

waveshare CM4-ETH-RS485-BASE-B

Waveshare Dual ETH Quad RS485 Base Board (B) User Manual

Model: CM4-ETH-RS485-BASE-B

1. INTRODUCTION

The Waveshare Dual ETH Quad RS485 Base Board (B) is designed for the Raspberry Pi Compute Module 4 (CM4). It provides a robust solution for industrial applications requiring multi-channel RS485 communication and enhanced networking capabilities. This base board integrates dual Gigabit Ethernet ports, four isolated RS485 interfaces, USB2.0 ports, HDMI, CSI, and a fan header, making it suitable for various embedded projects.

2. PACKAGE CONTENTS

Verify that all items are present in your package. The standard package includes the Waveshare Dual ETH Quad RS485 Base Board (B).

Dual ETH Quad RS485 Base Board For CM4

Designed For Raspberry Pi Compute Module 4

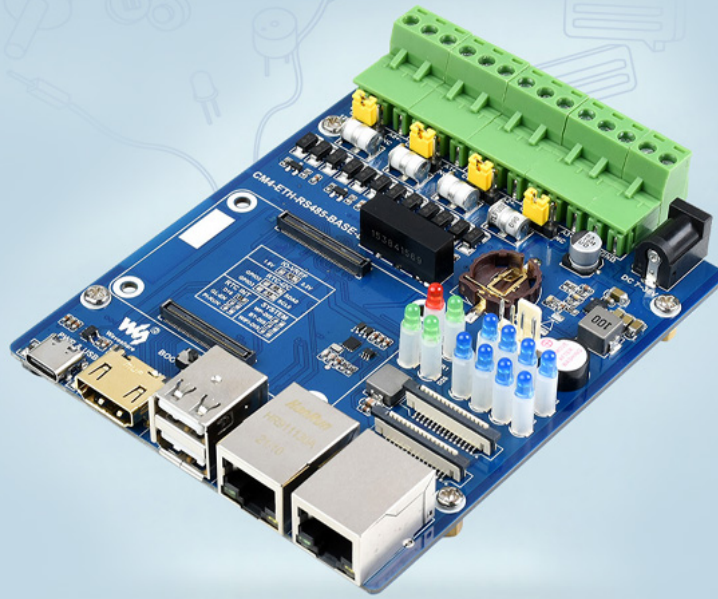


Image: The Waveshare Dual ETH Quad RS485 Base Board (B) as typically included in the package.

3. FEATURES

- Standard CM4 Socket: Compatible with all variants of the Raspberry Pi Compute Module 4.
- Diverse Interfaces: Includes Dual Gigabit Ethernet, 4-channel Isolated RS485, CSI camera ports, FAN header, HDMI, Micro SD slot, and USB2.0 ports.
- Industrial Application Focus: Designed for Raspberry Pi applications requiring multi-channel RS485 communication or other industrial contexts.

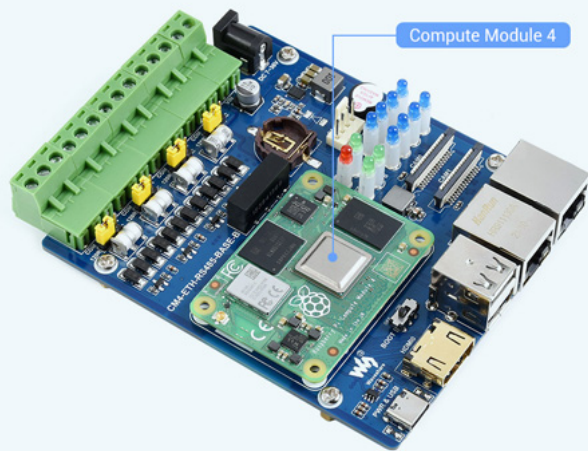
4. SETUP GUIDE

4.1 Connecting the Compute Module 4

Carefully align your Raspberry Pi Compute Module 4 with the standard CM4 socket on the base board. Ensure proper orientation before gently pressing the CM4 into place until it is securely seated.

Connecting With Compute Module 4

Standard CM4 Socket And Suitable For All Variants Of Compute Module 4



Application Examples

Suitable For Raspberry Pi Applications Requiring Multi-Channel RS485 Communication Or Other Industrial Context



for reference only, CM4, display, and cameras are NOT included.

Image: Illustration of how to connect the Raspberry Pi Compute Module 4 to the base board's CM4 socket.

