

LAN969x Ethernet Switch Family

L2/L3 Time Sensitive Networking (TSN)-Enabled Industrial Ethernet Switches

Summary

The LAN969x switch family is a flexible solution for driving the transition to Time-Sensitive Networking (TSN) in industrial automation and other embedded applications. These devices can be configured with High-availability Seamless Redundancy (HSR) and Parallel Redundancy Protocol (PRP) support for applications that require greater redundancy.

The LAN9694 (46 Gbps), LAN9696 (66 Gbps) and LAN9698 (102 Gbps) are highly configurable devices that support a combination of 1 Gbps, 2.5 Gbps and 10 Gbps Ethernet ports. Their powerful 1 GHz CPU enables full management of layer 2 and layer 3 industrial Ethernet switching.

These devices provide a rich set of industrial Ethernet switching features including a comprehensive TSN feature set, L2 switching, L3 routing, seamless redundancy, secure boot, high-precision timing and an extended temperature range. Using multi-stage Versatile Content Aware Processor (VCAP) technology, they enable Virtual Local Area Network (VLAN) and Quality of Service (QoS) processing to deliver differentiated services, security via intelligent frame processing and flexible frame manipulation.

A comprehensive Application Programming Interface (API) and turnkey software development package accelerate time to market for managed industrial Ethernet applications. The API integrates easily with third-party software, preserving existing investment in software.

Highlights

- Number of Ethernet ports supported:
 - 1 Gbps: 30 ports
 - 2.5 Gbps: 22 ports
 - 5 Gbps: 14 ports
 - 10 Gbps: 10 ports
- Fully managed L2 switching and L3 routing features
- Complete TSN feature set including time-aware shaping, cyclic queuing and forwarding, stream policing, high-precision time synchronization, seamless redundancy and low latency through preemption and cut-through switching
- Media Redundancy Protocol (MRP), Device Level Ring (DLR) and HSR/PRP redundancy protocols
- Secure boot
- Industrial temperature range

Applications

- Industrial Ethernet switching for:
 - Factory, building and substation automation
 - Process control
 - Physical security
 - Intelligent transportation systems

Family and Features

Family of devices supporting from 46 Gbps to 102 Gbps non-blocking switching bandwidth

Part Number	Bandwidth	Features
LAN9694TSN	46 Gbps	TSN
LAN9696TSN	66 Gbps	TSN
LAN9698TSN	102 Gbps	TSN
LAN9694RED	46 Gbps	TSN + HSR/PRP Redundancy
LAN9696RED	66 Gbps	TSN + HSR/PRP Redundancy
LAN9698RED	102 Gbps	TSN + HSR/PRP Redundancy

Features

- Flexible interface options including 1, 2.5, 5 and 10 GbE
- Additional 2.5 GbE node processor interface port
- Integrated 1 GHz single-core Arm® Cortex®-A53 CPU with DDR3/DDR4 SDRAM controller
- PCIe® 2.0/3.0 CPU interface
- Internal shared memory buffer (eight queues per port)
- Jumbo frame support
- Strict priority and Deficit Weighted Round Robin (DWRR) scheduler/shaper

Layer 2 Switching and Layer 3 Routing

- IEEE® 802.1Q VLAN switch with 16K Media Access Control (MAC) and 4K VLANs
- Secure MAC addressing
- Push/pop/translate up to two VLAN tags on ingress and egress
- Policing with storm control and Multicast/Broadcast (MC/BC) protection
- Rapid Spanning Tree Protocol (RSTP) and Multiple Spanning Tree Protocol (MSTP) support
- Independent VLAN Learning (IVL) and Shared VLAN Learning (SVL)
- Hardware-based and software-based learning
- Ternary Content-Addressable Memory (TCAM)-based classification and VCAP security
- Layer 3 unicast and multicast routing

Industrial Ethernet

- TSN feature set: 802.1Qbv, 802.1Qch, 802.1Qci, 802.1AS-2020, 802.1CB, 802.1Qbu
- Integrated timing: 1588v2 and SyncE
- Ethernet Ring Protection Switching (ERPS)

Multicast

- Layer 2
- IPv4 and IPv6
- Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD)

Key Specifications

- 17 mm × 17 mm BGA
- -40°C to 110°C operating temperature

Related Products

- SparX-5i, LAN9668 TSN Switches
- 1 Gbps Ethernet PHYs
- Power over Ethernet (PoE) Power Sourcing Equipment (PSE) ICs
- Unified API, IStax Linux® application software