

ACEIRMC W5500

ACEIRMC W5500 SPI to LAN Ethernet Network Module User Manual

Model: W5500

1. INTRODUCTION

The ACEIRMC W5500 SPI to LAN Ethernet Network Module is a compact and efficient solution for adding Ethernet connectivity to microcontrollers such as Arduino and STM32. This module utilizes the W5500 chip, providing a full hardware TCP/IP stack for easy network integration. It operates with a 3.3V power supply and communicates via a TTL-level SPI interface, making it suitable for various embedded applications requiring reliable wired network access.

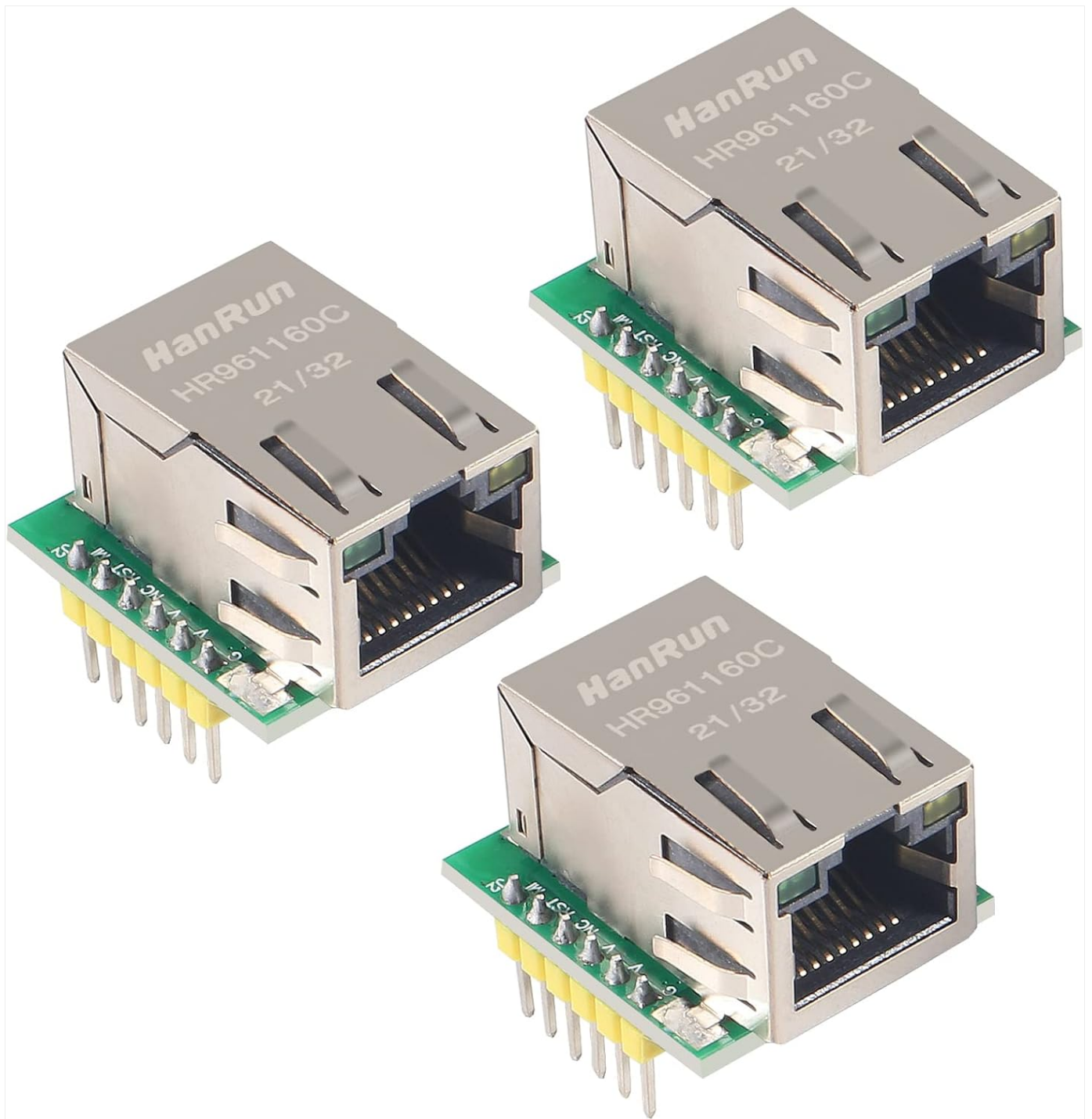


Figure 1: Front and back view of the W5500 SPI to LAN Ethernet Network Module. The front shows the HanRun HR961160C Ethernet transformer, and the back displays the WIZnet W5500 chip and various components.

