FCE
Flexible CRC Engine

Key Features

- Multiple CRC polynomial kernels
- Configurable CRC parameters
- Automatic checksum checks

Highlights

- The Flexible CRC Engine FCE is used to compute cyclic redundancy checksums without CPU intervention
- Parallel CRC implementation calculates CRC checksum of a word within 1 SPB clock cycle
- Register interface compliant with AUTOSAR™ specification

Customer Benefits

- Different CRC variants are supported: CRC32, CRC16 and CRC8
- CRC algorithms can be adapted to the application needs
- Automated comparison of expected vs. calculated checksum

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The generic architecture of an FCE CRC Kernel is shown on the right.

4 such kernels are supported:
- Kernel 0 & 1: IEEE 802.3 CRC32 Ethernet polynomial: 0x04C11DB71
- Kernel 2: 16-bit CRC-CCITT polynomial: 0x1021
- Kernel 3: SAE J1850 CRC8 polynomial: 0x1D

The usage of the kernel:
- The input values need to be written to the IR register.
- After 2 clock cycles, the calculated CRC result is available in the RES register.
FCE
Configurable CRC parameters

› The supported configurations for each kernel are shown on the right
› The length of the message can be configured
› For the CRC computation, the following configurations are important:
  - Input byte reflection
  - Output bit reflection
  - Output XOR (inversion)
The FCE supports automatic checksum checks at the end of a message. This means the FCE can be programmed to generate an interrupt, in case the CRC result does not match an expected CRC value.
The FCE

- gets its clock from the System Peripheral Bus clock ($f_{\text{SPB}}$)
- provides one interrupt line to the interrupt router (IR) indicating:
  - CRC mismatch
  - configuration error
  - length error
  - bus error
Application example
CRC computation

Overview
FCE can be used to accelerate CRC computation. For example, a data stream from a communication peripheral is fed to FCE via DMA or CPU.

Advantages
› Usage of DMA offloads the CPU
› Automatic CRC check at the end of computation
› CRC32 results from FCE and TriCore™ instruction are identical
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