



## Performance of Time-Critical Embedded Systems under the Influence of Errors and Error Handling Protocols

By Philip Axer

Cuvillier Verlag Feb 2016, 2016. Taschenbuch. Condition: Neu. Neuware - As for the entire embedded-systems domain, the complexity of safety-critical systems is growing rapidly. Additionally, the rate of errors in such devices also increases for instance due to silicon shrinking. Hence, error-free operation under in-specification operating conditions cannot be assumed for next-generation safety-critical devices. As a rule of thumb the key design parameters for such systems performance, price and reliability are almost always contradicting design goals. This work addresses the related design space, highlights the challenges and discusses the trade-offs. Of unique interest is the reliability under real-time aspects. Naturally, there are error-handling protocols, error-correcting codes, and modular redundancy available. However, the effect of errors always has an influence on system timing. Even if an error is handled and corrected, it remains unclear under which situations timing requirements are met. This leads to the absurd situation that a device such as an advanced driver assistance system produces correct data even under errors but fails to deliver service because hard deadlines are missed. We present the ASTEROID architecture as a next-generation high-performance, real-time platform which addresses reliability and thus safety aspects. ASTEROID differs from other MPSoC platforms in its cross-layer error...



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