2. FEATURES

- **W5500 Chip:** Integrates a full hardware TCP/IP stack, including TCP, UDP, IPv4, ICMP, ARP, IGMP, and PPPoE.
- **SPI Interface:** Supports high-speed SPI communication (TTL level, 3.3V) for easy integration with microcontrollers.
- **Ethernet PHY:** Embedded 10BaseT/100BaseTX Ethernet physical layer (PHY) with auto-negotiation support for full or half-duplex operation.
- **Power Supply:** Requires a stable 3.3V external power supply with a current capacity of at least 200mA.
- **Internal Buffer:** Features an internal 32KB receive buffer for efficient data handling.
- **LED Indicators:** Includes LEDs for network activity (Active) and link status (Link).
- **Compact Design:** Pin-type package with ultra-small dimensions for embedded applications.

- **Voltage Compatibility:** I/O pins are 5V tolerant, allowing connection to 5V microcontrollers with proper level shifting for SPI.

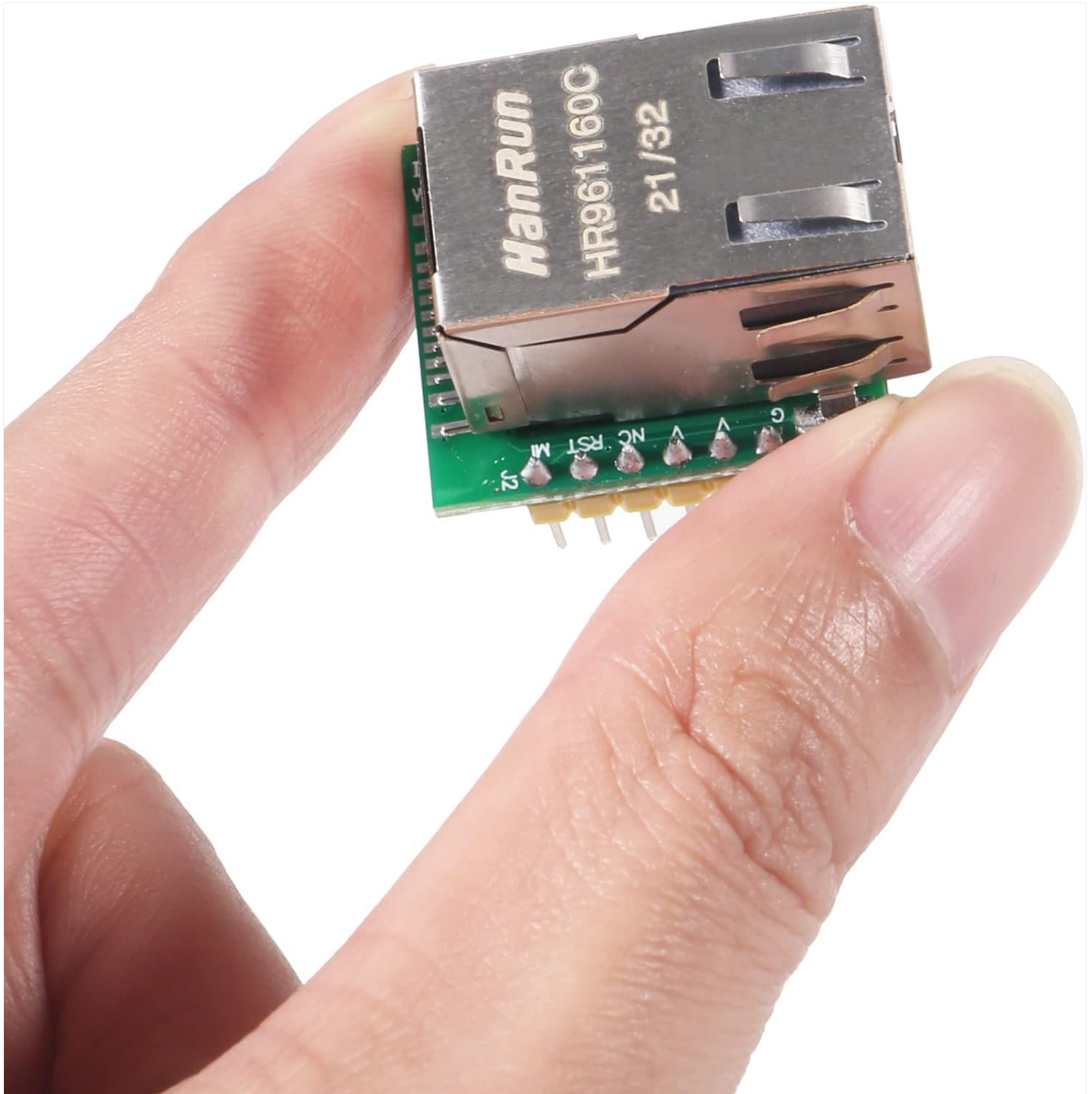


Figure 2: The W5500 module held in hand, illustrating its compact size suitable for various embedded projects.

3. SPECIFICATIONS

Parameter	Value
Chipset	WIZnet W5500
Interface	SPI (Serial Peripheral Interface)
Control Interface Level	TTL 3.3V
Power Supply Voltage	+3.3V DC

Parameter	Value
Power Supply Current	> 200mA (recommended)
Ethernet Standard	10BaseT/100BaseTX
Receive Buffer Size	32KB
PCB Dimensions (L x W)	25.5mm x 23mm (approx. 1.00in x 0.90in)
Item Weight	1.06 ounces (approx. 30g)

