Renesas Electronics Industrial Ethernet Communication LSI with EtherCAT

R-IN32M3-EC

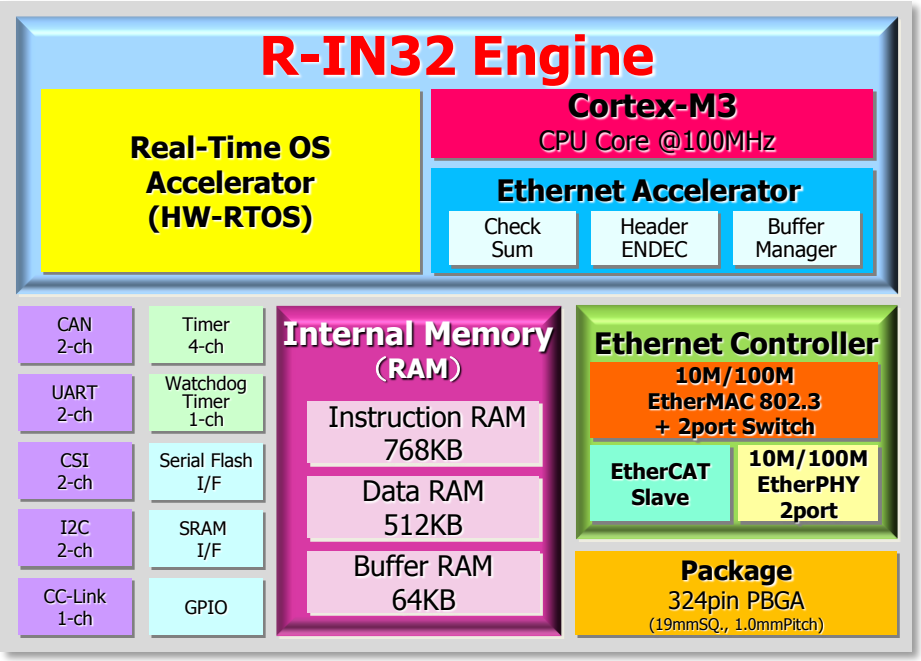
Highly Precise & Stable CPU Operation, High speed real time response, low power consumption

Introduction

R-IN32M3-EC is one of the Industrial Ethernet Communication LSI, which has R-IN32 Engine, EtherCAT Slave Core, 2port EtherPHY, Internal RAM and peripherals. R-IN32 Engine consists of 32bit RISC CPU " Cortex-M3 of ARM" , Real-Time OS Accelerator (Hardware Real-Time OS [HW-RTOS]), Ethernet Accelerator and EtherMAC 802.3 with 2port switch. R-IN32M3-EC achieves the high-speed real time response and low power consumption for Industrial Ethernet Communication with R-IN32 Engine. Especially Real-Time OS Accelerator makes high speed task changing and high speed interrupt response. As a result, R-IN32M3-EC can realize highly precise and stable CPU operation.