4.2 Power Connection

Connect a 7-36V DC power supply to the power input terminal. Ensure the polarity is correct. The board also supports power via the USB-C programming port when the BOOT switch is in the 'ON' position.

4.3 Network and Peripherals

Connect Ethernet cables to the Gigabit Ethernet or 100M Ethernet RJ45 connectors. Attach USB devices to the USB 2.0 Type A ports. For video output, connect an HDMI display to the HDMI port. Camera modules can be connected to the MIPI CSI-2 ports.

5. OPERATING INSTRUCTIONS

5.1 Booting the System

After connecting the CM4 and power supply, the system will boot. If booting from eMMC or Micro SD card, ensure the BOOT switch is in the 'OFF' position. For USB programming, set the BOOT switch to 'ON'.

5.2 RS485 Communication

The board features four isolated RS485 channels. Connect your RS485 devices to the screw terminals. Refer to the 'What's On Board' section for detailed pin assignments and operating mode selection (full-auto or semi-auto).

5.3 Indicator Lights

Observe the power indicator, CM4 status indicator (ACT), user LEDs, and RS485 communication indicators to monitor the board's status and data transmission.

6. SPECIFICATIONS

The following table outlines the key specifications of the Waveshare Dual ETH Quad RS485 Base Board (B):

Specifications

CM4 SOCKET	suitable for all variants of Compute Module 4
NETWORKING	Gigabit Ethernet RJ45 connector, 100M Ethernet RJ45 connector
CONNECTOR	Isolated RS485 × 4, Power screw terminal × 1
USB	USB 2.0 Type A × 2
CAMERA	MIPI CSI-2 port × 2 (15pin 1.0mm FPC connector)
VIDEO	HDMI port × 1, supports 4K 30fps output
RTC	Real-time clock with battery socket and ability to wake Compute Module 4
STORAGE	MicroSD card socket for Compute Module 4 Lite (without eMMC) variants
FAN HEADER	allows speed adjustment, 5V
INDICATOR	Power indicator × 1, CM4 status indicator × 1, User LED × 2, RS485 communication indicator × 8
POWER INPUT	7-36V
DIMENSIONS	93.6 × 108.8mm

Image: Visual representation of the board's specifications.

Feature	Description
CM4 Socket	Suitable for all variants of Compute Module 4
Networking	Gigabit Ethernet RJ45 connector, 100M Ethernet RJ45 connector
Connectors	Isolated RS485 × 4, Power screw terminal × 1
USB	USB 2.0 Type A × 2
Camera	MIPI CSI-2 port × 2 (15pin 1.0mm FPC connector)
Video	HDMI port × 1, supports 4K 30fps output
RTC	Real-time clock with battery socket and ability to wake Compute Module 4

Feature	Description
Storage	MicroSD card socket for Compute Module 4 Lite (without eMMC) variants
Fan Header	Allows speed adjustment, 5V
Indicators	Power indicator × 1, CM4 status indicator × 1, User LED × 2, RS485 communication indicator × 8
Power Input	7-36V DC
Dimensions	93.6 × 108.8mm

7. BOARD LAYOUT AND PINOUT

Understanding the layout of the base board is crucial for proper connection and operation. The following diagrams detail the various components and their functions.

