DEVMO CJMCU-9548 TCA9548A

DEVMO CJMCU-9548 TCA9548A 1-to-8 I2C Multiplexer Breakout Board User Manual

1. Introduction

The DEVMO CJMCU-9548 TCA9548A is a 1-to-8 I2C multi-channel expansion multiplexer breakout board. This module addresses the common challenge of connecting multiple I2C devices that share the same fixed address to a single microcontroller. It allows for the expansion of a single I2C bus into eight independent I2C channels, enabling communication with up to eight identical I2C devices.

2. Key Features

- **Interface:** I2C IIC
- **Chip:** TCA9548A
- **Selectable I2C Address:** 0x70-0x77
- **Working Voltage:** 1.65V - 5.5V
- **Max Clock Frequency:** 400KHz

3. Setup and Installation

This section outlines the steps for physically connecting and preparing your TCA9548A multiplexer for operation.

3.1 Component Overview

The breakout board comes with the TCA9548A chip and requires soldering of header pins for breadboard compatibility or direct wiring.

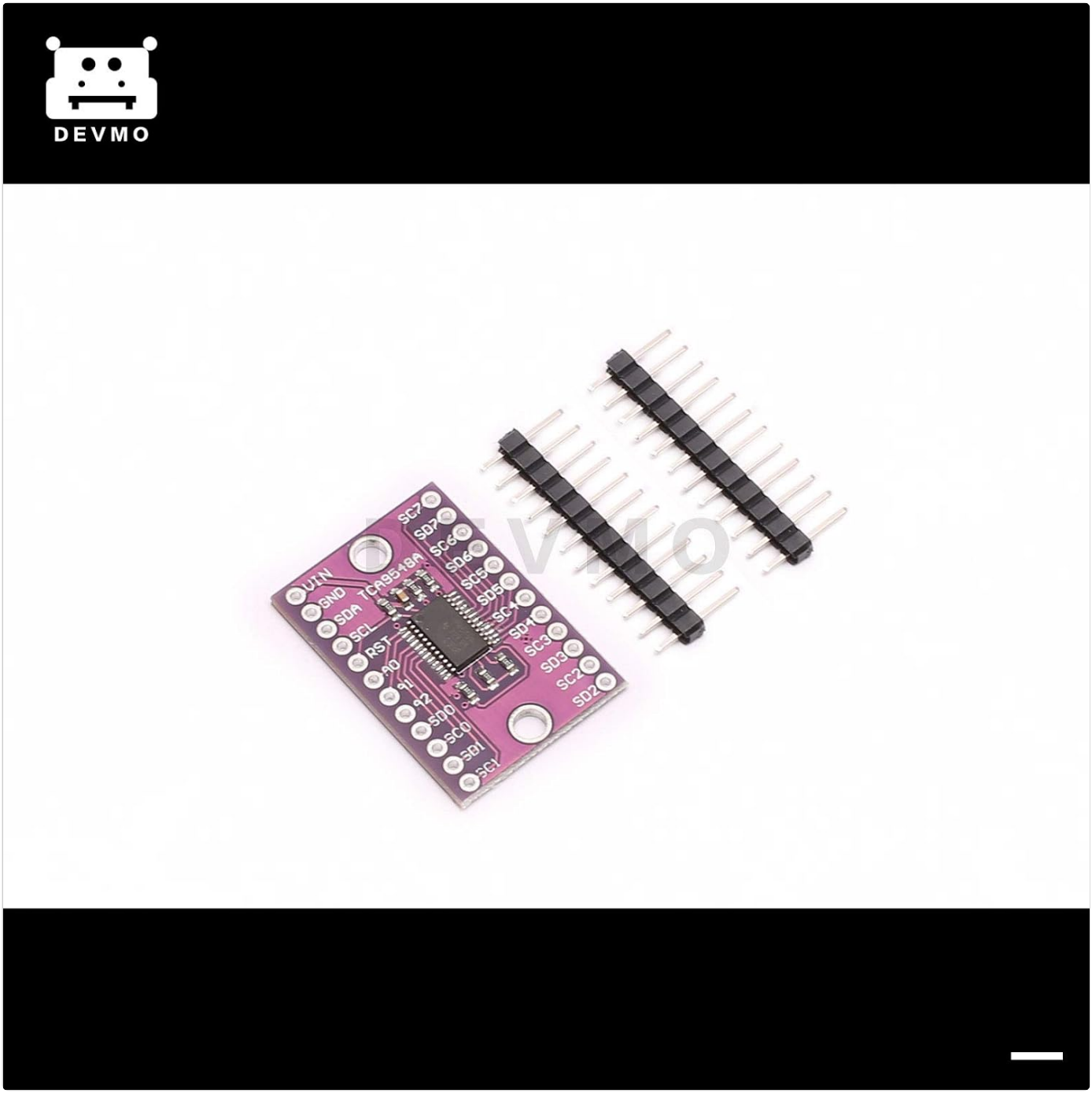

Figure 1: Top view of the TCA9548A breakout board with header pins. This image shows the main chip, I2C input pins (VIN, GND, SDA, SCL, RST, A0, A1, A2), and eight multiplexed I2C output channels (SC0/SD0 to SC7/SD7).

