A SpaceVPX Compliant Backplane

SpaceVPX LRNT BACKPLANE

VITA 78.0
VITA 46.0
VITA 65.0
VITA 62.0

FULL MESH TOPOLOGY AND FULL REDONDANT SPACEVPX BACKPLANE

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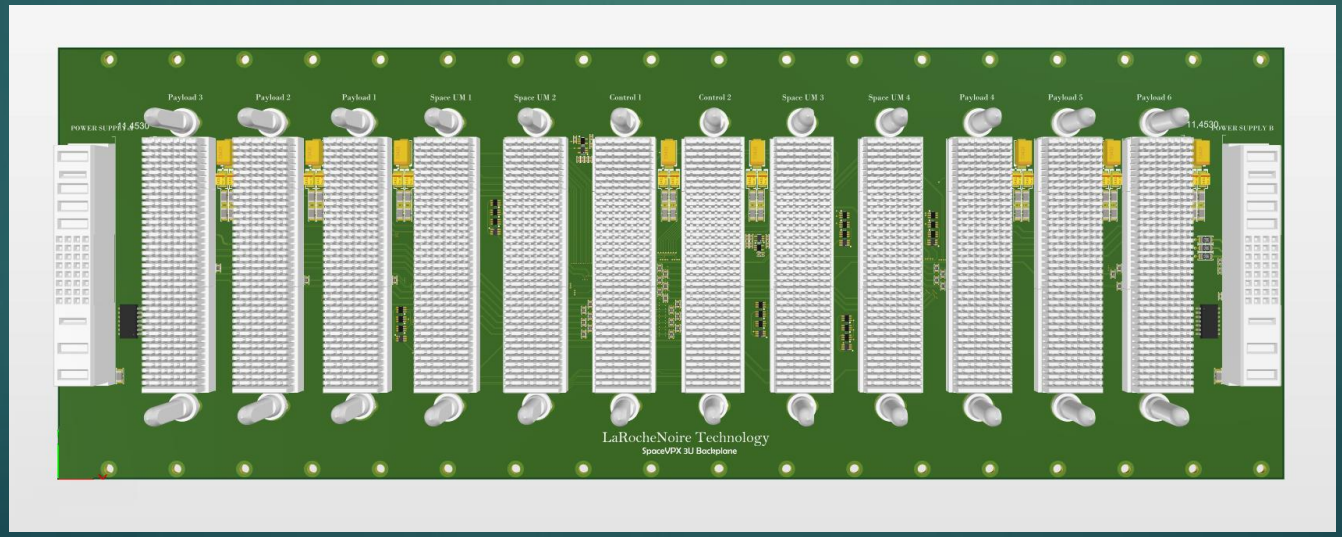
ACKNOWLEDGEMENTS

This work is carried out by LAROCHENOIRE TECHNOLOGY with its own financial means to offer solutions for space electronics.

Designed and tested by LAROCHENOIRE TECHNOLOGY's engineers within the NewSpace project of the Hardware team, this initiative was undertaken with determination and competence, making a significant contribution to the team's progress and achievements in the field of space exploration.



ANSI/VITA BACKPLANES

- **Here are some key points that define the context and market needs for SpaceVPX backplanes in these applications:**
  - **Harsh Environments** : SpaceVPX backplanes must withstand these challenges while delivering high performance.
  - **Industry standards** : A specific standard must be followed (VITA 78.0 and VITA 46.0) to ensure interoperability between components and suppliers, facilitating integration and maintenance.
  - **High Bandwidth** : The SpaceVPX backplanes stand out with their remarkable bandwidth and robust architecture, providing a suitable solution to effectively and reliably address these complex challenges.
  - **Flexibility and Scalability** : SpaceVPX backplanes are designed to provide flexibility and scalability, enabling the integration of new modules and supporting emerging technologies.
  - **Reliability & Redundancy** : SpaceVPX backplanes incorporate redundancy and fault tolerance features to ensure the proper functioning of systems even in the event of a component failure.
  - **Extended Lifecycle** : SpaceVPX backplanes must operate reliably over extended periods without significant degradation of performance.

OBJECTIVE

To highlight the features and benefits of our SpaceVPX-compliant Backplane.