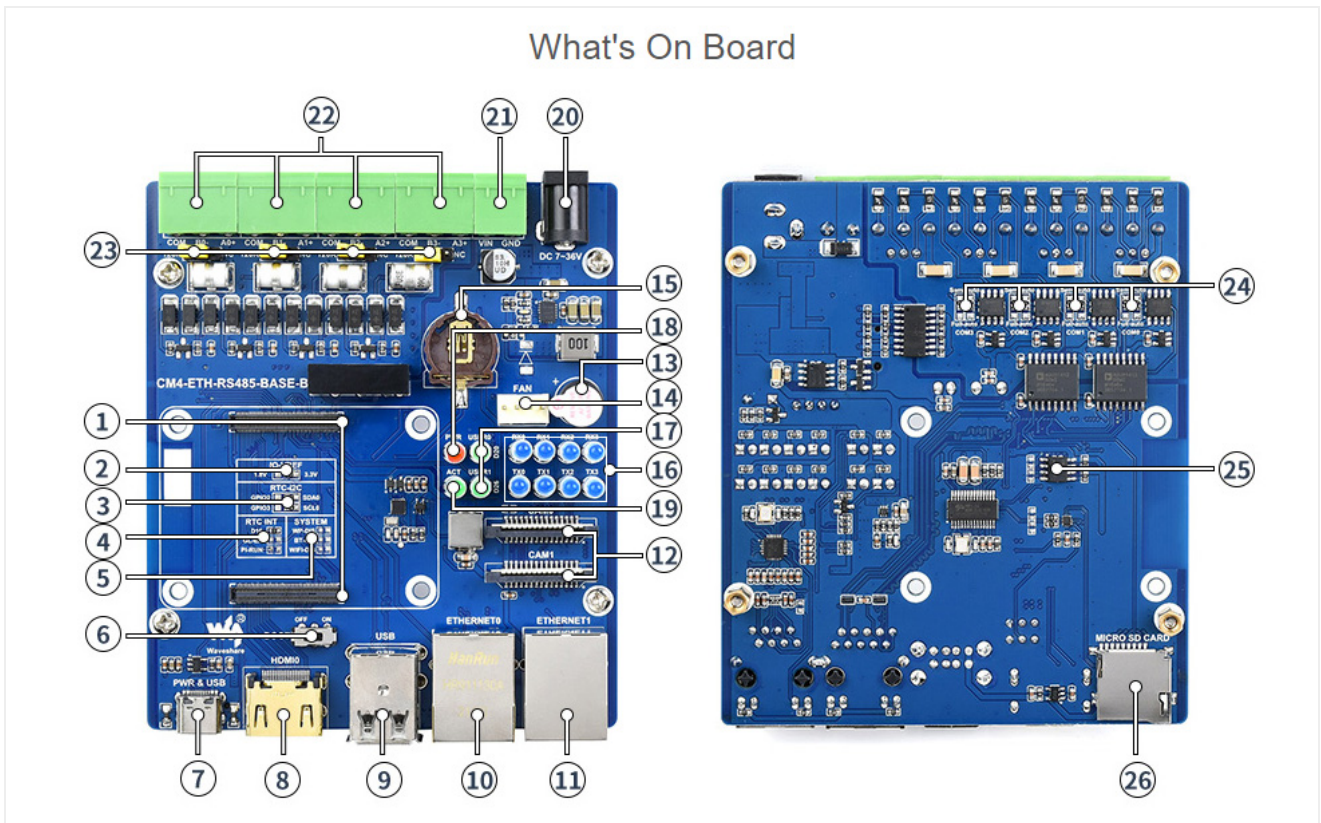


Image: Numbered diagram showing the location of various components and interfaces on the base board.

- | | |
|---|--|
| <ol style="list-style-type: none"> 1. CM4 socket
suitable for all variants of Compute Module 4 2. IO-VREF
Set the CM4 IO logic level as 3.3V (default) or 1.8V 3. RTC-12C: 12C bus selection for RTC
Can choose SDA0 & SCL0 (default) or GPIO2 & GPIO3 4. RTC INT: RTC interrupt pin select
D16: Use GPIO16 to receive interrupt signal when RTC interruption (default)
GL-EN: CM4 powerdown on RTC interruption
PI-RUN: CM4 will reboot on RTC interruption 5. SYSTEM: System function configuration
WP-DIS: Prevent EEPROM from being overwritten
BT-DIS: Disable Bluetooth function, for CM4 with antenna variant ONLY
WIFI-DIS: Disable WiFi function, for CM4 with antenna variant ONLY 6. Boot
ON: CM4 will be booted from USB-C interface
OFF: CM4 will be booted from eMMC or Micro SD card 7. PWR & USB
When the BOOT switch is "ON", can be used as the USB programming or DC power supply port
When the BOOT switch is "OFF", only used as the DC power supply port 8. HDMI0
HDMI port, supports 4K 30fps output 9. USB
2x USB 2.0, for connecting sorts of USB devices 10. ETHERNET0
CM4 original Gigabit RJ45 ETH 11. ETHERNET1
USB extended 100M ETH 12. CAM0 & CAM1
2x MIPI CSI camera ports 13. Buzzer
GPIO22 control | <ol style="list-style-type: none"> 14. FAN
4-pin FAN header, only supports 5V FAN, allows PWM speed adjustment (GPIO18 control, speed measurement is not supported) 15. RTC battery socket
Supports CR2032 button cell 16. RS485 TX/RX indicator
TXn: TX indicator for channel n
RXn: RX indicator for channel n 17. User LED
USER0: GPIO20 control
USER1: GPIO26 control 18. PWR
Raspberry Pi power indicator 19. ACT
Raspberry Pi working status indicator 20. DC 7~36V
DC power supply interface 21. Power input terminal
DC power supply terminal, supports 7~36V wide range power input 22. RS485 terminal
4 x Isolated RS485 terminal with a spacing of 5.08mm 23. Jumper
120R Balance Resistor Selection Jumper 24. RS485 operating mode selection
Full-auto: automatic mode, easy for program operation but the load capacity is weak
Semi-auto: semi-automatic mode, which requires manual TX/RX switching, with high reliability and strong load capacity 25. Encryption chip
ATSHA204 encryption chip, providing multiple encryption to ensure data security and reliability 26. Micro SD card slot
for connecting a Micro SD card with pre-burnt image (Lite variant ONLY) |
|---|--|