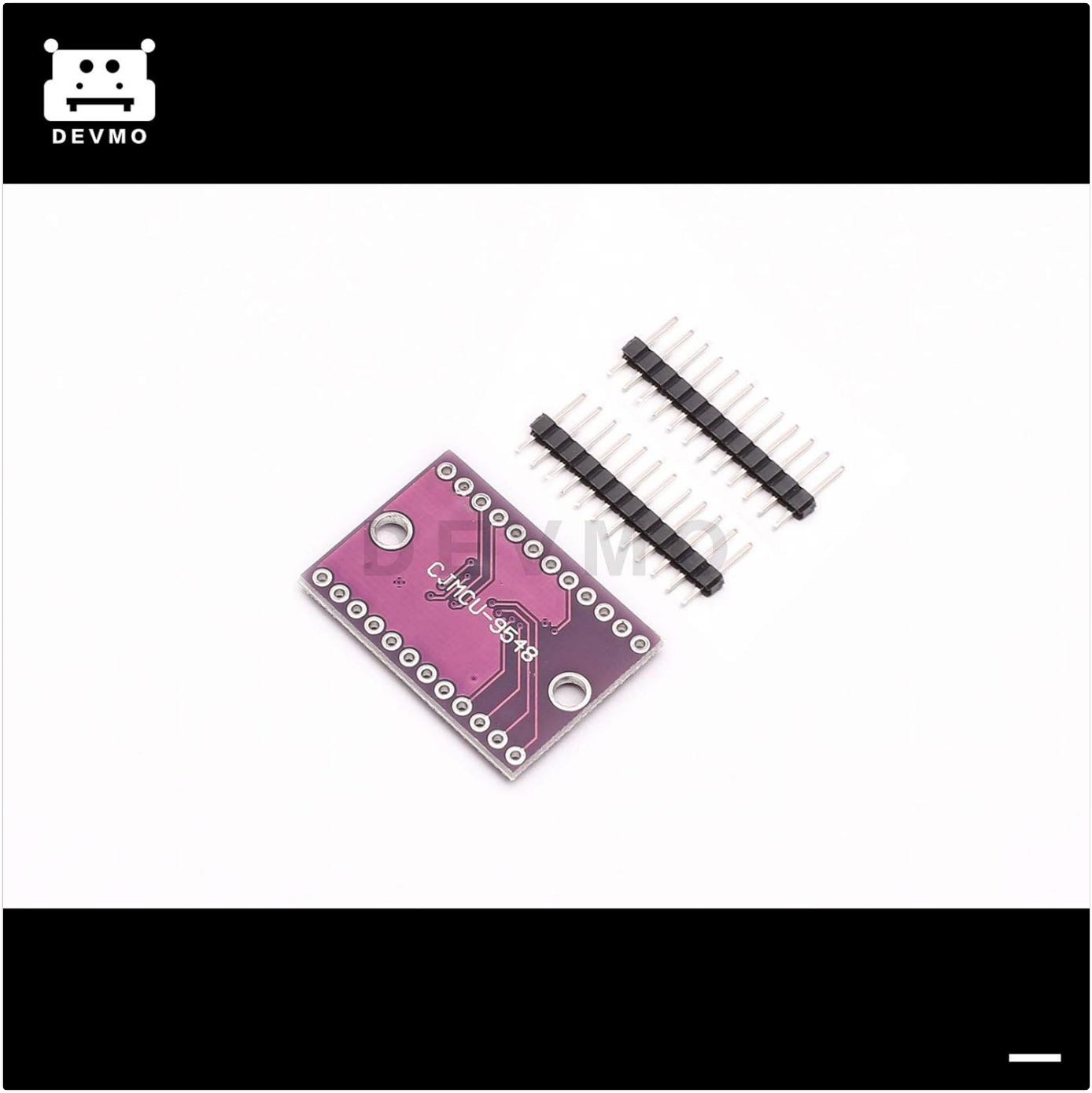

Figure 2: Bottom view of the TCA9548A breakout board. This view shows the underside of the purple PCB, highlighting the clean layout and solder points for the header pins.

3.2 Power Supply

The TCA9548A is compatible with both 3V and 5V logic levels. Connect the VIN pin to your microcontroller's power supply (e.g., 3.3V or 5V) and GND to the common ground.

3.3 I2C Connection

Connect your microcontroller's I2C SDA and SCL lines to the SDA and SCL pins on the multiplexer board. The multiplexer's default I2C address is 0x70. This address can be modified by adjusting the A0, A1, and A2 pins, allowing for up to eight multiplexers on a single bus (addresses 0x70 to 0x77).

