

FlexNoC[®] Reliability Option for Industrial Applications

Overview

In the realm of industrial systems, long-term performance and reliability are paramount. Choosing a suitable network-on-chip (NoC) safeguards integrated circuits against wear and tear, adverse environmental conditions, and other threats to sustained performance. The Arteris FlexNoC Reliability Option offers a comprehensive suite of reliability features tailored to address these challenges.

Wear and tear in industrial settings can be a significant concern due to continuous operation and stress on components. The integrated ECC and Parity mechanisms within the FlexNoC Reliability Option are vital for preserving data integrity during transmission, effectively countering the effects of wear and tear on data pathways. These mechanisms ensure data reliability even as components age.

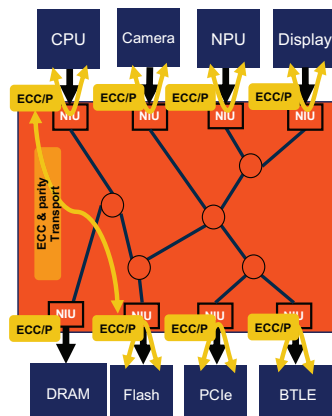
Harsh environmental conditions pose another challenge, with temperature fluctuations, humidity, and contaminants affecting electronic components. The Reliability Option's Packet Consistency checkers swiftly detect and address issues such as bad routing or partial packet anomalies caused by environmental stress, ensuring data consistency and reliability.

The Reliability Option's customizable user-defined ECC/parity on data extends data integrity and protection against payload faults, allowing tailored error correction for specific industrial applications. The AMBA interface, crucial for communication and coordination, benefits from user-defined ECC/parity to ensure reliable control and coordination, even in challenging environments.

The FlexNoC Reliability Option provides immediate fault mitigation and long-term performance solutions for industrial systems. By offering robust error correction, data integrity, and customizability, it equips designers to overcome wear and tear, environmental conditions, and other challenges, guaranteeing consistent reliability over extended operational lifespans.

Highlights

- Optimize your system's design for long-term performance and reliability in industrial environments.
- Streamline fault detection and correction processes for smoother and consistent operations.
- Adapt seamlessly to diverse operational scenarios with versatile data handling options.
- Achieve a high level of fault coverage customized for the specific requirements of industrial systems.
- Tailor the NoC to your industrial system's needs with user-defined ECC/parity checkers on socket data and control signals.



Benefits

Improved data integrity.

The data and control signal checkers ensure that data transfers and control operations occur without errors, enhancing the overall integrity of data within the system.

Fault tolerance and recovery.

The configurable redundancy generator and checker provide fault tolerance, improving system reliability and minimizing downtime.

Error detection and correction.

The transport packet protection (parity/DED/SECDED) techniques help detect and correct errors during data transmission, ensuring accurate and consistent data exchange.

Enhanced system dependability.

By addressing wear and tear, environmental conditions, and other factors that could impact long-term performance, the FlexNoC Reliability Option improves the overall dependability of the system.

Safety-critical system foundation.

The enhancement provides SoC designers with a robust foundation for building safety-critical systems, ensuring the safety and dependability of systems in industries like automotive and industrial applications.

Trustworthiness and longevity.

Reliability tries to ensure that the component of the system rarely fails, ensuring a trustworthy and long-lasting system.

Optimal decision for design engineers.

Opting for the Reliability Option of FlexNoC is a judicious decision for design engineers seeking to improve system dependability and ensure the successful operation of safety-critical systems.

Features

Transport packet protection (Parity/DED/SECDED).

Transport packet protection is a critical aspect of ensuring data integrity during transmission within the system. The FlexNoC Reliability Option includes different methods of packet protection, such as Parity, Double Error Detection (DED), and Single Error Correction Double Error Detection (SECDED). Parity is a simple method that uses an extra bit to represent the parity of the data. DED allows the detection of up to two errors within a packet, while SECDED can both detect and correct a single error within a packet and detect up to two errors.

Redundancy generator and checker (configurable for each network interface unit).

This feature provides a mechanism to introduce protection within the NoC design's network interface units (NIUs), and is the first NoC module an external IP is connected to. By configuring the redundancy generator and checker for each NIU, the system can achieve real-time fault detection using DED or SECDED schema.

Differentiation

FlexWay is a cost-efficient entry-level NoC product with an optimized feature subset of FlexNoC for smaller-scale SoC designs. Note that the FuSa Option is available to FlexWay and FlexNoC and includes all Reliability features mentioned above.

Both FlexNoC and FlexWay products can export IP-XACT files that can then be used in the Arteris Magillem import/export for enhanced productivity.

Other Arteris products with similar options are Ncore 3 cache-coherent NoC, and CodaCache last-level/dedicated cache.

About Arteris

Arteris is a leading provider of system IP for the acceleration of system-on-chip (SoC) development across today's electronic systems. Arteris network-on-chip (NoC) interconnect IP and SoC integration technology enable higher product performance with lower power consumption and faster time to market, delivering better SoC economics so its customers can focus on dreaming up what comes next. [Learn more at arteris.com](https://www.arteris.com).