EUROCARD SERIES

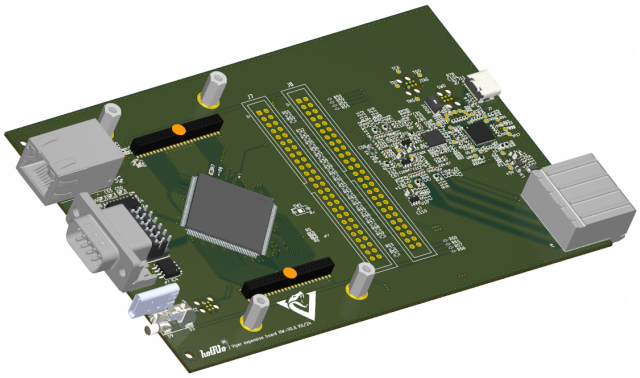
hotRIo

FUSION FOR ENERGY

F-HEE-VIP

HotRIO Eurocard Expansion board

- HotRIO expansion board solution for complex network and protocol stacks.
- Features an ARM coprocessor to handle complex software tasks.
- Embeds 100T-base Ethernet, RS232/RS-485 and USB host/device interfaces.



The HotRIO F-HEE-VIP is a high-performance Eurocard expansion board designed to significantly extend the communication capabilities of HotRIO controller boards by supporting advanced, high-level network protocols such as TCP/IP, Modbus, OPC UA, and customizable proprietary protocols. This expansion board achieves this by integrating a powerful STM32H723 microcontroller as a dedicated coprocessor, which offloads the complexities of network stack processing from the FPGA, thereby simplifying firmware development and optimizing system performance.

Equipped with a 100 Mbps Fast Ethernet interface that fully supports IEEE 1588 Precision Time Protocol (PTP), the F-HEE-VIP ensures synchronized and deterministic communication critical for industrial automation and other time-sensitive applications. The board also features a versatile serial port configurable for either RS232 or RS485 operation, providing compatibility with legacy systems and robust differential signaling for electrically noisy environments. Additionally, a flexible USB port capable of functioning in host or device mode expands the board's connectivity options, enabling peripheral interfacing, diagnostics, or firmware updates.

The embedded STM32H723 microcontroller runs mature and proven networking software stacks, handling all protocol complexities internally. This approach relieves the controller FPGA from resource-intensive network processing tasks, allowing it to focus exclusively on real-time control and data acquisition.

Technical Specifications

Form factor	160x100 mm Eurocard board
Coprocessor	STM32H723 at up to 550MHz
FPGA	LFE5UM5G-85F
Backplane slot	60-pin type A slot
Communication interfaces	Fast Ethernet, RS-232/RS-485 and USB host/device
Power supply	5V DC

To overcome the microcontroller's inherent limitations in high-speed interface support, the board incorporates a Lattice ECP5 FPGA (non-SERDES variant), which serves as a high-throughput memory bridge between the HotRIO controller FPGA and the microcontroller. This FPGA enables efficient data transfer across the HotRIO backplane and can be programmed to perform pre-processing or data filtering functions, further reducing the computational load on the main controller FPGA and enhancing overall system responsiveness.

The design also takes full advantage of the STM32H723's extensive I/O capabilities by routing most of its unused GPIO pins to expansion headers on the board. This allows developers to easily interface additional peripherals, sensors, or custom electronics without the need for extensive firmware or hardware development.

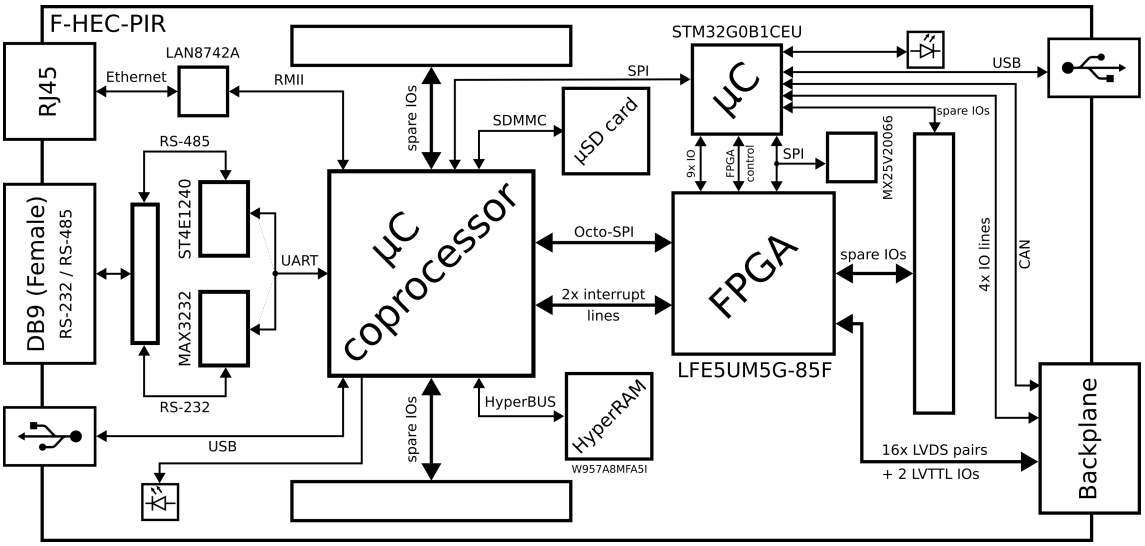
open source hardware

Warning: This document exclusively describes the hardware detailed herein. Any reference to software or firmware used to operate this hardware is outside the scope of this document.

Developers are advised to consult separate documentation for any information related to software or firmware functionality.

1 Detailed description

1.1 Board Overview



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