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# ERIKA Enterprise Benchmarks on MPC5674F Mamba

July 2010

# A benchmark on PPC MPC5674F

These benchmarks were done as a joint work with Magneti Marelli Powertrain Bologna, in a comparison with the Freescale AUTOSAR OS and another OSEK/VDX-like operating system. Data of the operating systems other than ERIKA Enterprise have been removed from this document.

## Benchmark Environment

- EVB with MPC5674F (Mamba) @ 120 Mhz
- Cache Disabled
- Branch Predictor Enabled
- Execution from FLASH
- 7 Read Wait States / 3 Read Wait States

# Operative Systems Features

ERIKA OSEK (BCC1, BCC2, ECC1, ECC2)

**Alarms and Counters**

**32 Priority Levels, Unlimited Tasks supported**

ERIKA FP (BCC2)

**Same as Erika OSEK, but with no TerminateTask()**

# Activation and Reschedule

	Average (us)	Max (us)	Min (us)
ERIKA FP – 3 RWS	3,49	3,52	3,46
ERIKA OSEK EXTENDED – 3 RWS	4,29	4,39	4,25
ERIKA FP – 7 RWS	8,18	8,39	8,13
ERIKA OSEK STANDARD – 7 RWS	9,43	10,39	9,2
ERIKA OSEK EXTENDED – 7 RWS	9,7	10,66	9,47

- **Activate a higher priority task and measure how much time it takes to start its execution.**

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# Activation and No Reschedule

	Average (us)	Max (us)	Min (us)
ERIKA FP – 3 RWS	2,35	2,41	2,34
ERIKA OSEK EXTENDED – 3 RWS	2,33	2,44	2,31
ERIKA FP – 7 RWS	5,24	5,46	5,19
ERIKA OSEK STANDARD – 7 RWS	5,37	5,59	5,32
ERIKA OSEK EXTENDED – 7 RWS	5,64	5,86	5,59

- **Activate a low priority task and measure how much time it takes to return to the caller.**

# Interrupts Enabling

	Average (us)	Max (us)	Min (us)
ERIKA FP – 3 RWS	0,06	0,07	0,06
ERIKA OSEK EXTENDED – 3 RWS	0,06	0,07	0,06
ERIKA FP – 7 RWS	0,18	0,18	0,18
ERIKA OSEK STANDARD – 7 RWS	0,18	0,18	0,18
ERIKA OSEK EXTENDED – 7 RWS	0,18	0,18	0,18

- Call to `EnableAllInterrupts()`

# Interrupts Disabling

	Average (us)	Max (us)	Min (us)
ERIKA FP – 3 RWS	0,1	0,12	0,07
ERIKA OSEK EXTENDED – 3 RWS	0,1	0,12	0,07
ERIKA FP – 7 RWS	0,31	0,32	0,31
ERIKA OSEK STANDARD – 7 RWS	0,31	0,32	0,31
ERIKA OSEK EXTENDED – 7 RWS	0,31	0,32	0,31

- Call to `DisableAllInterrupts()`



# ISR1 Entry Time

	Average (us)	Max (us)	Min (us)
ERIKA FP – 3 RWS	2,09	2,24	2,05
ERIKA OSEK EXTENDED – 3 RWS	2,09	2,24	2,05
ERIKA FP – 7 RWS	4,42	4,63	4,37
ERIKA OSEK STANDARD – 7 RWS	4,42	4,63	4,37
ERIKA OSEK EXTENDED – 7 RWS	4,42	4,63	4,37

- Measure the time between when an interrupt occurs and its handler is executed.

# ISR1 Exit Time

	Average (us)	Max (us)	Min (us)
ERIKA FP – 3 RWS	2,32	2,45	2,17
ERIKA OSEK EXTENDED – 3 RWS	2,33	2,45	2,17
ERIKA FP – 7 RWS	2,79	2,98	2,58
ERIKA OSEK STANDARD – 7 RWS	2,79	2,98	2,58
ERIKA OSEK EXTENDED – 7 RWS	2,79	2,98	2,58

- Measure the time between when an interrupt handler terminates and the previously executing task resumes.

# ISR2 Entry Time

	Average (us)	Max (us)	Min (us)
ERIKA FP – 3 RWS	1,95	2,19	1,88
ERIKA OSEK EXTENDED – 3 RWS	1,95	2,19	1,88
ERIKA FP – 7 RWS	4,31	4,94	4,15
ERIKA OSEK STANDARD – 7 RWS	4,31	4,94	4,15
ERIKA OSEK EXTENDED – 7 RWS	4,31	4,94	4,15

- Measure the time between when an interrupt occurs and its handler (ISR2) is executed.

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## Task Activation inside ISR2

	Average (us)	Max (us)	Min (us)
ERIKA FP – 3 RWS	2,94	3,45	2,73
ERIKA OSEK EXTENDED – 3 RWS	3,51	4,22	3,32
ERIKA FP – 7 RWS	7,12	8,53	6,67
ERIKA OSEK STANDARD – 7 RWS	8,13	10,27	7,6
ERIKA OSEK EXTENDED – 7 RWS	8,13	9,73	7,6

- Measure the time between when an interrupt occurs and the task handling it is executed.

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# Task Resume from ISR1

	Average (us)	Max (us)	Min (us)
ERIKA FP – 3 RWS	4,57	4,67	4,46
ERIKA OSEK EXTENDED – 3 RWS	5,65	5,74	5,54
ERIKA FP – 7 RWS	7,32	7,44	7,17
ERIKA OSEK STANDARD – 7 RWS	9,32	9,44	9,17
ERIKA OSEK EXTENDED – 7 RWS	9,57	9,57	9,57

- Measure the time between when a task handling an interrupt terminates and the previously executing task resumes.

## Term.Task and Switch to Lower

	Average (us)	Max (us)	Min (us)
ERIKA FP – 3 RWS	4,62	4,68	4,6
ERIKA OSEK EXTENDED – 3 RWS	5,77	6,33	5,62
ERIKA FP – 7 RWS	9,97	10,4	9,87
ERIKA OSEK STANDARD – 7 RWS	11,76	12,4	11,6
ERIKA OSEK EXTENDED – 7 RWS	12,16	12,8	12

- Measure the time taken to terminate a task and switch to a lower priority one.

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