- Introduce our product that meets the specific requirements of aerospace and defense applications by providing a robust and reliable architecture.
- To provide a comprehensive understanding of how our backplane promotes the integration of electronic components in critical environments while ensuring optimal interoperability.
- We will highlight the stringent compliance standards that our product adheres to, thereby emphasizing its quality and reliability.

CONCEPT

The concept of our SpaceVPX-compliant Backplane is to offer the most redundant system possible. Here are some key features:

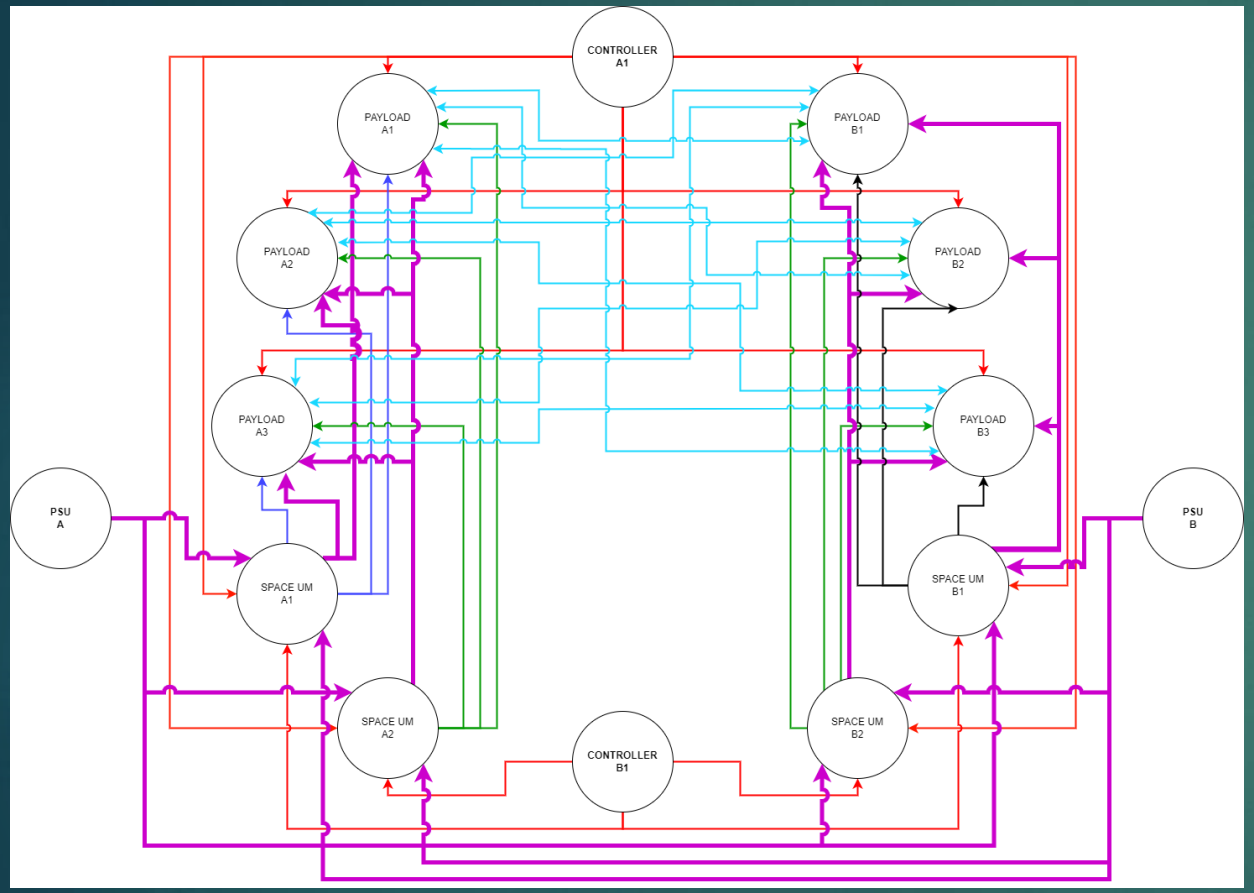
- HIGHER REDUNDANCY
- SUPERIOR PERFORMANCE
- ADVANCED CONFIGURABILITY
- ENHANCED RELIABILITY
- HIGH COMPLIANCE STANDARDS

CONCEPT

The concept of our SpaceVPX-compliant Backplane is to offer the most redundant system possible. Here are some key features:

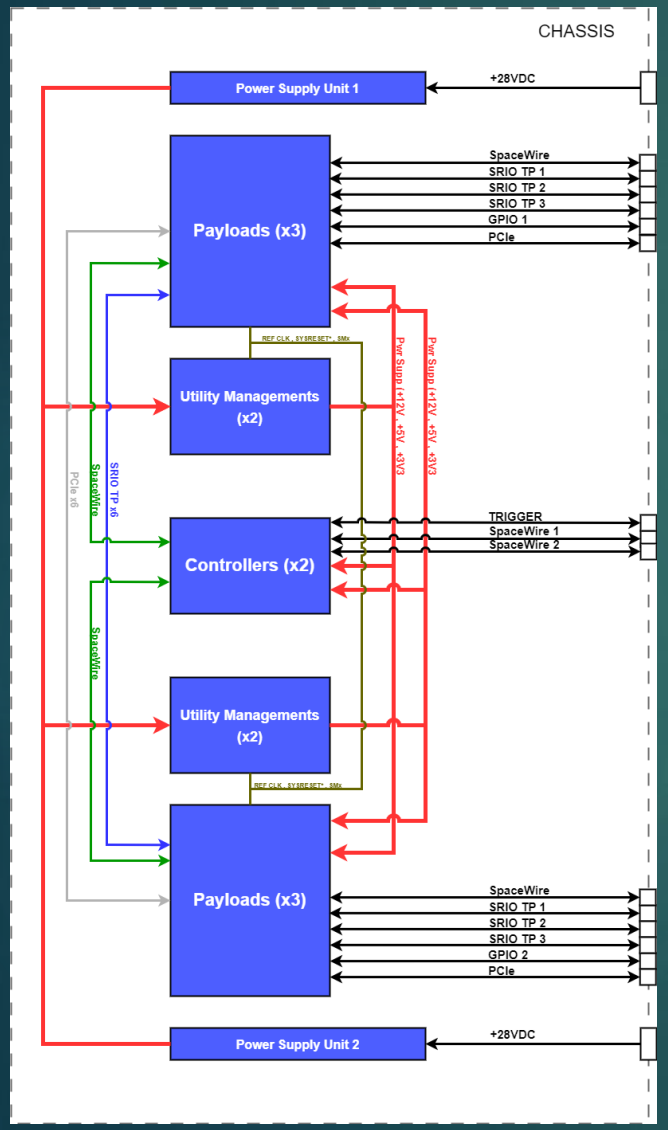
- HIGHER REDUNDANCY
  - Our Backplane stands out with superior redundancy, ensuring operational continuity even in the event of a failure of one or several modules
  - Advanced redundancy mechanisms have been integrated at every level, ensuring maximum availability and exceptional resilience in the face of potential incidents.
- SUPERIOR PERFORMANCE
  - It delivers outstanding performance with faster data transfer rates compared to competing solutions
- ADVANCED CONFIGURABILITY
  - Each slot in our backplane provides individual configurability, allowing precise adaptation to the specific needs of the user.
  - This flexibility allows for customized optimization based on the requirements of each application, providing a significant competitive advantage compared to standardized solutions.
- ENHANCED RELIABILITY
  - Maximum redundancy for payloads and power supplies ensures continuous operation, minimizing the risks of failure.
  - Rigorous testing protocols have been applied at each stage of production to ensure exceptional reliability, positioning our Backplane as a robust solution in the market.
- HIGH COMPLIANCE STANDARDS
  - Our Backplane complies with the strictest industry standards, demonstrating our commitment to quality and safety.
  - Compliance with SpaceVPX standards ensures seamless integration with other market components, providing an interoperable and reliable solution.

LRNT BACKPLANE'S ARCHITECTURE



- Full-Mesh connectivity
  - Each module or card of the backplane is connected to every other module or card, ensuring direct and complete connectivity.
- Link Redundancy
  - The connections between modules are often redundant, meaning there are multiple paths for data to travel. This enhances the system's reliability in case of a connection failure.
- Fault Tolerance
  - Redundancy enables the system to maintain its operations even in the event of a link or module failure. Fault-tolerance mechanisms ensure continuous availability.
- Fault Management
  - It is often integrated to identify, isolate, and automatically recover errors within the backplane, thereby minimizing the impact of failures.
- Matrix Arichitecture
  - The full-mesh architecture can be considered as a matrix architecture, where each element of the system is connected to all others. This provides great flexibility in the management of data flows.
- Scalability
  - The full-mesh and redundant architecture is typically designed to be scalable, allowing the addition of new modules without compromising the performance or reliability of the system.

