

Article Overview

Ultrasonic Electronics' Optical Module is a compact, robust sensor system that detects objects and measures distances using ultrasonic waves, often integrated with advanced signal processing for industrial and robotic applications.

Overview and Functionality

The module operates by emitting inaudible ultrasonic waves via a piezoelectric disc and receiving the reflected signals to detect objects or measure distances without physical contact . It typically includes an integrated driver and signal processor, allowing precise signal generation and processing, which enhances measurement accuracy and reliability . Some modules also combine ultrasonic sensing with embedded computing capabilities for autonomous operation or remote monitoring .

Key Specifications

- o Measurement Range: Up to 5000 mm, suitable for obstacle detection, collision avoidance, and level measurement .
- o Resolution: Under ideal conditions, accuracy can reach approximately 4 mm, though typical scenarios yield around 1 cm .
- o Operating Voltage: Nominally 12 V DC, with a minimum startup voltage around 8 V .
- o Temperature Range: Functional between -40 °C and +85 °C, though extreme temperatures may reduce maximum distance performance .
- o Environmental Protection: IP65/IP67 rated, providing resistance to dust and water, making it suitable for harsh industrial environments .

Applications

These modules are widely used in:

- o Industrial Automation: Touchless object detection, level measurement in tanks, and automated guided vehicles (AGVs), .
- o Robotics: Integration into robotic systems for obstacle avoidance, distance sensing, and motor control interfaces .
- o Laboratory and Field Testing: Embedded ultrasonic modules (EUMs) can serve as standalone workstations with HDMI, USB, and encoder inputs for flexible testing setups .
- o Remote Monitoring: Some modules support fiber-optic or long-distance communication for transmitting ultrasonic data to remote stations .

How are the optical modules from Ultrasonic Electronics

Integration and Connectivity

Modules often provide user-friendly interfaces compatible with microcontrollers and processors such as Arduino, ARM, PIC, or Raspberry Pi . Advanced embedded versions include USB-C power, USB-3 peripheral connections, and dedicated I/O for motor and camera control, enabling seamless integration into complex systems .

Summary

Ultrasonic Electronics' Optical Module represents a versatile, high-precision, and robust solution for distance measurement and object detection. Its combination of ultrasonic sensing, signal processing, and embedded computing makes it suitable for industrial, robotic, and laboratory applications, offering flexibility, environmental resilience, and high measurement accuracy .

Optical sensor is used in imaging, remote sensing satellite, metrology, medical devices, and quality & process control

Explore the working principles, structures, and performance metrics of optical modules, essential components of

Abstract Cutting-edge biomedical ultrasound imaging demands advanced ultrasound sensing capabilities such as

Optical-based sensing technologies have a similar principle to ultrasonic technology. Instead of using sound waves, however, optical

Among the emerging concepts in subwavelength focusing, photonic nanojets represent a promising direction for

Optical modules come in various types, and their external structures are not exactly the same. However, their basic compositional

Ultrasonic ranging module HC - SR04 provides 2cm - 400cm non-contact measurement function, the ranging accuracy can reach to

Schematic diagram of an opto-isolator showing source of light (LED) on the left, dielectric barrier in the center, and sensor

How are the optical modules from Ultrasonic Electronics

Similarly to digital cameras, optical sensors vary in resolution capabilities and can achieve tremendous amounts of

Ultrasonic sensors disks are ceramic disks, which are using the piezoelectric effect to emit and to detect inaudible

An optical module is a typically hot-pluggable optical transceiver used in high-bandwidth data communications applications. Optical

Ultrasonic frequencies are categorized into distinct bands, each optimized for specific use cases: Low-frequency band (20-100 kHz):

Explore the ultimate guide to optical modules. Learn types, functions, performance metrics & how to choose the right

Empfiehl TDK irgendwelche Parameter/ Konfigurationen für das Modul? Empfiehlt TDK irgendwelche

Signal paths for ultrasonic sensors involve higher drive voltages (often 20-100 V or more) and sensitive echo

The ultrasonic sensor is a sensor that converts ultrasonic signals into other energy signals.

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