Image: Corresponding text descriptions for each numbered component shown in the previous diagram.

8. APPLICATION EXAMPLES

The Waveshare Dual ETH Quad RS485 Base Board (B) is suitable for various industrial and embedded applications. An example setup might involve connecting a display and camera modules for monitoring or control systems.

Application Examples

Suitable For Raspberry Pi Applications Requiring Multi-Channel RS485 Communication Or Other Industrial Context





for reference only, CM4, display, and cameras are NOT included.

Outline Dimensions

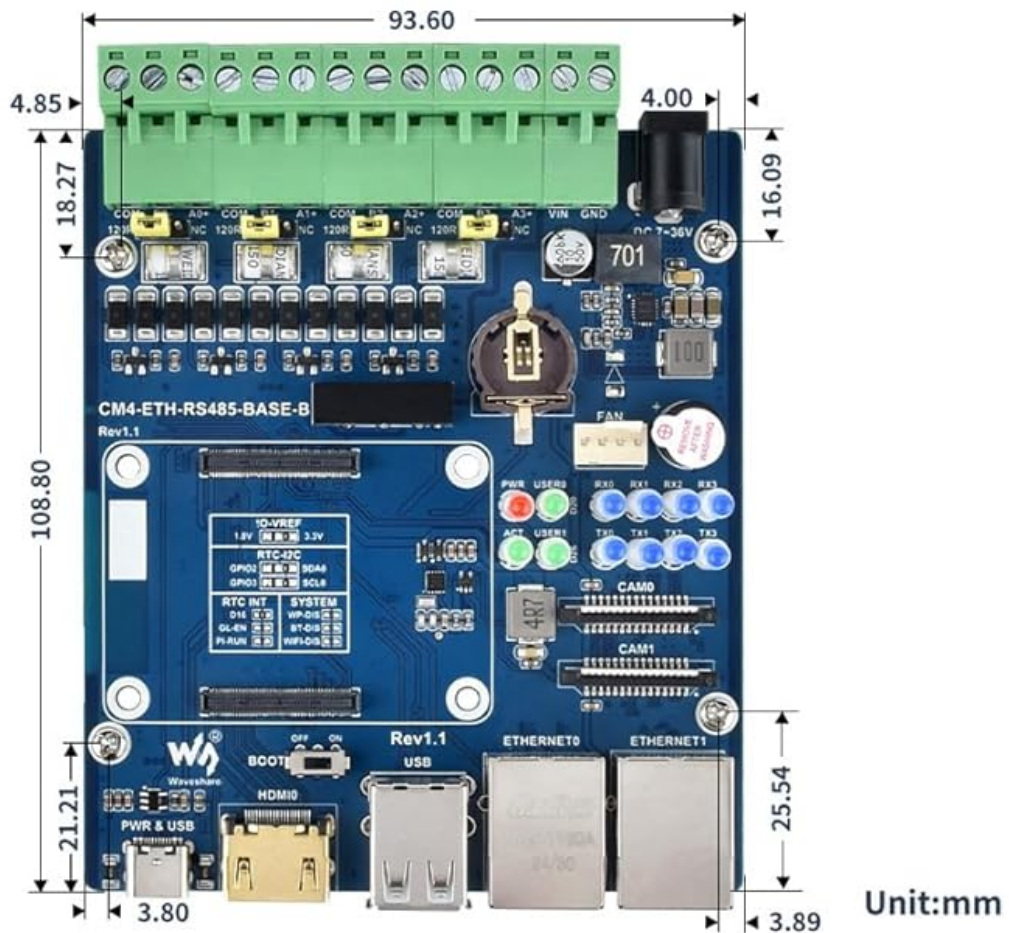


Image: An example setup showing the base board connected to a display and camera modules, demonstrating a typical application.