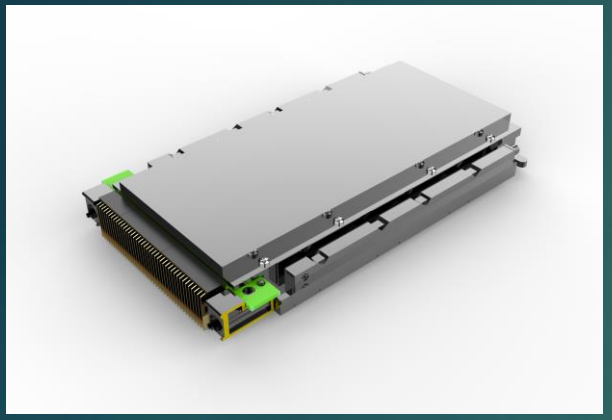
LRTN BACKPLANE'S INTERFACE



SpaceVPX LRNT Backplane interconnects card slots & Front Panel

- SerialRapidIO for Wideband Data
- SpaceWire for Command/Control
- PCIe Interface for Various External Hardware Components Connection
- RS-422 & GPIOs For Peripheral Interfaces
- 2 x 28VDC inputs for Power Supply
- Frequency Reference, External Sample Clock for RF Applications

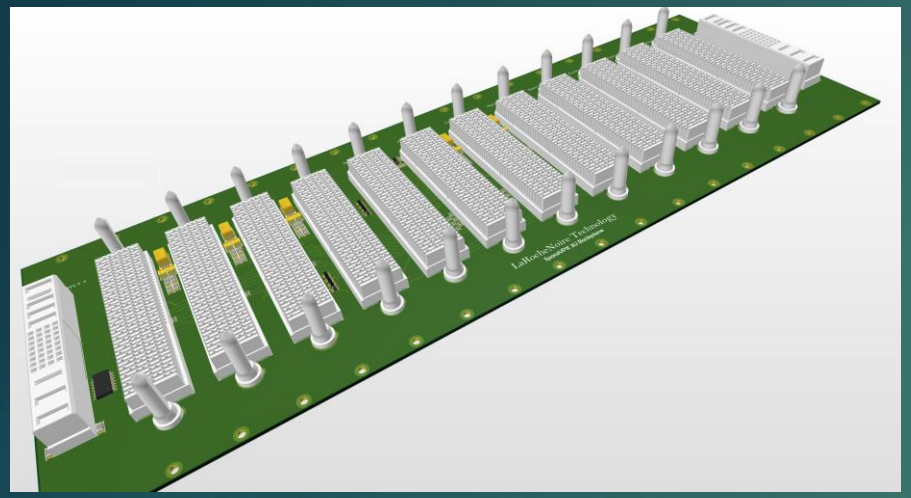
Compatible Payload Cards With LRNT Backplane



A standalone 3U SpaceVPX solution designed to oversee and track the well-being, status, and configuration of both spacecraft and payload, suitable for diverse applications.

- The modules can have FPGA, CPUs, Microcontrollers and any other controllers to support connections with the backplane
- The modules must have/support PCIe, Serial RapidIO, and SpaceWire interfaces.
- The modules can be configured through the JTAG interface present on all connection slots, independently of each other.
- The modules must support an input power of +12V0 or +5V0.

Design Assurance



- Radiation Tolerance :

- All components selected for high latchup immunity and total dose

	TID (Component min)	LET
DRT :	50 krad(Si)	65MeV-cm²/mg
DRT (hi-rel) :	100 krad(Si)	65MeV-cm²/mg
TCC :	100 krad(Si)	72MeV-cm²/mg

- Fault Tolerance :

- TMR Program flow
  SEU/SEFI fault detection/recovery
  Configurable scrubbing

- Parts/Materials/Processes :

- Exceeds requirements for targeted missions.
  Contact **LAROCHENOIRE TECHNOLOGY** for details

Program Status

- All “LRNT Backplane” circuit board and components are currently in the process of development and testing.
- Laboratory tests in process
- Engineering Development Models delivers
- Qualification testing activities
- Application-specific documents are available upon request.

Contact Us

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