

xPC Target Version 4.2 (R2009b)

Benchmarks

The xPC Target real-time kernel is tuned for minimum computational overhead and maximum performance. On a PC system configured as a target PC, the kernel dedicates all resources to the target application. This provides a fast and efficient environment for deploying and running Simulink models in real-time. Because the xPC Target software can run on many x86-based PC platforms, you must use standardized benchmarks to compare relative system performance. To benchmark and evaluate a system's suitability as a target PC to meet your application-specific performance requirements, use the xPC Target utility, `xpcbench`.

About `xpcbench`

Using five different Simulink models (low-complexity to high-complexity), `xpcbench` calculates the smallest sample time that can be achieved when the models are run as xPC Target real-time applications. The figures in this document summarize the benchmark results for several systems. To display these results type `xpcbench` in the MATLAB Command Window. The stored benchmark results are from test runs with multi-core support disabled thus allowing a direct comparison with previous release results.

To use `xpcbench` to benchmark your target PC, configure your xPC Target host PC-target PC environment, then type the following in the MATLAB Command Window.

```
>> xpcbench('this')
```

This function runs the benchmark models on your target PC and plots (in rank order) the performance results along with the stored measurements obtained from other PC systems. The five benchmark models are:

- Minimal : This is based on a "minimal" model consisting of three blocks (Constant, Gain, Termination). The model has neither continuous nor discrete states. The result of this benchmark gives an indication of target PC specific latencies.
- F14 : This is based on the standard Simulink example model 'f14'. Type `f14` at the MATLAB command prompt to open the model and view the model complexity. It contains 62 blocks and defines 10 continuous states.
- F14*5 : This is based on the standard Simulink example model 'f14' as well, but this benchmark model consists of five f14 systems, each configured in separate subsystems. This benchmark is therefore 5 times more demanding than the previous benchmark.
(310 blocks, 50 continuous states)
- F14*10 : This benchmark contains ten f14 systems
(620 blocks, 100 continuous states)
- F14*25 : This benchmark contains twenty five f14 systems
(1550 blocks, 250 continuous states)

Results are labeled by CPU type, CPU clock rate, and compiler. Compiler refers to the compiler used during the build process to create the application executable after Real-Time Workshop generates code for the model. Compilers are annotated as follows:

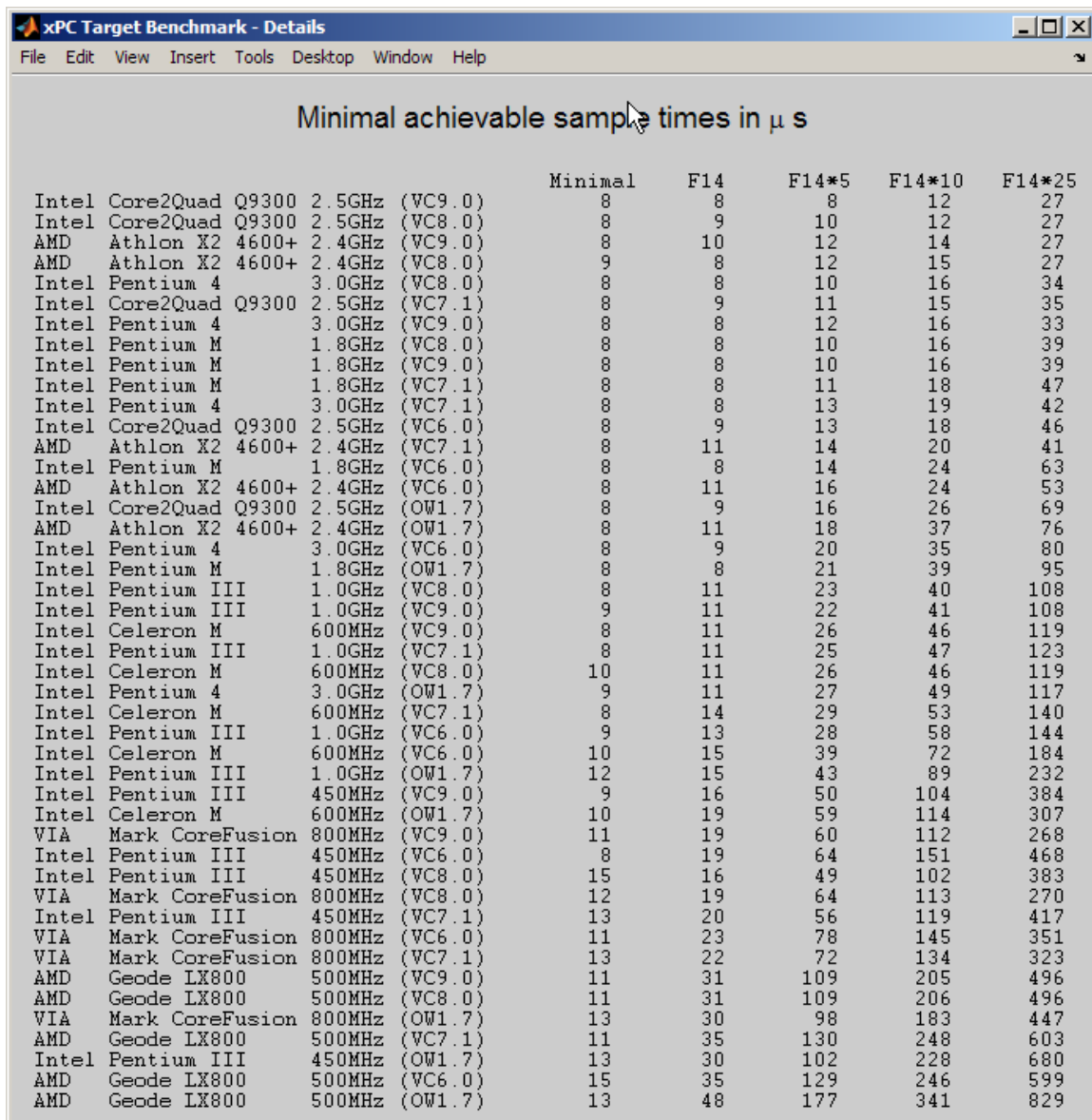
- VC9.0 : Microsoft Visual C/C++ 2008 Professional
- VC8.0 : Microsoft Visual C/C++ 2005 SP1 Professional
- VC7.1 : Microsoft Visual C/C++ .NET 2003 Professional
- VC6.0 : Microsoft Visual C/C++ 6.0
- OW1.7 : Open Watcom 1.7

