Teyleten Robot TR-LCB001

Teyleten Robot 4 Channels Logic Level Converter Bi-Directional Module Instruction Manual

Model: TR-LCB001

1. Introduction

The Teyleten Robot 4 Channels Logic Level Converter Bi-Directional Module is designed to safely and efficiently convert digital signals between systems operating at different voltage levels, specifically between 3.3V and 5V. This module is essential when interfacing microcontrollers or sensors that operate at different logic voltage levels, preventing damage to components. It supports bi-directional conversion for various bus signals including UART, IIC, 1-wire, and SPI. *Note that while the module may come in different colors (e.g., green or blue), their functionality remains identical.*

2. Key Features

- **Bi-directional Conversion:** Utilizes four MOS tubes to achieve seamless bi-directional 3V to 5V logic level conversion for up to four channels.
- **Power Protection:** Features anti-reverse connection protection for the power input, safeguarding the module from incorrect power polarity.
- **Integrated Voltage Regulator:** Includes an integrated 3.3V LDO (Low Dropout Regulator) capable of supplying up to 150mA external current.
- **Power Indicator:** Equipped with a power indicator LED for quick visual confirmation of operation.
- **Wide Signal Compatibility:** Capable of converting various bus signals such as UART, IIC (I2C), 1-wire, and SPI.

3. Setup and Connections

This module facilitates communication between a high voltage (HV) system (e.g., 5V Arduino) and a low voltage (LV) system (e.g., 3.3V sensor). Proper connection is crucial for correct operation and to prevent damage.

3.1. Pinout Diagram

The module typically has two sets of pins for high voltage (HV) and low voltage (LV) sides, along with ground

(GND) connections. The specific layout may vary slightly, but the functions are consistent.

