

RelyUm[®] Industrial



HSR/PRP/PTP
SR-IOV PCIe NIC

RELY-VPCIe

Overview

Single Root I/O Virtualization (SR-IOV) is an extension of the PCI Express (PCIe) standard that enables efficient hardware resource sharing in virtualized environments. By creating virtual interfaces known as Virtual Functions (VFs), SR-IOV reduces hypervisor overhead and significantly improves network bandwidth and latency. This technology allows SR-IOV-capable network cards to deliver near-native performance, making them ideal for data centres, cloud infrastructures, and high-performance applications that require secure and direct access to physical resources. SR-IOV provides a balance between virtualization flexibility and hardware-level performance,

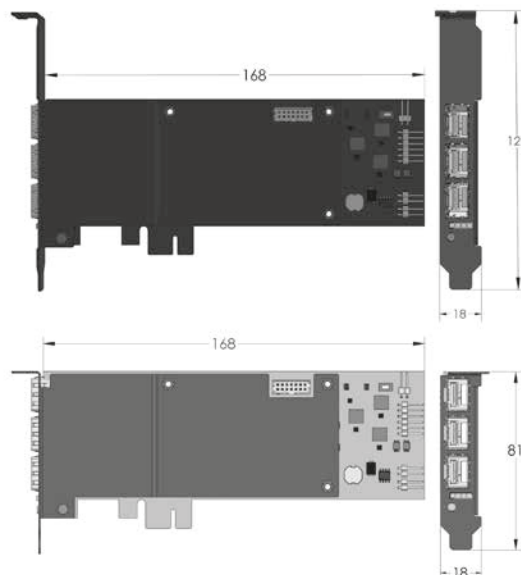
ensuring scalable and efficient system deployments.

In this context, the RELY-VPCIe, equipped with HSR/PRP redundancy and SR-IOV capabilities, can provide each virtual machine with direct, isolated hardware access to redundant network channels, merging real-time reliability with virtualized performance. This convergence allows industries such as energy, transportation, and automation to deploy highly available communication systems within virtual environments, without compromising safety or efficiency.

Key Features

- Full in-house design (SOC-E IP Cores) based on a **reconfigurable platform, upgradable and customizable**.
- Support for **HSR/PRP** "Zero-Packet Loss" redundancy and **NTP/PTP** sub-microsecond synchronization.
- **SR-IOV** virtualization support to enable multiple virtual protection instances on a single card.
- **4-port configuration** supporting up to **two dual-redundant networks**, ensuring uninterrupted communication and maximum reliability for critical power grid and industrial applications.
- **Simplified management and monitoring** via a user-friendly HTTPS web interface or SSH accessible CLI.
- Ethernet **network drivers available for most OS** (Linux, Windows and other RTOS).

Dimensions



All measurements are in mm.

Technical Specifications

Communication Interfaces

- 4x 100/1000BASE-SFP HSR/PRP Ethernet ports
- 1x 1G PCIe Gen4 x4 host interface
 - PCIe SR-IOV enabling up to 64 virtual device queues (VMDq) for enhanced VM network performance
- 1 x PPS input/output

Layer 2 Features

- IEEE 802.3-2008 (Ethernet)
- Automatic MAC address learning and aging
- Static MAC Table
- Port-Based Virtual LANs (VLANs):
 - Logical segmentation of network for optimal use of bandwidth
 - IEEE 802.1Q for VLAN tagging (up to 4K VLAN groups)
 - IEEE 802.1p for Class of Service (CoS) / Quality of Service (QoS)
- Switching port mask for forwarding
- Port rate limiting
- Storm control for flooded broadcast, multicast and unicast
- Layer 2 multicast filtering
- Dual Redbox architecture for Zero-Recovery Time redundancy:
 - High-availability Seamless Redundancy (HSR) - IEC 62439-3 Clause 5
 - Supported modes: H, N, U, HSR-SAN, PRP-HSR, HSR-HSR
 - Cut-through operation for the HSR ring to minimise the latency in the ring
 - Parallel Redundancy Protocol (PRP) - IEC 62439-3 Clause 4
 - Supported modes: Duplicate discard, duplicate accept, transparent reception, PRP-HSR
 - Store & Forward for PRP and Ethernet operation
- Spanning Tree Protocol:
 - IEEE 802.1D (STP)
 - IEEE 802.1w (RSTP)
 - IEEE 802.1s (MSTP)

Synchronization

- IEEE 1588-2008 v2 (PTPv2)
- IEEE 1588 Stateless Transparent Clock (TC)
- IEEE 1588 Ordinary Clock
- (Master-Slave)
- Time Bridge operation: NTP <-> PTP
- NTP (Server/Client)

Security

- IEEE 802.1X for port-based network access control
- MAC port binding & authentication for login security
- RADIUS authentication
- RBAC (Role Based Access Control)
- LDAP (Lightweight Directory Access Protocol)
- Selective ports disabling capability
- Unsecure protocols disabling capability
- Per port ingress and egress port mirroring
- HTTPS for web interface
- Secure Shell (SSH) Protocol v2 for command line interface
- Encryption/authentication & signature for firmware and bitstream