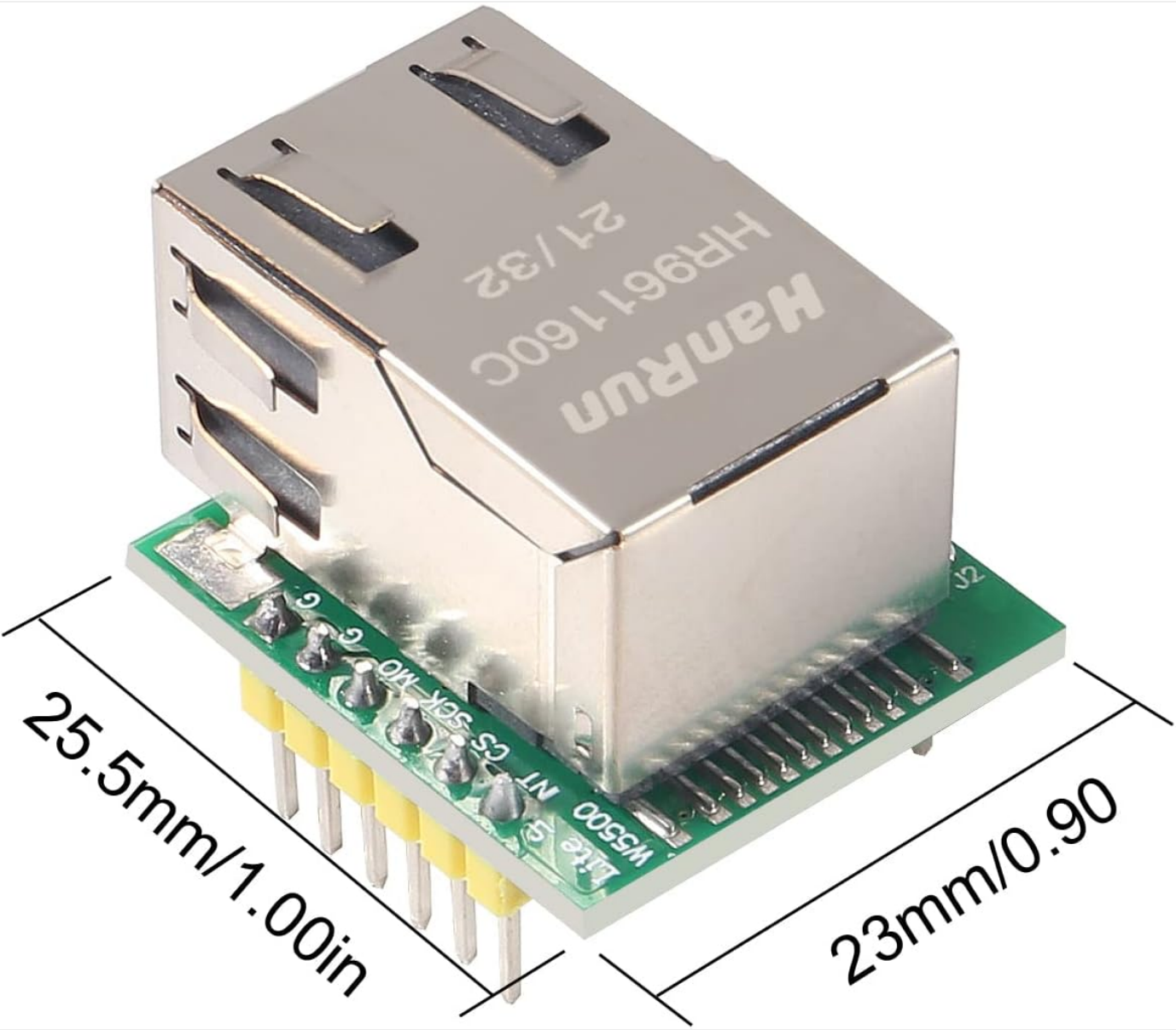


Figure 3: Physical dimensions of the W5500 module, showing approximate length and width.

4. SETUP AND CONNECTION

This section details the pinout and basic connection steps for integrating the W5500 module with your microcontroller.