- **VIN:** Power input (1.65V - 5.5V)
- **GND:** Ground
- **SDA:** I2C Data Line (from microcontroller)
- **SCL:** I2C Clock Line (from microcontroller)

- **RST:** Reset pin (active low)
- **A0, A1, A2:** Address selection pins for the multiplexer itself.

Connect your I2C devices to the multiplexed output channels (SC0/SD0 through SC7/SD7). Each pair represents an independent I2C bus.

4. Operating Instructions

To communicate with a specific I2C device connected to one of the multiplexer's channels, you must first select that channel. This is done by writing a single byte to the multiplexer's I2C address.

4.1 Channel Selection

The multiplexer's default I2C address is 0x70. To select a channel (e.g., channel 0), write the byte `0x01` to the multiplexer's address. For channel 1, write `0x02`, for channel 2, write `0x04`, and so on, up to channel 7, which corresponds to writing `0x80`. Each bit in the byte corresponds to a channel, allowing you to enable one or more channels simultaneously (though typically only one is active at a time for devices with identical addresses).

- To select Channel 0: Write `0x01` to multiplexer address (e.g., 0x70)
- To select Channel 1: Write `0x02` to multiplexer address
- To select Channel 2: Write `0x04` to multiplexer address
- ...
- To select Channel 7: Write `0x80` to multiplexer address

After selecting a channel, all subsequent I2C communications from your microcontroller will be routed to the devices connected to that specific channel until a different channel is selected or the multiplexer is reset.

4.2 Example Usage Scenario

If you have multiple temperature sensors, all with the same I2C address, you can connect each sensor to a different channel of the TCA9548A. To read from Sensor A (on Channel 0), you would:

1. Write `0x01` to the TCA9548A (address 0x70).
2. Perform an I2C read operation to Sensor A's address.
3. To read from Sensor B (on Channel 1), write `0x02` to the TCA9548A, then perform an I2C read to Sensor B's address.

4.3 Visual Demonstration

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Video 1: A visual overview of the CJMCU-9548 TCA9548A 1-to-8 I2C Multi-Channel Multiplexer. This video demonstrates the physical appearance and pinout of the board, providing a helpful visual reference for setup and connection.

5. Specifications

Feature	Detail
Chip Model	TCA9548A
Interface	I2C (IIC)
Number of Channels	8 (1-to-8)
Selectable I2C Address	0x70 - 0x77

Feature	Detail
Working Voltage	1.65V - 5.5V
Max Clock Frequency	400KHz
Package Dimensions	4.02 x 3.7 x 0.83 inches
Item Weight	0.317 ounces
Manufacturer	DEVMO

6. Maintenance

The TCA9548A multiplexer board is a robust electronic component that requires minimal maintenance. To ensure longevity and reliable operation:

- Keep the board clean and free from dust and debris. Use a soft, dry brush or compressed air if necessary.
- Avoid exposing the board to extreme temperatures or humidity.
- Ensure all connections are secure and free from corrosion.
- Handle the board by its edges to prevent damage to components or static discharge.

7. Troubleshooting

If you encounter issues with your TCA9548A multiplexer, consider the following troubleshooting steps:

- **No Communication with Multiplexer:**
  - Verify power connections (VIN and GND) are correct and within the 1.65V-5.5V range.
  - Check I2C SDA and SCL connections from your microcontroller to the multiplexer.
  - Confirm the multiplexer's I2C address (default 0x70) and ensure it doesn't conflict with other devices on the main bus. Check A0, A1, A2 pin configurations if the address was changed.
  - Ensure pull-up resistors are correctly implemented on the main I2C bus if not already present on your microcontroller board.
- **No Communication with Devices on Multiplexed Channels:**
  - Ensure the correct channel is selected by writing the appropriate byte to the multiplexer's address.
  - Verify the I2C device's connections to the selected multiplexer channel (SCx/SDx).
  - Confirm the I2C address of the device connected to the multiplexed channel.
  - Check for proper pull-up resistors on the multiplexed channels if required by the connected device.
- **Intermittent Communication:**
  - Check for loose connections or poor soldering.
  - Ensure adequate power supply stability.
  - Reduce I2C clock speed if operating over long wires or with many devices.

8. Warranty Information

This DEVMO product is covered by a standard manufacturer's warranty against defects in materials and workmanship. Please refer to the product packaging or the official DEVMO website for specific warranty terms and conditions. Keep

your proof of purchase for warranty claims.

9. Technical Support

For technical assistance, detailed documentation, or further inquiries regarding the DEVMO CJMCU-9548 TCA9548A multiplexer, please visit the official DEVMO support website or contact their customer service. Contact information can typically be found on the product packaging or the manufacturer's website.