IBM PowerPC® 750FX RISC Microprocessor

Supplement for DD2.X Revisions

(Part-Level Specific Information for 750FX Design Revision Level DD2.X)

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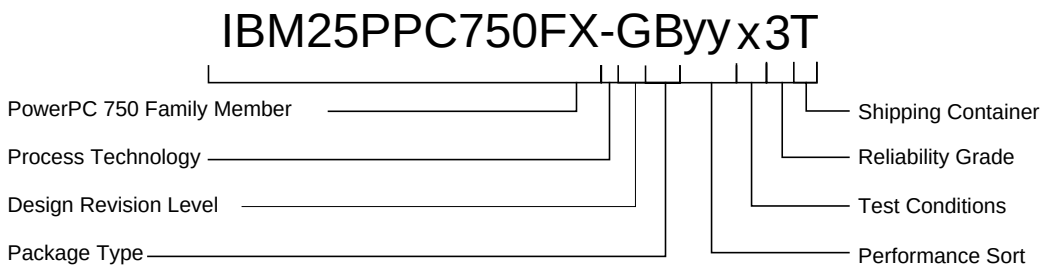
1. General Information

The IBM PowerPC® 750FX RISC Microprocessor, also called the PowerPC® 750FX, is an implementation of the IBM PowerPC family of reduced instruction set computer (RISC) microprocessors. This document is specific to revision DD 2.X of the PowerPC® 750FX RISC Microprocessor and may not apply to previous or subsequent revisions. All information in this supplement supersedes that in the *PowerPC 750FX RISC Microprocessor Datasheet*. All other information is as stated in the *PowerPC 750FX RISC Microprocessor Datasheet*.

1.1 Part Number Information

Not all of the part numbers contained in this document are available. Contact an IBM PowerPC Sales representative for more information.

Figure 1-1. Part Number Legend



Design Revision Level	D = DD2.0 E = DD2.1 F = DD2.2 G = DD2.3
Package Type	B = Ceramic Ball Grid Array
Performance Sort	01 = Nominal at 600 MHz 05 = Nominal at 700 MHz 10 = Nominal at 733 MHz 25 = Nominal at 800 MHz
Test Conditions	1 = (see Note) 2 = Special Test Conditions 3 = 1.4 - 1.5V @ 105°C
Reliability Grade	3 = Grade 3, <100 FIT AFR 2 = Grade 2, < 25 FIT AFR
Shipping Container	T = Tray

Note: The original V_{DD} and T_j specification of Test Condition 1 part numbers for DD2.2 was 1.35V to 1.45V at @ 105°C. As per PCN-IBM-050803, the test conditions or these parts have changed to 1.4V to 1.5V @ 105°C. The increase in V_{DD} does not increase the nominal F_{MAX} for these part numbers.

1.2 Part Number by Application Condition

Table 1-1 provides a summary of the general parameters of the 750FX.

