



powered by port



STM32 Family

Whether low power & low cost EtherCAT with STM32F103 or high performance PROFINET with STM32F407 – port provides the fitting Protocol Library.

STM32 103 STM32 105 STM32 107 STM32 F303	STM32 F207	STM32 407 STM32 417 STM32 427 STM32 F437
ETHERNET POWERLINK Limited, lowest cost POWERLINK with F105 and F107 Full featured POWERLINK (w/FPGA) with all types	ETHERNET POWERLINK Limited, lowest cost POWERLINK with on-board MAC Full featured POWERLINK (w/ FPGA) with all types	ETHERNET POWERLINK Limited, lowest cost POWERLINK with on-board MAC Full featured POWERLINK (w/FPGA) with all types



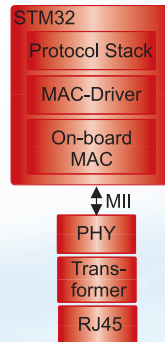


PROFINET and EtherNet/IP

Among the outstanding support for the STM32 family is the option to run PROFINET and EtherNet/IP only with on-board resources – no external memory needed. Beside the cost effective Single Port solution a Dual Port solution can be realized, by utilizing an external managed Switch Controller ASIC.

Single Port

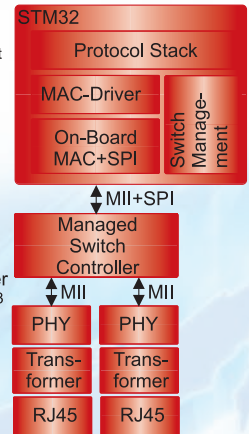
µIP TCP/IP Stack included, only 96kB f. PROFINET
PROFINET - CC-A - RT-1
EtherNet/IP



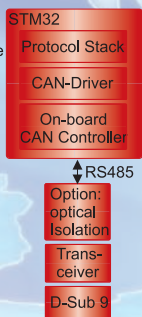
Dual Port

Switch Management included
µIP TCP/IP Stack included

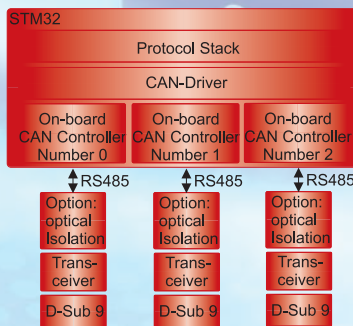
Switch Controller e.g.: KSZ8995, 8893



Single Line
Master or Slave
Full-CAN
Basic-CAN



Multi Line
Master or Slave per Line
Full-CAN
Basic-CAN



CANopen

All available CAN controller can be operated at the same time with Master or Slave functionality, operated by the same library. This way the combined power of multiple CAN lines does not cost multiple times resources. Port's comprehensive CANopen support enables the complete CAN power of the STM32 family.



ETHERNET 
POWERLINK

Lowest Cost POWERLINK

The STM32 family enables for lowest cost POWERLINK with only on-board resources. By connecting a low cost switch controller ASIC with repeater mode support even line structure can be achieved. This solution provides best cost but comes with restrictions in jitter and response time.

POWERLINK with Repeater-Mode Switch Controller and external CPU

This approach combines the price effective silicon MCUs with Flash/RAM and the proper peripherals on-board with a Silicon Switch controller for providing line structure.

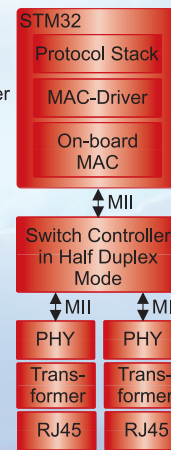
Some Switch controller manufacturer provide a feature calle Repeater Mode, which provides lowlatency and low jitter troughout the network.

This approach – providing Line Structure – comes with the lowest BOM cost, however shorter cycle times than 1ms are not possible.

Dual Port

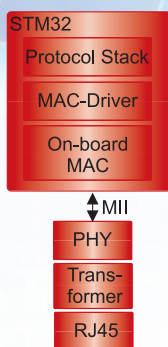
Restrictions apply

Switch Controller used for Hub
Example:
Micrel KSZ 8893



Single Port

Restrictions apply



POWERLINK with CPU in Star Structure

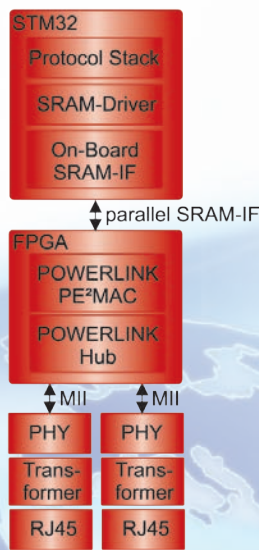
This use case describes the lowest cost BOM approach – utilizing the start structure topology. The POWERLINK Protocol Stack is employed on the same MCU as the application is running. This makes sense for cost sensitive applications with only medium performance requirements. A cycle time down to 1ms is possible – however this depends on the software architecture.

ETHERNET 
POWERLINK

Best Performance POWERLINK

Best performance POWERLINK can be achieved by using an external FPGA to accommodate a special POWERLINK enhanced MAC and a special POWERLINK Hub.

Dual Port
no Restrictions
FPGA with
9000 Gates
sufficientExample:



This case is the most common use case, it allows for an excellent POWERLINK Performance and supports all outstanding POWERLINK features. In this scenario a Hub-IP Core ensures low latency and low jitter in the line-structure of the network.

