

Article Overview

STM32 microcontrollers use an external PHY connected via RMII or MII interfaces to enable Ethernet connectivity, requiring proper pin configuration and PHY addressing for network communication.

Hardware Interface

STM32 Ethernet relies on a MAC (Media Access Controller) integrated into the microcontroller and an external PHY (Physical Layer) chip such as LAN8742, DP83848, or LAN8720, which handles electrical signaling, link detection, and speed negotiation . The PHY connects to the STM32 via either:

- o RMII (Reduced Media Independent Interface): Uses 9 pins, simpler and common on most STM32 boards, including Nucleo and Discovery series .
- o MII (Media Independent Interface): Uses 18 pins, more complex, less commonly used due to higher pin count . The PHY address must be correctly set (typically 0 for onboard PHYs) to ensure proper communication between the MAC and PHY . Pull-down resistors on PHY pins like PHYAD0 and nINTSEL are used to configure the address and reference clock output.

Pin Configuration

For RMII, the nine essential pins include:

- o TXD0, TXD1 (Transmit data)
- o RXD0, RXD1 (Receive data)
- o TX_EN (Transmit enable)
- o CRS_DV (Carrier sense / data valid)
- o REF_CLK (Reference clock)
- o MDIO (Management data input/output)
- o MDC (Management data clock) All pins must be configured in alternate function mode in STM32CubeMX or manually in firmware to enable Ethernet functionality .

Software Setup

- o CubeMX Configuration: Enable the Ethernet peripheral, select RMII or MII mode, and assign the correct pins and PHY address .
- o LWIP Stack: Use the Lightweight IP (LWIP) stack to implement TCP/IP communication, allowing STM32 to act as a client, server, or host HTTP/MQTT services .
- o IP Configuration: Ethernet interfaces can be configured with DHCP or static IP using systemd-networkd or ifconfig on STM32MPU platforms .

ST Ethernet cable interface

Practical Considerations

- o Ensure the PHY type and interface match the board schematic; mismatches prevent link establishment .
- o RMI is preferred for simplicity and fewer pins, while MII may be used for legacy or high-speed designs .
- o Ethernet is ideal for high-throughput, long-distance communication, and reliable LAN connectivity compared to UART, SPI, or I2C . By correctly wiring the PHY, configuring pins, and setting up the software stack, STM32 devices can achieve robust Ethernet connectivity suitable for IoT, industrial, and embedded network applications .

Prerequisites for Connecting ISDN BRI S/T High-Speed WAN Interface Cards to a Network Before connecting an

MCU ethernet support MCUs such as the STM32F107 come with a degree of ethernet

Begriff Der englische Begriff Ethernet setzt sich zusammen aus ether (=Äther) und net (kurz für network -

2. Defining MII and RMII MII and RMII are IEEE 802.3 standards that define how an Ethernet MAC communicates

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Explore the fiber optic ST connector with our complete guide. Learn how it works, its key applications, installation

This tutorial explains which network media cables use which connectors. Learn the specifications of the most common

On the hardware side, it covers the Ethernet architecture based on the STM32 MAC and external PHY connection, explaining how

This video demonstrates how to interface the W5500 Ethernet module with STM32 using the SPI protocol. It covers

ST's portfolio of interfaces includes standard interfaces (such as RS-232, RS-422, RS-423, RS-485, LVDS, and USB), I/O

Fast Ethernet is a cost-effective solution for delivering higher bandwidth connectivity while ensuring full compatibility with existing 10

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Introduction The ST-LINK/V2 is an in-circuit debugger/programmer for the STM8 and STM32 microcontrollers. The single wire

With STM32 microcontrollers, you can enable high-speed networking by combining the

Most Common Fiber Optic Connectors - Full Breakdown with Examples Written by Ben Hamlitsch, trueCABLE

This multimode duplex fiber optic ST/ST Ethernet cable is manufactured from 62.5/125 zipcord fiber. The cable has ST connectors on

When the user re-connects the cable, the Ethernet traffic will resume and network interface will be set up. If an LCD controller is used

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