Other Performance Factors

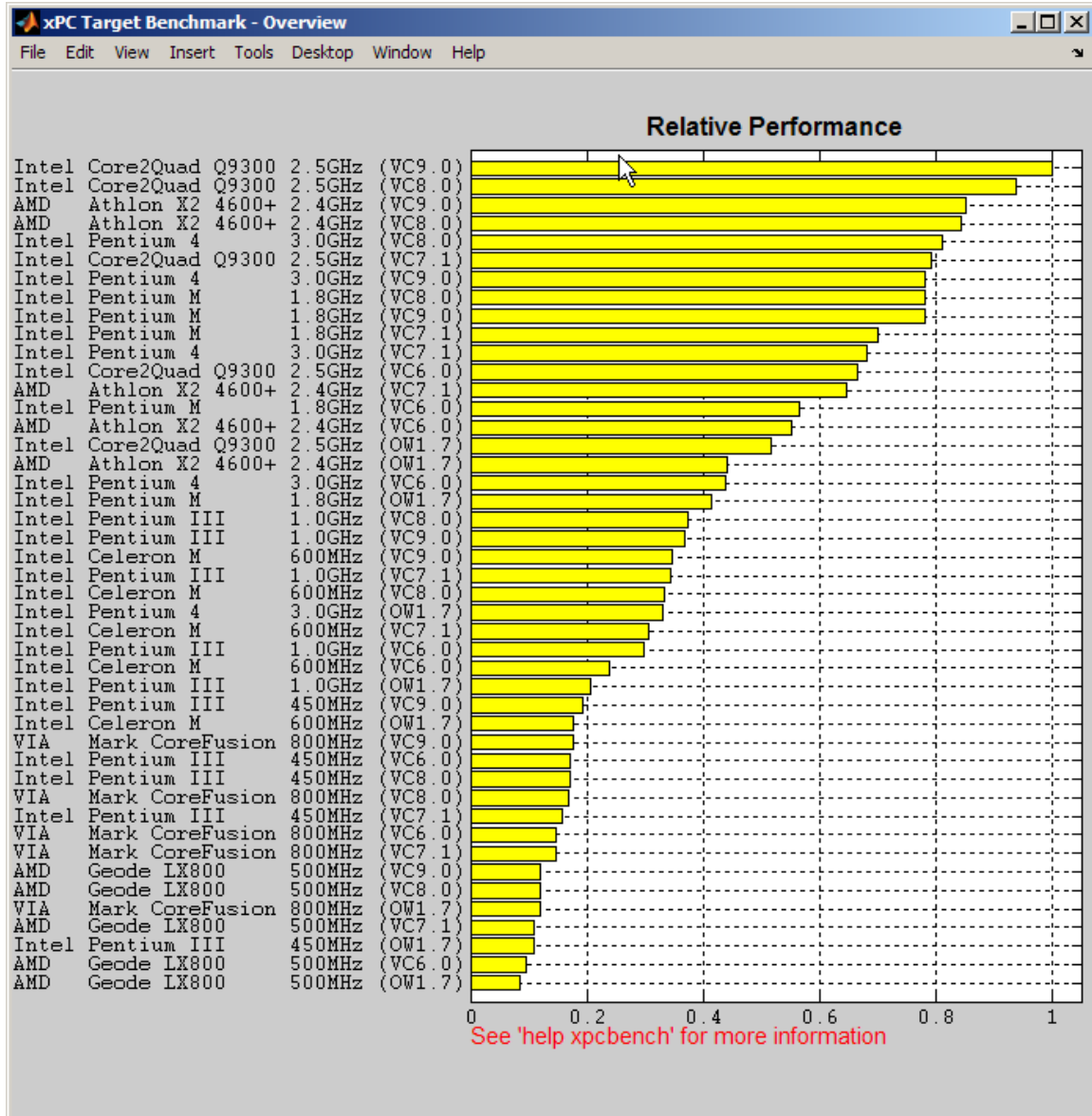
xpcbench provides a measure of the raw computational speed of a target PC as a function of model complexity and build compiler. Based on your application requirements, there might be other factors that affect system performance as well, such as:

- CPU Cache size
- Unwanted system management interrupts (SMIs)
- Background task switching (e.g., when using scopes)
- I/O requirements (e.g., device driver latency, channel conversion time)

The Simulink models tested with xpcbench do not include I/O blocks. However, many applications require I/O and include blocks from the xPC Target I/O device driver library. Although xPC Target I/O device drivers are very efficient, when you create models containing I/O blocks, the performance results will also include I/O hardware dependencies and driver latencies.



					Minimal	F14	F14*5	F14*10	F14*25
Intel	Core2Quad	Q9300	2.5GHz	(VC9.0)	8	8	8	12	27
Intel	Core2Quad	Q9300	2.5GHz	(VC8.0)	8	9	10	12	27
AMD	Athlon X2	4600+	2.4GHz	(VC9.0)	8	10	12	14	27
AMD	Athlon X2	4600+	2.4GHz	(VC8.0)	9	8	12	15	27
Intel	Pentium 4		3.0GHz	(VC8.0)	8	8	10	16	34
Intel	Core2Quad	Q9300	2.5GHz	(VC7.1)	8	9	11	15	35
Intel	Pentium 4		3.0GHz	(VC9.0)	8	8	12	16	33
Intel	Pentium M		1.8GHz	(VC8.0)	8	8	10	16	39
Intel	Pentium M		1.8GHz	(VC9.0)	8	8	10	16	39
Intel	Pentium M		1.8GHz	(VC7.1)	8	8	11	18	47
Intel	Pentium 4		3.0GHz	(VC7.1)	8	8	13	19	42
Intel	Core2Quad	Q9300	2.5GHz	(VC6.0)	8	9	13	18	46
AMD	Athlon X2	4600+	2.4GHz	(VC7.1)	8	11	14	20	41
Intel	Pentium M		1.8GHz	(VC6.0)	8	8	14	24	63
AMD	Athlon X2	4600+	2.4GHz	(VC6.0)	8	11	16	24	53
Intel	Core2Quad	Q9300	2.5GHz	(OW1.7)	8	9	16	26	69
AMD	Athlon X2	4600+	2.4GHz	(OW1.7)	8	11	18	37	76
Intel	Pentium 4		3.0GHz	(VC6.0)	8	9	20	35	80
Intel	Pentium M		1.8GHz	(OW1.7)	8	8	21	39	95
Intel	Pentium III		1.0GHz	(VC8.0)	8	11	23	40	108
Intel	Pentium III		1.0GHz	(VC9.0)	9	11	22	41	108
Intel	Celeron M		600MHz	(VC9.0)	8	11	26	46	119
Intel	Pentium III		1.0GHz	(VC7.1)	8	11	25	47	123
Intel	Celeron M		600MHz	(VC8.0)	10	11	26	46	119
Intel	Pentium 4		3.0GHz	(OW1.7)	9	11	27	49	117
Intel	Celeron M		600MHz	(VC7.1)	8	14	29	53	140
Intel	Pentium III		1.0GHz	(VC6.0)	9	13	28	58	144
Intel	Celeron M		600MHz	(VC6.0)	10	15	39	72	184
Intel	Pentium III		1.0GHz	(OW1.7)	12	15	43	89	232
Intel	Pentium III		450MHz	(VC9.0)	9	16	50	104	384
Intel	Celeron M		600MHz	(OW1.7)	10	19	59	114	307
VIA	Mark CoreFusion		800MHz	(VC9.0)	11	19	60	112	268
Intel	Pentium III		450MHz	(VC6.0)	8	19	64	151	468
Intel	Pentium III		450MHz	(VC8.0)	15	16	49	102	383
VIA	Mark CoreFusion		800MHz	(VC8.0)	12	19	64	113	270
Intel	Pentium III		450MHz	(VC7.1)	13	20	56	119	417
VIA	Mark CoreFusion		800MHz	(VC6.0)	11	23	78	145	351
VIA	Mark CoreFusion		800MHz	(VC7.1)	13	22	72	134	323
AMD	Geode LX800		500MHz	(VC9.0)	11	31	109	205	496
AMD	Geode LX800		500MHz	(VC8.0)	11	31	109	206	496
VIA	Mark CoreFusion		800MHz	(OW1.7)	13	30	98	183	447
AMD	Geode LX800		500MHz	(VC7.1)	11	35	130	248	603
Intel	Pentium III		450MHz	(OW1.7)	13	30	102	228	680
AMD	Geode LX800		500MHz	(VC6.0)	15	35	129	246	599
AMD	Geode LX800		500MHz	(OW1.7)	13	48	177	341	829



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