# Real-time Ethernet for Embedded Systems

REDBUS solution

REDBUS is a proprietary field bus for embedded systems. It provides robust and high speed communication interface for applications like motor control, lighting, fast I/O and, in general, distributed peripherals and embedded control.

Features

- REDBUS is an Ethernet based BUS
- Deterministic & real-time communication
- IEEE 802.3 standard frames
- Multiple Slaves connection without HUB or SWITCH
- It requires only one PHY device per Slave
- IP-Core can use less than 400 LUT
- Low cost solution

REDBUS Topology
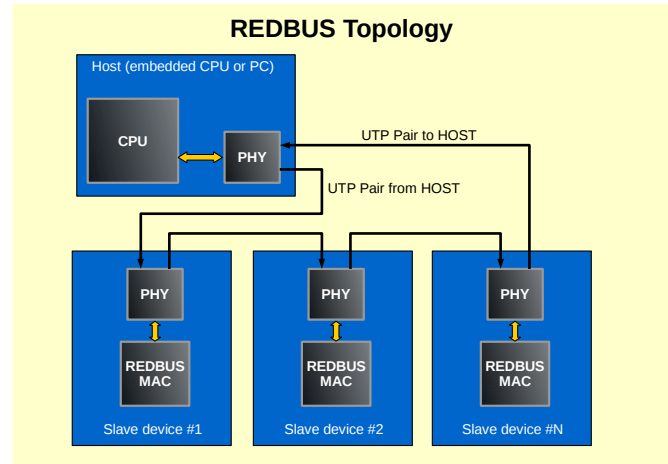
Ethernet to SPI converter

The Ethernet to SPI converter provides an easy and low-cost solution to exchange real-time data with micro-controllers. The IP-Core fits into a MachXO2-256, the smallest CPLD of MachXO2 Lattice family.

Features

- One PHY device per Slave and two RJ45 connectors
- RMII standard PHY interface
- Bidirectional real-time data exchange
- I2C interface to set device address by µC
- Addressing 8128 slaves
- 3.125 MHz SPI clock
- TraceID, readable by I2C, can be used as unique Slave ID

REDBUS Real-time Ethernet to SPI converter using a MachXO2-256 CPLD
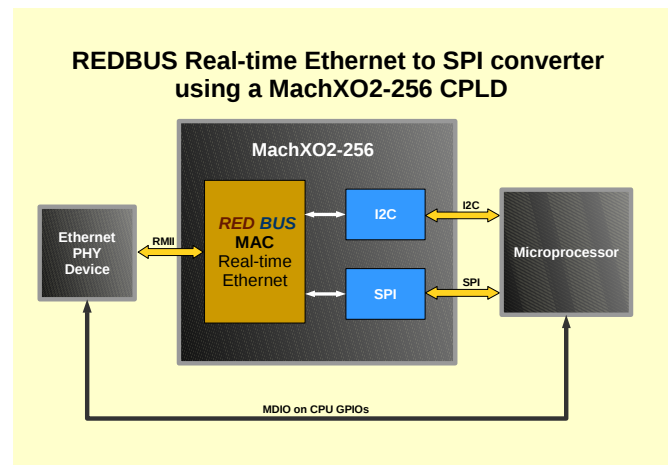
Evaluation board

The Ethernet-to-SPI evaluation board provides a simple platform to evaluate the REDBUS Real-time Ethernet. Several boards can be connected together. Power over Ethernet can be activated in the first board to power all the other boards.

Characteristics

- Based on MACHXO2-256, QFN32 package
- One PHY device, one transformer, and two RJ45 connectors
- NXP Cortex M3 with USB device interface
- Cortex A/D converter inputs and GPIO connector
- 3 Axes MEMS accelerometer for data transfer demo
- One RGB led
- External power supply from +5V DC, Mini-USB connector or PoE.