Table 1-1. IBM Part Numbers for the PowerPC 750FX RISC Microprocessor

IBM Part Number	DD Revision	Internal PN	Processor Speed	Units	V_{DD}	Units	T_j	Units	Notes
IBM25PPC750FX-EB0113T	DD2.1	P70P1003	600	MHz	1.4+/-0.05	V	0 to 105	°C	1
IBM25PPC750FX-EB0513T		P70P0999	700	MHz	1.4+/-0.05	V	0 to 105	°C	1
IBM25PPC750FX-EB1013T		P70P1000	733	MHz	1.4+/-0.05	V	0 to 105	°C	1
IBM25PPC750FX-FB0113T	DD2.2	70P1332	600	MHz	1.45+/-0.05	V	-40 to 105	°C	1, 2
IBM25PPC750FX-FB0112T		70P2811	600	MHz	1.45+/-0.05	V	-40 to 105	°C	1, 2
IBM25PPC750FX-FB0513T		70P1333	700	MHz	1.45+/-0.05	V	-40 to 105	°C	1, 2
IBM25PPC750FX-FB0533T		70P4579	700	MHz	1.45+/-0.05	V	-40 to 105	°C	1
IBM25PPC750FX-FB0512T		70P2812	700	MHz	1.45+/-0.05	V	-40 to 105	°C	1, 2
IBM25PPC750FX-FB0532T		70P4581	700	MHz	1.45+/-0.05	V	-40 to 105	°C	1
IBM25PPC750FX-FB1013T		70P1334	733	MHz	1.45+/-0.05	V	-40 to 105	°C	1, 2
IBM25PPC750FX-FB1033T		70P4580	733	MHz	1.45+/-0.05	V	-40 to 105	°C	1
IBM25PPC750FX-FB1012T		70P2813	733	MHz	1.45+/0.05	V	-40 to 105	°C	1, 2
IBM25PPC750FX-FB1032T		70P4578	733	MHz	1.45+/-0.05	V	-40 to 105	°C	1
IBM25PPC750FX-FB2513T		70P1335	800	MHz	1.45+/-0.05	V	0 to 105	°C	1, 2
IBM25PPC750FX-GB0133T	DD2.3	70P4675	600	MHz	1.45+/-0.05	V	-40 to 105	°C	1
IBM25PPC750FX-GB0132T		70P4671	600	MHz	1.45+/-0.05	V	-40 to 105	°C	1
IBM25PPC750FX-GB0533T		70P4674	700	MHz	1.45+/-0.05	V	-40 to 105	°C	1
IBM25PPC750FX-GB0532T		70P4670	700	MHz	1.45+/-0.05	V	-40 to 105	°C	1
IBM25PPC750FX-GB1033T		70P4673	733	MHz	1.45+/-0.05	V	-40 to 105	°C	1
IBM25PPC750FX-GB1032T		70P4669	733	MHz	1.45+/-0.05	V	-40 to 105	°C	1
IBM25PPC750FX-GB2533T		70P4672	800	MHz	1.45+/-0.05	V	-40 to 105	°C	1
IBM25PPC750FX-GB2532T		70P4668	800	MHz	1.45+/-0.05	V	-40 to 105	°C	1

Note: C

1. The last letter of the part number field, which is not printed on the module, indicates the delivery shipping container.
2. The original V_{DD} and T_j specification of Test Condition 1 part numbers for DD2.2 was 1.35V to 1.45V at @ 105°C. As per PCN-IBM-050803, the test conditions or these parts have changed to 1.4V to 1.5V @ 105°C. The increase in V_{DD} does not increase the nominal F_{MAX} for these part numbers.

1.3 750 FX Derating Chart for General Market Application Conditions

Table 1-2. Low Voltage Recommended Operating Conditions

Characteristic	Symbol	Value	Unit	Notes
Minimum Core supply voltage	V_{DD}	1.2	V	1
Minimum PLL supply voltage	AV_{DD}	1.2	V	1, 2

Notes:

1. These are recommended and tested operating conditions. Proper device operation outside of these conditions is not guaranteed. In all cases, the specifications in the Absolute Maximum Ratings table of the Datasheet must not be exceeded.
2. AVdd should be set to the same value as Vdd when only one AVdd is used.

Table 1-3. Application Conditions - Maximum frequency at Minimum Voltage

IBM Part Number	Revision	MHz	V	MHz	V	MHz	V	MHz	V	MHz	V	Notes
IBM25PPC750FX-EB0113T	DD2.1	N/A	1.40	600	1.35	566	1.30	533	1.25	500	1.2	1,2,3
IBM25PPC750FX-EB0513T	DD2.1			700		650		600		566		
IBM25PPC750FX-EB1013T	DD2.1			800		700		650		600		
IBM25PPC750FX-FB0113T	DD2.2	600	1.40	600	1.35	566	1.30	533	1.25	500	1.20	1,2,3,4
IBM25PPC750FX-FB0112T	DD2.2											
IBM25PPC750FX-GB0133T	DD2.3	600		600		566		533		500		1,2,3
IBM25PPC750FX-GB0132T	DD2.3											
IBM25PPC750FX-FB0533T	DD2.2	700		650		600		566		533		
IBM25PPC750FX-FB0532T	DD2.2											
IBM25PPC750FX-GB0533T	DD2.3											
IBM25PPC750FX-GB0532T	DD2.3											
IBM25PPC750FX-FB0513T	DD2.2	700		700		650		600		566		1,2,3,4
IBM25PPC750FX-FB0512T	DD2.2											
IBM25PPC750FX-FB1033T	DD2.2	733		700		650		600		566		1,2,3
IBM25PPC750FX-FB1032T	DD2.2											
IBM25PPC750FX-GB1033T	DD2.3											
IBM25PPC750FX-GB1032T	DD2.3											
IBM25PPC750FX-FB1013T	DD2.2	733		733		700		650		600		1,2,3,4
IBM25PPC750FX-FB1012T	DD2.2											
IBM25PPC750FX-FB2513T	DD2.2	800		800		750		700		667		1,2,3,4
IBM25PPC750FX-GB2533T	DD2.3	800		750		700		667		600		1,2,3
IBM25PPC750FX-GB2532T	DD2.3											

