Optical Module Level Conversion

Overview

6-channel VME optical-to-electrical converter | Highland TechnologyThe V730 is a six-channel logic-level optical-to-electrical converter, packaged as a sin.

Key Takeaways

Optical module level conversion enables safe and reliable interfacing between devices with different voltage levels or between optical and electrical signals.

Digital Logic Level Conversion with Optical Isolation

Digital logic level converters with optical isolation are used to shift voltage levels between devices while protecting sensitive electronics from voltage spikes, noise, and ground loops. For example, a 4-channel module can handle bidirectional conversion between 3.3V, 5V, 12V, and 24V logic levels. Key features include:

• Optical isolation for robust protection and improved signal integrity

• Low and high voltage inputs (e.g., VCC_L for 3.3V/5V, VCC_H for 12V/24V)

• Input/output pins for connecting microcontrollers (Arduino, Raspberry Pi) to higher voltage devices

• Applications: interfacing microcontrollers with industrial equipment, IoT devices, or sensors, and protecting circuits from electrical noise and transients

These modules are compact, lightweight, and support multiple signal types, including PNP/NPN to NPN conversion, making them versatile for embedded systems and automation projects .

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Optical-to-Electrical Conversion

Optical-to-electrical converters transform optical signals into electrical logic levels, often used in high-speed communication or test systems. Examples include:

• VME or PXI modules that accept optical inputs (850 nm, 1310 nm, 1550 nm) via single- or multi-mode fiber

• Electrical outputs producing TTL or NIM logic levels with selectable polarity and configurable channels

• High bandwidth support (up to 50 GHz) for testing high baudrate signals

• Safety and control features such as logic-level gate inputs and power toggle switches

• Applications: precision timing, pulse distribution, EMI-proof signal conversion, and high-speed optical testing

These converters are essential in laboratory, industrial, and communication systems where optical signals must be accurately converted to electrical logic for measurement, control, or further processing.

Summary

Optical module level conversion can be categorized into:

• Digital logic level converters with optical isolation – for safe voltage level shifting and protection in embedded and industrial systems.

• Optical-to-electrical converters – for high-speed, high-bandwidth conversion of optical signals to electrical logic levels in test and communication applications.

Choosing the right module depends on voltage levels, signal type, speed requirements, and isolation needs, ensuring reliable interfacing and protection of sensitive components.

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Article Content

Classification and basic principles of optical modules

After the optical signal of a certain code rate is input to the module, it is converted into an electrical signal by the light detection diode,

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This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.

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