4.1 Pinout Diagram

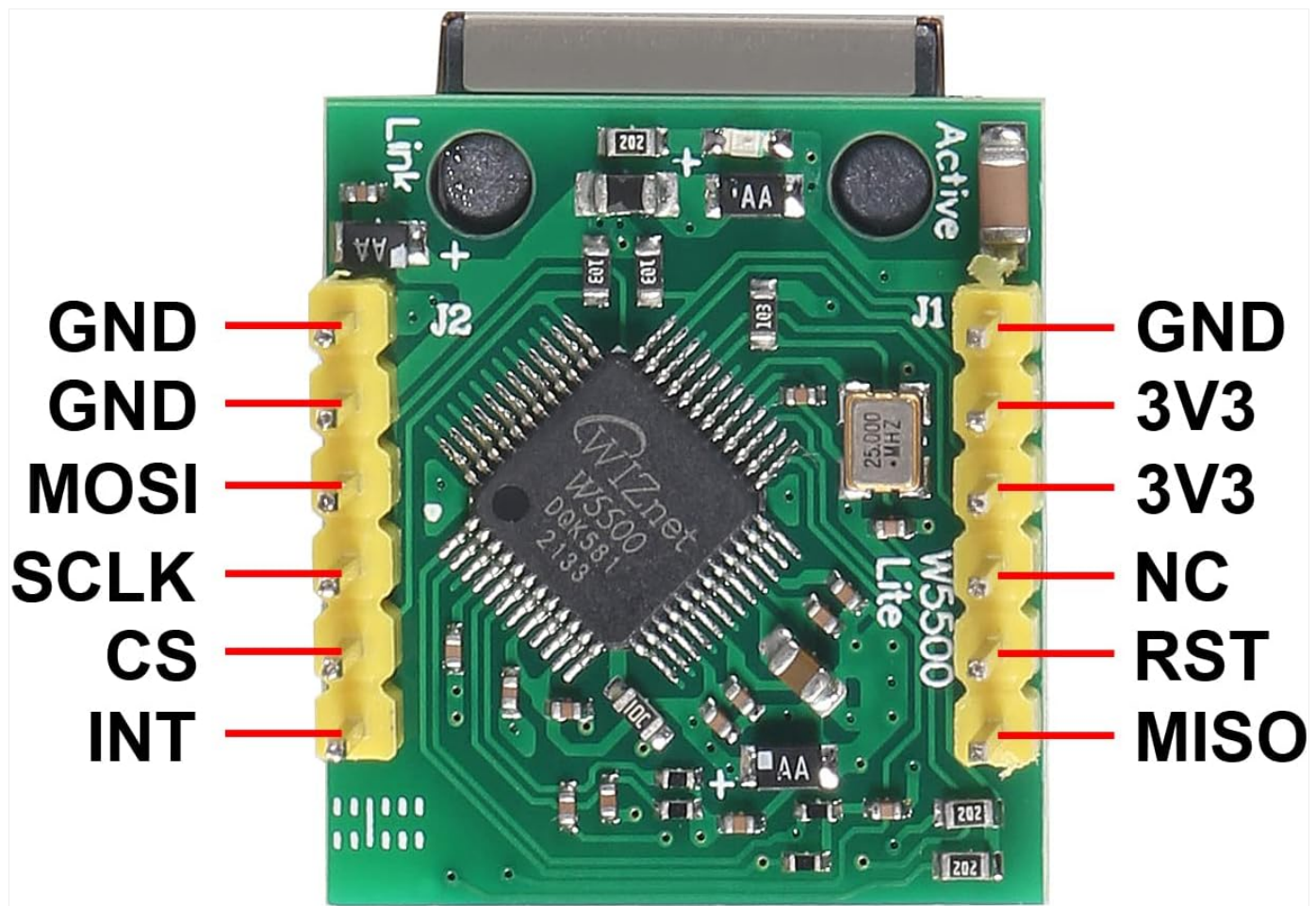


Figure 4: Detailed pinout of the W5500 module, indicating the function of each pin for connection.

The module features two rows of pins (J1 and J2) for connection. Refer to the diagram above for precise pin identification. Key pins include:

- **GND**: Ground connection.
- **3V3**: 3.3V power supply input. Ensure a stable supply of at least 200mA.
- **MOSI (Master Out Slave In)**: SPI data output from microcontroller, input to W5500.
- **MISO (Master In Slave Out)**: SPI data input to microcontroller, output from W5500.
- **SCLK (Serial Clock)**: SPI clock signal.
- **CS (Chip Select)**: SPI chip select signal. Active low.
- **RST (Reset)**: Hardware reset pin. Active low.
- **INT (Interrupt)**: Interrupt output from W5500 to microcontroller.
- **NC**: No Connection.

4.2 Power Supply Requirements

The W5500 module requires a **3.3V DC external power supply**. It is crucial that this supply is stable and can provide a minimum of **200mA**. Insufficient or unstable power can lead to unreliable operation or module failure. While the I/O pins are 5V tolerant, the core operating voltage is 3.3V.

4.3 Basic Connection Steps

1. Connect the **3V3** pin of the W5500 module to a stable 3.3V power source on your microcontroller board.
2. Connect the **GND** pins of the W5500 module to the ground of your microcontroller board.
3. Connect the SPI pins:
 - W5500 **MOSI** to Microcontroller **MOSI**

- W5500 **MISO** to Microcontroller **MISO**
 - W5500 **SCLK** to Microcontroller **SCLK**
 - W5500 **CS** to Microcontroller **CS** (or any general-purpose I/O pin configured as chip select)
4. Connect the **RST** pin to a general-purpose I/O pin on your microcontroller, allowing software control over reset.
 5. Optionally, connect the **INT** pin to an interrupt-capable I/O pin on your microcontroller for event-driven communication.
 6. Insert a standard RJ45 Ethernet cable into the module's Ethernet port and connect it to a network switch or router.