Note: CM4, display, and cameras are not included with the base board.

9. DIMENSIONS

The physical dimensions of the Waveshare Dual ETH Quad RS485 Base Board (B) are provided below for integration planning.

Outline Dimensions

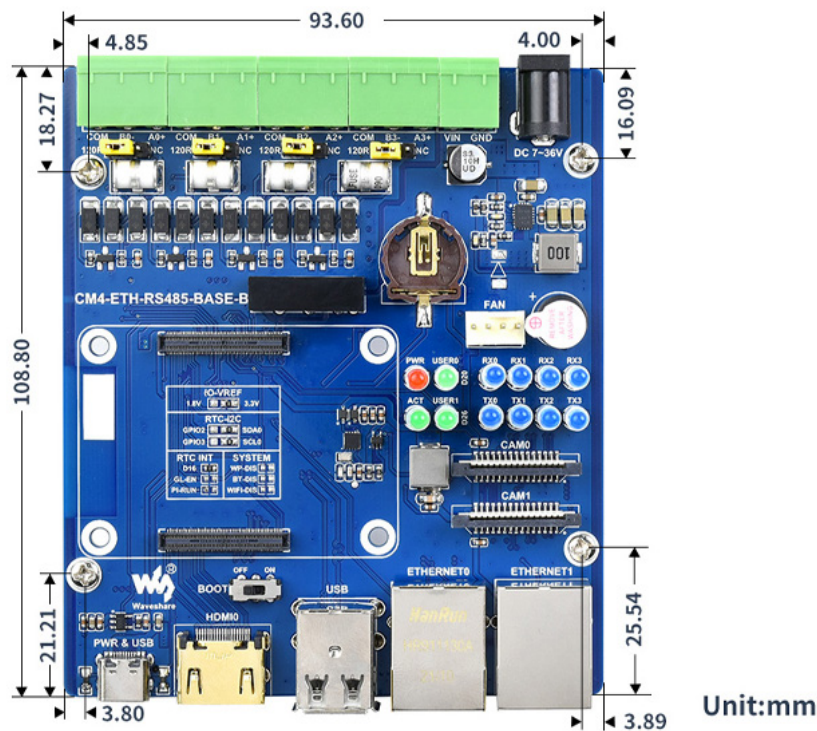


Image: Detailed outline dimensions of the base board, measured in millimeters.

10. MAINTENANCE

To ensure the longevity and optimal performance of your WaveShare Dual ETH Quad RS485 Base Board (B), follow these general maintenance guidelines:

- **Cleaning:** Use a soft, dry cloth to gently clean the board. Avoid using liquids or abrasive cleaners.
- **Handling:** Always handle the board by its edges to prevent damage to components and to avoid electrostatic discharge.
- **Environment:** Operate the board in a clean, dry environment within its specified temperature and humidity ranges.
- **Power:** Disconnect power before making any physical connections or disconnections to the board.

11. TROUBLESHOOTING

If you encounter issues with your WaveShare Dual ETH Quad RS485 Base Board (B), consider the following troubleshooting steps:

- **No Power:** Ensure the power supply is correctly connected (7-36V DC) and functional. Check the power indicator LED on the board.
- **CM4 Not Detected:** Verify that the Compute Module 4 is securely seated in its socket. Check the BOOT switch position if booting from eMMC/Micro SD or for USB programming.
- **Network Issues:** Confirm Ethernet cables are properly connected. Check network indicator LEDs on the RJ45 ports. Ensure your CM4 operating system has the correct network drivers.
- **RS485 Communication Failure:** Double-check wiring for polarity and correct terminal connections. Verify the RS485 operating mode jumper settings (full-auto/semi-auto) and software configuration.
- **Display/Camera Not Working:** Ensure cables are correctly connected to the HDMI/CSI ports. Verify that the CM4 operating system is configured to support the connected display or camera.

For further assistance, refer to the official Waveshare documentation or contact their technical support.

12. WARRANTY AND SUPPORT

For information regarding product warranty, returns, or technical support, please refer to the Waveshare official website or contact the seller directly. Warranty terms typically cover manufacturing defects for a specified period from the date of purchase.

You can visit the official Waveshare store for additional resources and support: [Waveshare Store](#)