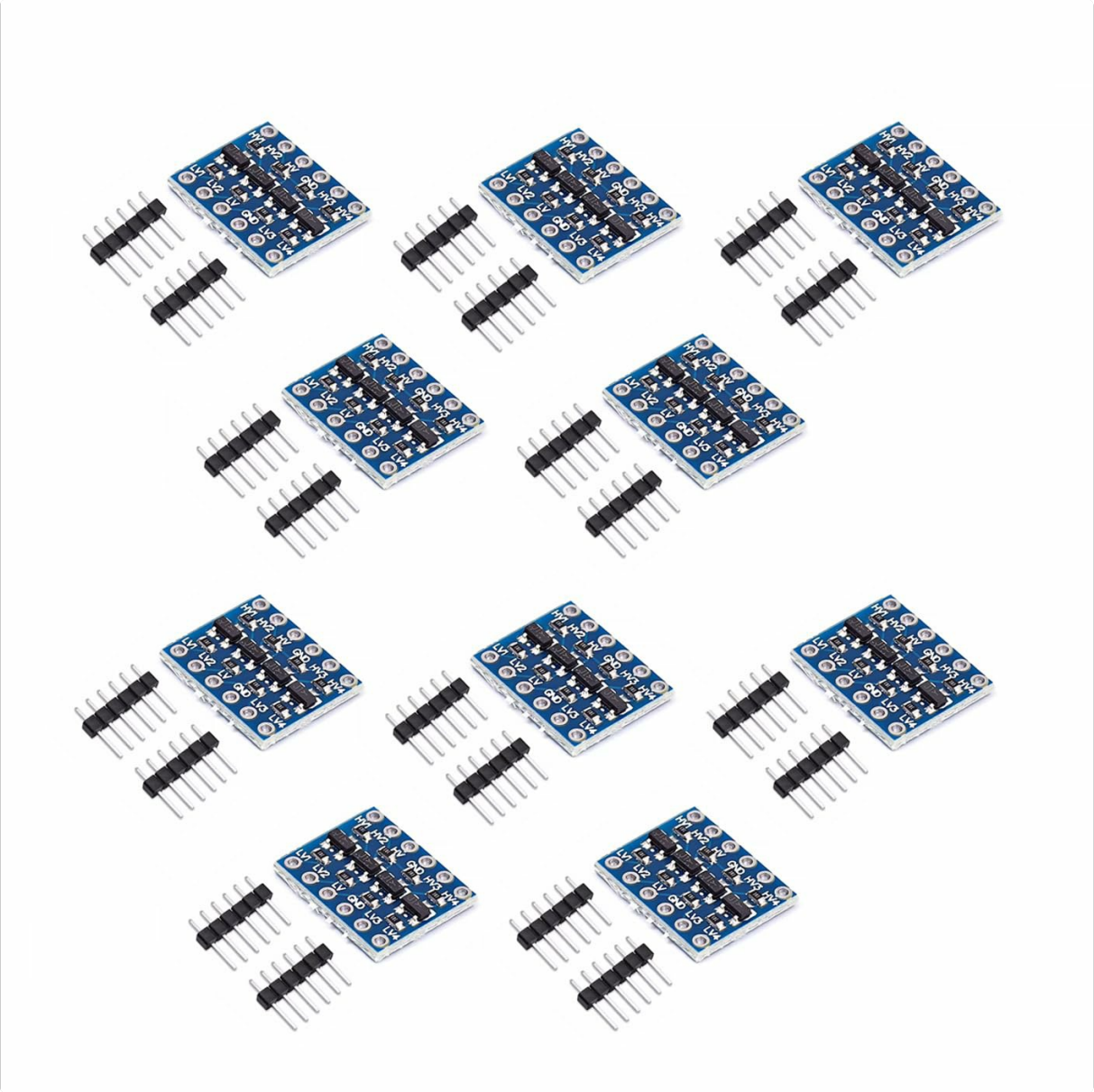

Image 1: Teyleten Robot 4 Channels Logic Level Converter Module. This image shows the compact design of the module with clearly labeled pins for high voltage (HV), low voltage (LV), and ground (GND) connections on both sides. The power indicator LED is also visible.

3.2. Connection Steps

1. **Connect High Voltage Power:** Connect the 5V power supply from your high-voltage system (e.g., Arduino 5V pin) to the **HV** pin on the converter module. Connect the corresponding ground of the high-voltage system to one of the **GND** pins on the HV side.
2. **Connect Low Voltage Power:** Connect the 3.3V power supply from your low-voltage system (e.g., 3.3V sensor or microcontroller) to the **LV** pin on the converter module. Connect the corresponding ground of the low-voltage system to one of the **GND** pins on the LV side.
3. **Connect Signal Lines:** Connect the digital signal lines from your high-voltage system to the **HV1-HV4** pins. Connect the corresponding digital signal lines from your low-voltage system to the **LV1-LV4** pins. Ensure that each HV signal pin is connected to its corresponding LV signal pin (e.g., HV1 to LV1, HV2 to LV2, etc.).
4. **Verify Power:** Once connections are made, apply power to both systems. The power indicator LED on the module should illuminate, confirming it is powered.

Important: *Always ensure that the grounds of both the high-voltage and low-voltage systems are connected to the respective GND pins on the logic level converter. Failure to do so can result in improper operation or damage.*

4. Operating Principles

The Teyleten Robot Logic Level Converter operates using MOSFETs (Metal-Oxide-Semiconductor Field-Effect Transistors) to achieve bi-directional voltage translation. When a signal is sent from the low-voltage side to the high-voltage side, the MOSFET acts as a switch, pulling the high-voltage line up to the low-voltage signal level. Conversely, when a signal is sent from the high-voltage side to the low-voltage side, the MOSFET allows the low-voltage line to be pulled down to ground, effectively translating the signal.
This design ensures that signals are correctly interpreted by both 3.3V and 5V components without over-volting the lower voltage device or under-volting the higher voltage device.

5. Maintenance and Care

- **Environmental Conditions:** Store and operate the module in a dry environment, away from moisture and extreme temperatures.
- **Handling:** Handle the module by its edges to avoid touching the electronic components, which can be sensitive to static discharge.
- **Cleaning:** If necessary, gently clean the module with a soft, dry brush or compressed air to remove dust. Do not use liquids or abrasive cleaners.
- **Inspection:** Periodically inspect the solder joints and connections for any signs of damage or corrosion.

6. Troubleshooting

Problem	Possible Cause	Solution
Module not powering on (LED off)	Incorrect power connection (HV/LV pins), insufficient power supply, reversed polarity.	Verify HV and LV power connections are correct and stable. Check for reversed polarity (module has anti-reverse protection, but still good to check). Ensure power supplies are providing adequate voltage and current.
Signals not converting correctly	Incorrect signal pin connections, missing common ground, faulty module.	Double-check that HV signal pins are connected to corresponding LV signal pins. Ensure both HV and LV systems share a common ground connected to the module's GND pins. Test with a known working signal source.
Intermittent signal issues	Loose connections, noise interference, signal integrity issues.	Secure all connections. Use shorter wires if possible. Ensure proper shielding if operating in a noisy electrical environment.

7. Specifications

Feature	Detail
Brand	Teyleten Robot
Model Number	TR-LCB001
ASIN	B0CKCQDH7N
High Voltage (HV) Side	5V Logic Level
Low Voltage (LV) Side	3.3V Logic Level
Channels	4 (Bi-directional)
Integrated LDO	3.3V, up to 150mA external current
Dimensions (L x W x H)	0.59 x 0.49 x 0.08 inches (15 x 12.4 x 2 mm)
Item Weight	0.317 ounces (0.01 kg)
Supported Bus Signals	UART, IIC (I2C), 1-wire, SPI
Manufacturer	Teyleten Robot

8. Warranty and Support

For warranty information and technical support, please refer to the seller's policy or contact Teyleten Robot directly through their official channels. You can often find support information on the product's purchase page or the manufacturer's website.
Visit the Teyleten Robot Store for more products and information.