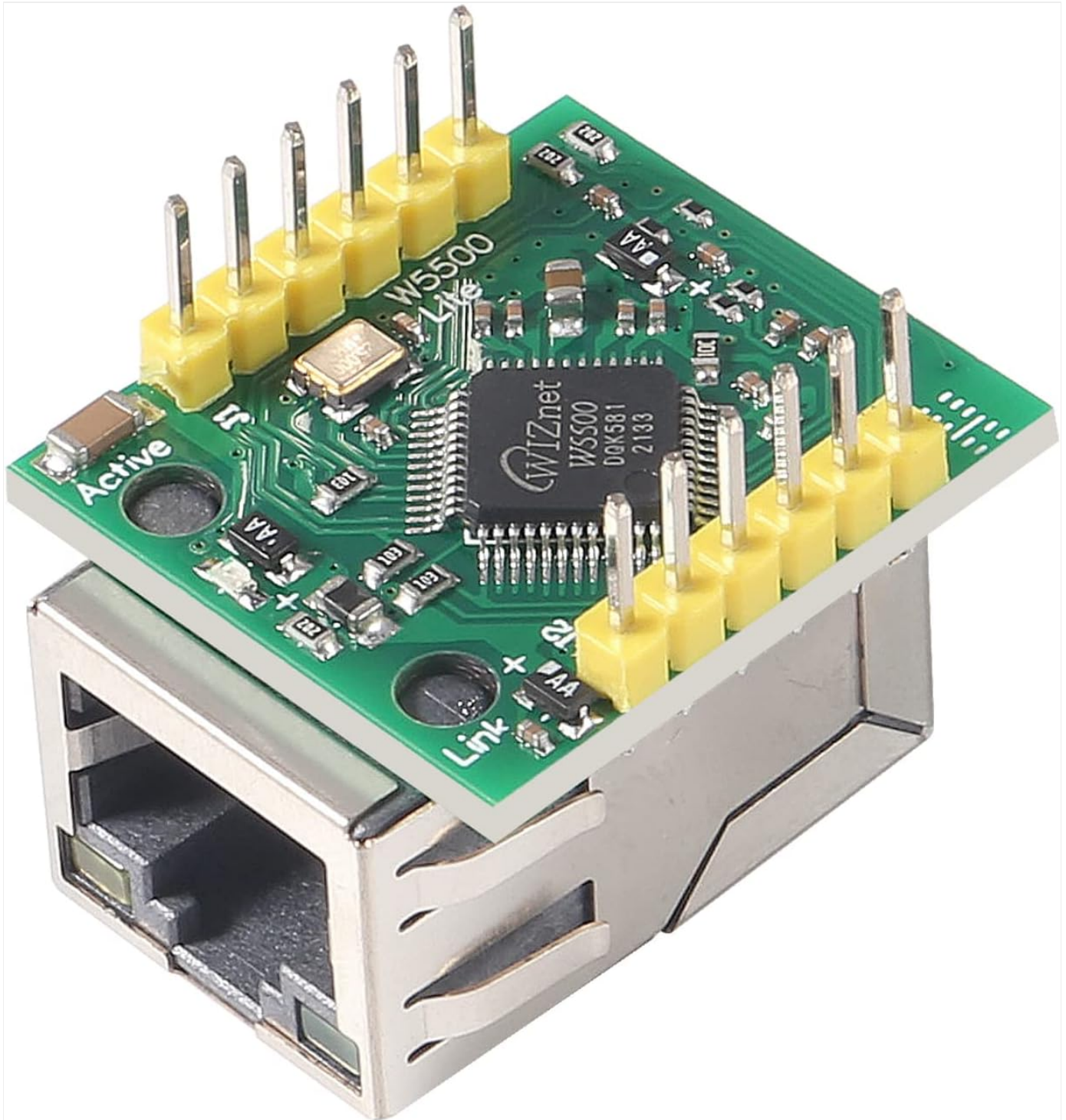


Figure 5: A perspective view of the W5500 module, highlighting the Ethernet port and pin headers for connection.

5. OPERATING INSTRUCTIONS

Once the module is physically connected, software configuration is required to enable network communication.

5.1 Software Initialization

The W5500 chip requires initialization via SPI. This typically involves:

- Resetting the W5500 chip (via the RST pin or software command).
- Configuring the SPI communication parameters (mode, clock speed).
- Setting the MAC address of the module.
- Configuring network parameters such as IP address, subnet mask, and gateway.
- Initializing the TCP/IP stack and opening sockets for desired protocols (TCP, UDP).