Note:

1. Minimum low frequency of 400 MHz is supported.
2. Minimum voltage must account for regulator voltage tolerance, ripple noise, and transient response.
3. Maximum temperature is 105°C T_j
4. The original V_{DD} and T_J specification of Test Condition 1 part numbers for DD2.2 was 1.35V to 1.45V at @ 105°C. As per PCN-IBM-050803, the test conditions or these parts have changed to 1.4V to 1.5V @ 105°C. The increase in V_{DD} does not increase the nominal F_{MAX} for these part numbers.

1.4 Power Consumption

Table 1-4. Power Consumption

Power-Saving Mode Power Consumption Specifications	Representative Processor Frequency (MHz)					Unit	Notes
	400	500	600	650	700		
Low Voltage Mode							
Typical(V_{DD}=1.3V)(85°C)	2.3	2.6	2.9	3.1	3.3	W	1, 3, 4
Maximum(V_{DD}=1.4V)(105°C)	5.9	6.3	6.7	6.9	7.1	W	1, 2, 4
Typical(V_{DD}=1.25V)(85°C)	1.9	2.2	2.5	N/A	N/A	W	1, 3, 4
Maximum(V_{DD}=1.35V)(105°C)	5.2	5.6	6.0	6.2	N/A	W	1, 2, 4

Notes:

1. These values apply for all valid 60x buses. The values do not include I/O Supply Power (OV_{DD}). OV_{DD} power is system dependent, but is typically <2% of V_{DD} power.
2. Maximum power is specified for fastest (worst process) parts running RC5.
3. Typical power is specified for median process 800 MHz parts running RC5. The value is then adjusted for 13% less switching (AC component for P_D) to account for the differences between RC5 and more typical application code.
4. Guaranteed by design and characterization, and is not tested.

1.5 V_{IH} Limits at Lower V_{DD} Voltages

Table 1-5. DC Electrical Specification - V_{IH} Minimum for OV_{DD} Range 2.5 Volt - I/O

V_{DD} (Minimum)	OV_{DD} - Maximum Limit							Unit
	2.38	2.40	2.45	2.50	2.55	2.60	2.63	
	V_{IH} Limits							
Low Voltage Mode								
1.30V	1.70	1.70	1.70	1.70	1.70	1.70	1.70	Volts
1.25V	1.70	1.70	1.70	1.70	1.70	1.70	1.75	Volts
1.20V	1.70	1.70	1.70	1.70	1.70	1.75	1.80	Volts

1.6 60x Bus Output AC Specifications

Table 1-6 provides the clock AC timing specifications for the 750FX.

Table 1-6. 60x Bus Output AC Timing Specifications (See Table 1-2 on page 5 for operating conditions)

Num	Characteristic	1.8V Mode		2.5V Mode		3.3V Mode		Unit	Notes
		Min.	Max.	Min.	Max.	Min.	Max.		
13	SYSCLK to Output Valid	—	2.5	—	2.5	—	3.0	ns	1

Notes:

1. Output valid increases as the V_{DD} is reduced. These values assume V_{DD} minimum of 1.20V.

Revision Log

Date	Description
October 1, 2002	Version 1.0 Initial preliminary general release.
December 20, 2002	Version 1.1 • Updated Figure 1-1 Part Number legend DD2.3. • Updated Table 1-1IBM Part Numbers for the PowerPC 750FX RISC Microprocessor. • Updated Table 1-3 Application Conditions - Maximum Frequency at Minimum Voltage. • Deleted K-POH Requirements section. • Updated Table 1-4 Power Consumption.
February 24, 2003	Version 1.2
August 15, 2003	Version 1.3 includes input/updates from designers.
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August 20, 2003	Version 1.3 includes input/updates from designers.
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August 22, 2003	Version 1.3 includes input/updates from designers.
August 25, 2003	Version 1.3 includes input/updates from designers.
August 28, 2003	Version 1.3 includes input/updates from designers.