RRX200LC
				233	MPC603RRX233LC
				266	MPC603RRX266LC
				300	MPC603RRX300LC
				166	MPE603RRX166LC
				200	MPE603RRX200LC
				233	MPE603RRX233LC
				266	MPE603RRX266LC
				300	MPE603RRX300LC
				200	MPC603RRX200TC
				266	MPC603RRX266TC

Part Marking

This section provides information on Motorola device marking standards. Parts are marked as the example shown below.

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Ⓜ MPC603RRX200LC




MMMMMM        ATWLYYWWA
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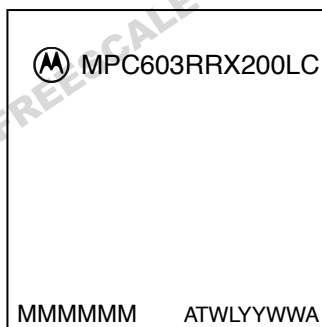
BGA

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)

Part Marking for BGA Devices