

Bidirectional data communication of industrial switches



AI Overview

Bidirectional data communication in industrial switches enables two-way data exchange for real-time control, monitoring, and automation, using protocols like BiSS and technologies such as BiDi SFP modules. Overview Bidirectional communication allows data to flow in both directions between devices, unlike unidirectional systems where data only moves from source to destination. In industrial networks, this capability is essential for interactive control, acknowledgment messages, and real-time adjustments between controllers, sensors, actuators, and switches. While it enhances operational flexibility, it also introduces additional cybersecurity considerations, requiring robust protection measures.

Key Technologies

- 1. BiSS Interface** The BiSS (Bidirectional/Serial/Synchronous) protocol is widely used in industrial automation for secure, high-speed, bidirectional communication between controllers, sensors, and actuators. BiSS-C mode supports continuous bidirectional data exchange, enabling real-time feedback and control. Features include: High transfer rates up to 10 MHz CRC and error detection for data integrity Support for multiple clients on a single channel Compatibility with RS-485/RS-422 transceivers for long-distance communication
- 2. BiDi SFP Modules** BiDi (Bidirectional) SFP modules allow two-way data transmission over a single fiber strand using Wavelength Division Multiplexing (WDM), reducing fiber usage and network complexity. Unlike standard SFPs that require two fibers, BiDi modules send and receive signals at different wavelengths, making them ideal for fiber-constrained industrial environments.
- 3. Wireless and Power-Integrated Methods** Advanced industrial systems may use quasi-independent bidirectional communication methods, such as RF links (WiFi, Zigbee, Bluetooth) or modulated power lines, to transmit data alongside power in wireless o...

Article Content

Unidirectional vs Bidirectional Integration | Main Differences

In today's increasingly connected industrial environments, the way data flows between systems has a direct impact on both operational efficiency and cybersecurity. As more organizations

BiSS interface

The BiSS protocol is designed in B mode and C mode (continuously bidirectional mode). It is used in industrial applications which require transfer rates, safety, flexibility and a minimized implementation

BISS Interface Encoders

The BiSS protocol is used on the lower sensor/actuator communication level in industrial applications which require transfer rates, safety, flexibility and a minimized implementation effort.

GaN Bidirectional Switches: The Revolution is Here

With home and vehicle electrification, data centers and nascent artificial intelligence, the demand for electricity is rising and the need for small,

A Review on State-of-the-Art Power Converters: Bidirectional ...

With the rapid development of modern energy applications such as renewable energy, PV systems, electric vehicles, and smart grids, DC-DC converters have become the key component to

Unidirectional vs Bidirectional Integration | Main Differences

In contrast, bidirectional integration supports two-way communication between systems. This setup is essential for use cases where interactive control, acknowledgment messages, or real

Analysis of bidirectional switch solutions based on different power ...

The numerous limitations of Electro Mechanical Relays (EMRs) for implementing Single-Pole, Single-Throw (SPST) Bi-Directional Switches (BDS) lead to new developments based on power

Fraunhofer IAF Unveils 1200 V GaN Bidirectional Switch for Future

Fraunhofer IAF has developed a highly integrated monolithic bidirectional switch (MBDS) with a 1200 V blocking voltage using its proprietary GaN-on-insulator technology. This innovation,

Bidirectional synchronization between AR/MR interfaces and digital ...

While these works provide valuable overviews of AR/MR-DT integration, they treat data exchange as unidirectional, from physical system to virtual representation. Moreover, most surveys

Wireless Power and Bidirectional Data Transfer System for IoT and ...

Wireless power and bidirectional wireless data transfer system using a conventional 2-coil inductive link is presented for Internet-of-Things (IoT) and mobile applications without any additional coil or

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What is Bidirectional Communication? | AT-Automation

Bidirectional communication plays a crucial role in industrial automation, where it enables the exchange of data between various systems and real-time responsiveness to changes in the production

Research status of bidirectional wireless power transfer technology ...

The current research status of BWPT technology is analyzed, focusing on the typical bidirectional transformation topologies, resonant networks, power control strategies, and

Thyristor Surge Suppressors (TSS) Market Research Report 2034

The Thyristor Surge Suppressors (TSS) market was valued at \$1.82 billion in 2025 and is projected to reach \$3.47 billion by 2034, growing at a 7.4% CAGR.

Industrial IoT Ecosystem: Comparison of Major IoT Module

It also explores the composition and roles of network elements in industrial communication, their typical application scenarios, and the distinctions and applications of industrial

FS Community

Hier sollte eine Beschreibung angezeigt werden, diese Seite lässt dies jedoch nicht zu.

Design and Analysis of Integrated Bidirectional DC-DC Converter for ...

For dc microgrid energy interconnection, this article proposes a multiport bidirectional converter, leveraging three shared half-bridges. This converter achieves high voltage gain with fewer

BiDi Transceiver: Utilizing WDM Technology for Dual-Direction Data ...

How Does BiDi Transceiver Work? BiDi transceivers, short for Bidirectional Small Form-Factor Pluggable transceivers, operate based on the principle called Wavelength Division

Research status of bidirectional wireless power transfer technology ...

This bidirectional transformation topology requires only one switch device for both the primary and secondary sides, enabling phase-shifted bidirectional power flow control while ensuring

GaN Bidirectional Switches: The Revolution is Here

TAGS: Active Switches, Battery System, Bidirectional Flow, Bidirectional Switch, Charge Storage, Companies, Conduction Loss, Costs, Data

Simple Bidirectional Power Line Communication with Switching

Simple bidirectional power line communication (PLC) method by using switching ripples in DC-DC converters is proposed. In this method, current ripples in the input side of converters are used as

What is Bidirectional Communication? | AT-Automation

Bidirectional communication in industrial automation Bidirectional communication plays a crucial role in industrial automation, where it enables the exchange of data between various systems and real-time

AN-960: RS-485/RS-422 Circuit Implementation Guide

The purpose of this application note is to discuss the implementation of RS-485/RS-422 in an industrial environment.

Infineon Technologies AG (via Public) / Infineon launches industry ...

Munich, Germany - 02 June 2026 - Infineon Technologies AG (FSE: IFX / OTCQX: IFNNY) introduces silicon carbide (SiC) bidirectional switches (BDS) built on rugged 750 V CoolSiC™ G2 technology.

Bidirectional wireless power transfer: Bridging electric vehicles and ...

Additionally, it explores diverse types, structures, and shapes of wireless power-transferring coils that are well-suited for bidirectional WPT applications. The discussion extends to

Bidirectional synchronization between AR/MR interfaces and digital ...

Unlike prior surveys that address AR/MR-DT integration or immersive technologies in manufacturing, this review provides an overview of existing research on bidirectional synchronization

Infineon launches industry-first silicon carbide | Infineon Technologies

Munich, Germany – 02 June 2026 – Infineon Technologies AG (FSE: IFX / OTCQX: IFNNY) introduces silicon carbide (SiC) bidirectional switches (BDS) built on rugged 750 V CoolSiC™ G2 technology.

Industrial Ethernet Switches | Phoenix Contact

Our Industrial Ethernet Switch portfolio comprises Managed and Unmanaged Switches with Gigabit, PoE, IEC 61850 certification, and for DIN rail mounting. This gives you the flexibility to build powerful

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