Many libraries are available for popular microcontrollers (e.g., Arduino Ethernet2 library, WIZnet official libraries) that simplify these steps. Refer to the WIZnet documentation and community resources for specific code examples and detailed API usage.

5.2 LED Indicators

The module includes two LEDs to indicate network status:

- **Link LED:** Illuminates when a valid Ethernet link is established.
- **Active LED:** Flashes to indicate network activity (data transmission/reception).

Proper functioning of these LEDs confirms physical network connectivity and data flow.

5.3 Example Application

The W5500 module can be used for various network applications, including:

- Web servers on microcontrollers.
- IoT device connectivity.
- Data logging to network servers.
- Remote control and monitoring.

For a visual overview of the module and its features, please refer to the following video:

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Video 1: An overview of the W5500 SPI to LAN Ethernet Network Module, demonstrating its physical characteristics and potential applications.

6. MAINTENANCE

The W5500 Ethernet module is a robust electronic component designed for long-term operation. Minimal maintenance is required, but adhering to the following guidelines can ensure optimal performance and longevity:

- **Environmental Conditions:** Operate the module within its specified temperature and humidity ranges. Avoid extreme conditions.
- **Cleanliness:** Keep the module free from dust, dirt, and moisture. If cleaning is necessary, use a soft, dry brush or compressed air. Avoid liquid cleaners.
- **Physical Handling:** Handle the module by its edges to avoid touching the electronic components, which can be sensitive to static discharge.
- **Connections:** Ensure all pin connections are secure and free from corrosion. Periodically check the Ethernet cable for damage.
- **Power Supply:** Verify that the 3.3V power supply remains stable and within the specified voltage and current limits.

7. TROUBLESHOOTING

If you encounter issues with your W5500 module, consider the following troubleshooting steps:

- **No Power/Module Not Responding:**

- Verify the 3.3V power supply is connected correctly and is stable, providing at least 200mA.
- Check all ground connections.
- Ensure the module is not damaged.

- **No Link LED Activity:**

- Confirm the Ethernet cable is securely connected to both the module and the network device (switch/router).
- Test the Ethernet cable with another device to ensure it is functional.
- Check if the network port on the switch/router is active.

- **No Active LED Activity (No Data Transfer):**

- Review your SPI wiring (MOSI, MISO, SCLK, CS) for correctness.
- Check your microcontroller's SPI configuration (clock speed, mode).
- Ensure the W5500 chip is correctly initialized in your software, including MAC address and IP configuration.
- Verify that your network settings (IP address, subnet mask, gateway) are compatible with your local network.
- Confirm that the W5500's internal registers are being read/written correctly via SPI.

- **Intermittent Connectivity:**

- This can often be caused by an unstable 3.3V power supply. Ensure it meets the current requirements.
- Check for loose connections or poor soldering.
- Environmental interference might be a factor; consider shielding if operating in a noisy electrical environment.

- **Module Not Detected by Software:**

- Ensure the CS pin is correctly toggled during SPI communication.
- Verify the RST pin is being properly controlled (e.g., pulled high after a brief low pulse).
- Double-check the SPI pin assignments in your code against the module's pinout.

If issues persist after these steps, consult online forums, WIZnet documentation, or contact ACEIRMC customer support.

8. WARRANTY AND SUPPORT

For product support, technical assistance, or warranty inquiries, please contact ACEIRMC directly through their official channels or the platform where the product was purchased. Keep your purchase receipt or order number handy for faster service.

You can typically find support information by visiting the [ACEIRMC Store on Amazon](#) or by referring to the product listing for contact details.

ASK A QUESTION ABOUT THIS MANUAL

Ask about setup, troubleshooting, compatibility, parts, safety, or missing instructions. Manuals+ will review the question

and use this page's manual context to help answer it.

Name

Anonymous

Email

you@example.com

After a successful submission, we securely hash the supplied account or form email before sending it to Microsoft Advertising for conversion attribution. [Privacy details](#).

Question

Example: How do I reset this device or fix this error?

Details

Model number, symptoms, what you tried, or the section of the manual you are using.

Submit question