A special component PE²MAC (POWERLINK Enhanced Ethernet MAC) provides a Autoreply functionality, which basically answers Poll-Request from the MN almost instantly with the corresponding Poll-Response. This results in an overall excellent performance and specially low jitter.

POWERLINK PE²MAC

Port's POWERLINK Enhanced Ethernet MAC (PE²MAC) is a VHDL written IP-Core for Altera and Xilinx FPGAs. The Core of the PE²MAC is a set of Compare/Capture Registers that can trigger on the Poll-Request message, sent by the Managing Node (MN). Upon reception of the Poll-Request message the PE²MAC automatically responds "in hardware" with the preconfigured Poll-Response message. This functionality enables the CN for cycle times down to 200µs and for an exceptional low jitter over the complete network. The PE²MAC operates best with port's POWERLINK Hub and port's POWERLINK Protocol Stack.

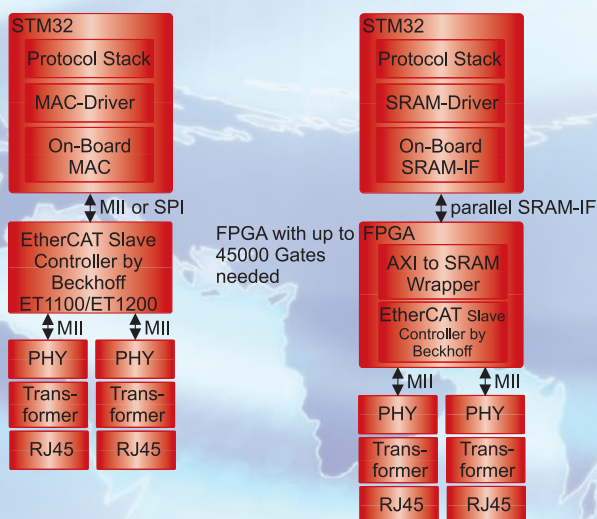
POWERLINK Hub

The POWERLINK Hub by port is a Class 2 Repeating Hub with 3 MII-ports for use in POWERLINK networks. It only introduces below 360ns delay (including delay by the PHYs) and less than 40ns Jitter. The POWERLINK Hub integrates seamlessly with the PE²MAC

EtherCAT

EtherCAT Support

EtherCAT is being supported by connecting to Beckhoff's EtherCAT Slave Controller – either to the ASIC or to the FPGA IP-Core. Port's outstanding support for CoE – CANopen over EtherCAT and the Library concept with close compatibility to port's CANopen and port's POWERLINK make the difference.



The EtherCAT Library by port provides an quick and efficient way to EtherCAT.

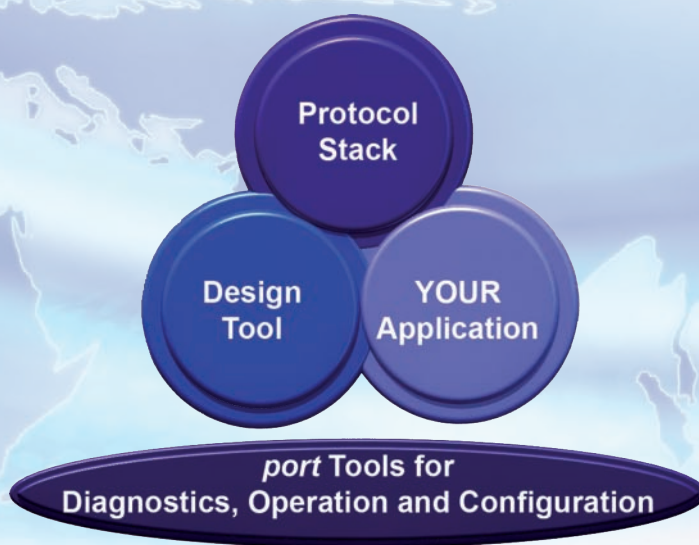
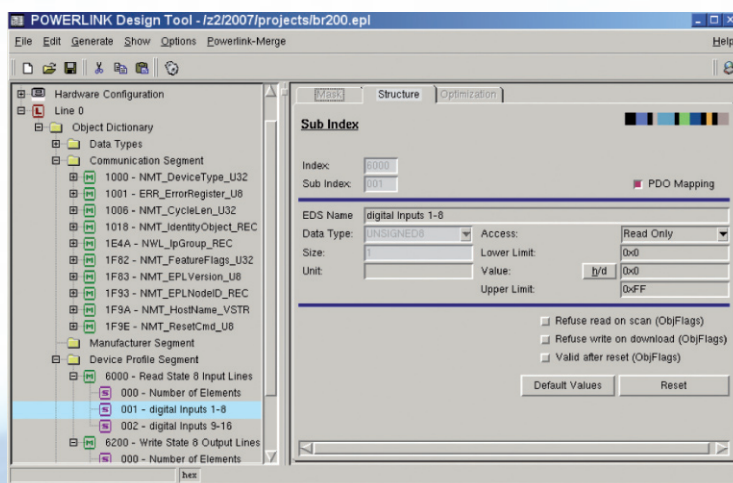
STM32 Family - Use Cases

DesignTool

Port's DesignTools generates the 'fabric' to combine User-Application, Protocol-Stack and the XDD/ESD/ESI/GSDML-File to be a powerful device.

The SW-Engineer configures using this GUI-Tool port's Protocol Stack, creates the -objects and creates his own variables-definitions. Upon pressing a button the tool creates the 'fabric', consisting from various Header-Files and from the XDD/ESD/ESI/GSD-ML-File. Further a reasonable documentation is created.

The DesignTool saves development time, reduces design cycles and improves the quality of the product creation process.



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