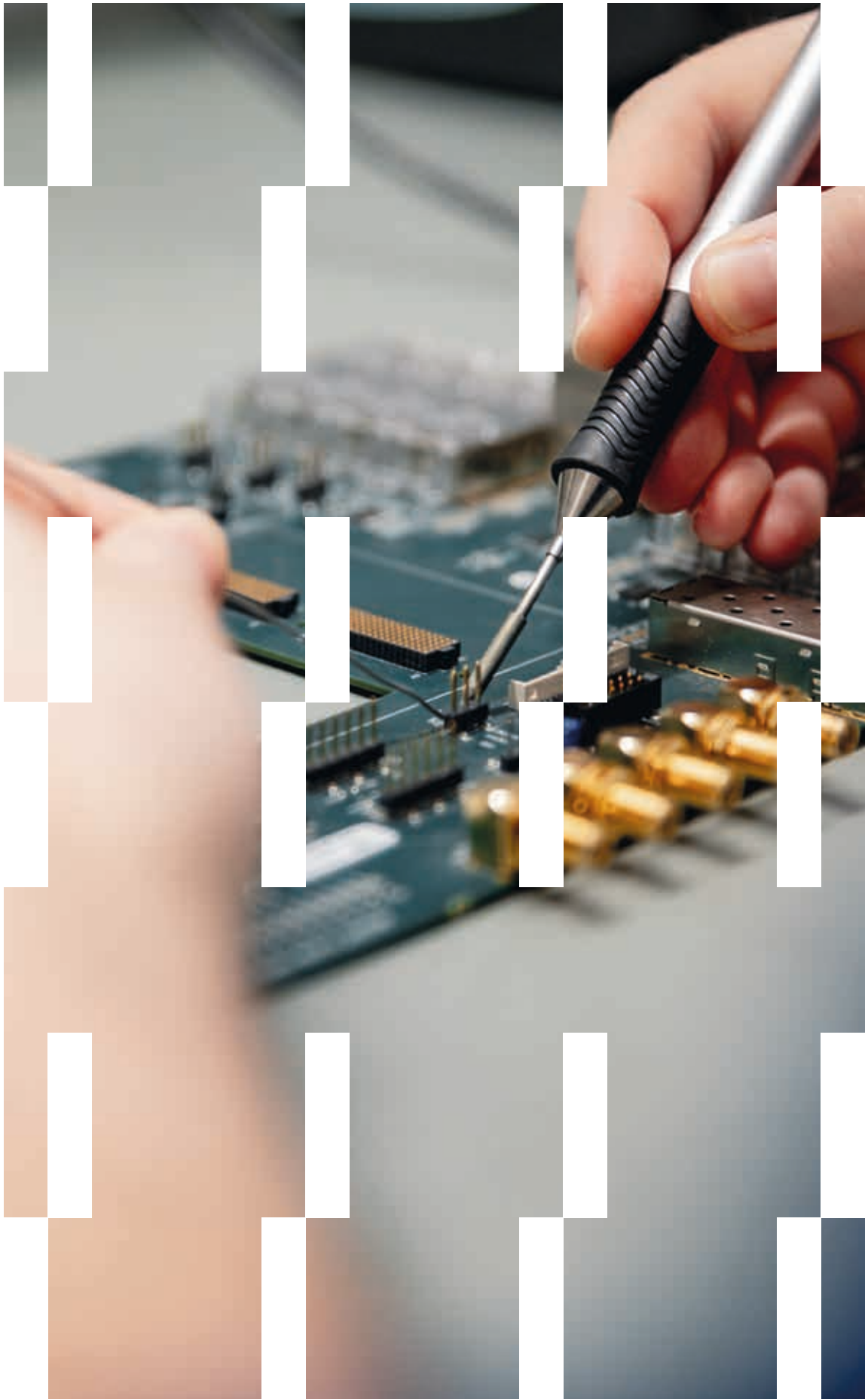
Configuration & Management

- HTTPS web interface
- SSHv2 command line interface (CLI)
- SNMP V1/V2c/V3 protocol support
- SNMP V3 encrypted authentication and access security
- Encrypted and digitally signed firmware/bitstream upgrades
- Saving and restoring configuration
- Internal status monitoring and logging
- Event notification through Syslog
- Graphic representation of Network status (only in HSR/PRP networks)
- Statistics independent per port
- In-band management via any Ethernet switch port
- Configuration wizard for easy system setup

Processing	Next-generation SoC FPGA with integrated ARM processors and high-speed interface	4GB DDR3 RAM memory 32GB eMMC Flash memory 512Mb QSPI Flash memory
Physical & Electrical Characteristics	- Dimensions (mm): - Full Height: 168(W) 122(D) 18(H) - Low Profile: 168(W) 81(D) 18(H) - Weight: TBD - Power input as defined in PCI-express standard: +12VDC +3.3VDC	- Operating temperature: -40°C to +55°C - Storage temperature: -40°C to +85°C - Full-Height or Low Profile PCIe card mounting - Power Consumption: TBD
MTBF	TBD GB@25	MTTR = 0.5 hour
Warranty	2 years	
Certifications	UNE-EN 61326-1:2013	UNE-EN 61326-2-1:2013

Ordering Code

Ordering code	Model and description
TBD	TBD



RelyUm[®] By

RELY-VPCIe
Model under development – preliminary version

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SR-IOV PCIe NIC

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