Specification

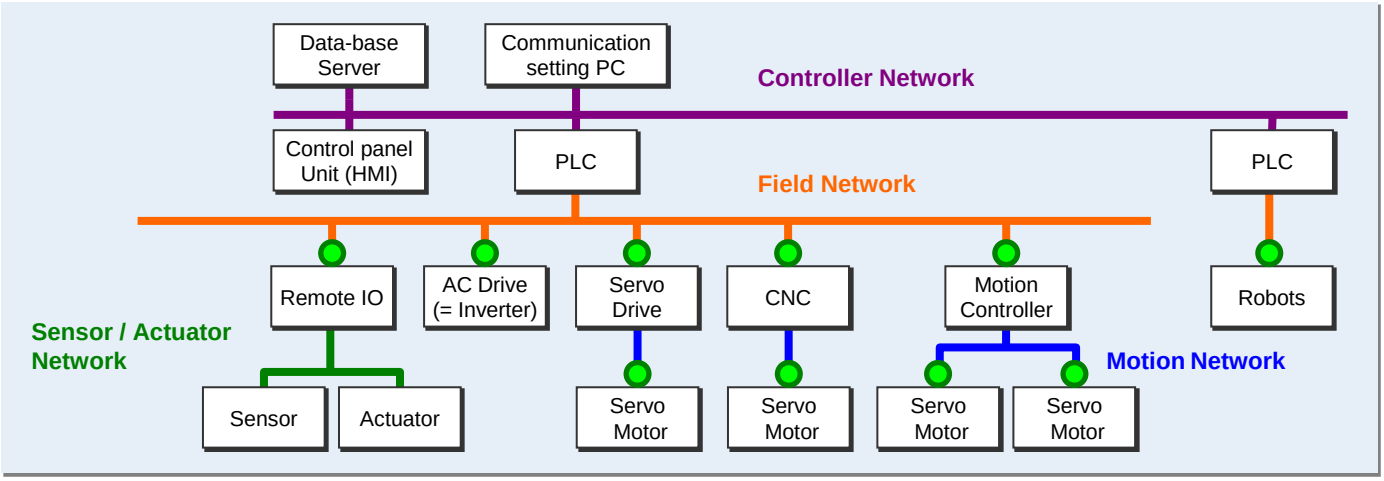
- Cortex-M3 32bit RISC CPU (operating frequency : 100MHz)
- 2Port EtherPHY(10/100-TX/FX)
- SRAM-I/F : 32bit (max) (Master / Slave)
- Non-Ethernet I/F (CAN, CSI, UART, etc…)
- 1.3MBytes Large size memory (RAM)
- Multiprotocol support
- GPIO : 96port(max)
- Power supply voltage : 1.0V±0.1V (Internal) 3.3V±0.3V (I/O)
- Operating temperature : -40～85℃



Application Image

R-IN32M3-EC can be adapted to the communication unit of all FA slave devices at the field network and the motion network. (:Relevant parts)

■Recommend : PLC, Remote IO, CNC, AC Drive(Inverter), Robot, Servo drive, Servo Motor



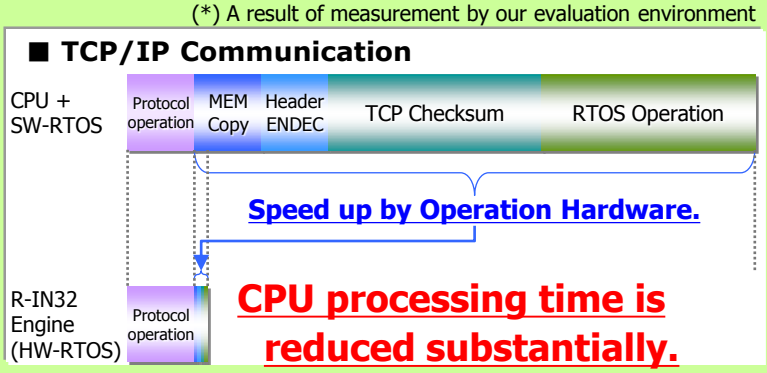
Feature

R-IN32M3 achieves high-performance communication rather than conventional "CPU+ Software RTOS" (SW-RTOS) by using the both of "R-IN32 engine" and high-speed real time communication by the effect of Ethernet Accelerator.

On the other hand, R-IN32M3 achieves highly precise, low latency communication and low power consumption by effect of Real-Time OS Accelerator .

Effect of Ethernet Accelerator

(*) A result of measurement by our evaluation environment

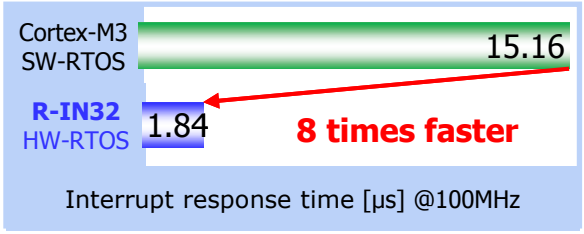


Effects of Real-Time OS Accelerator

(*) A result of measurement by our evaluation environment

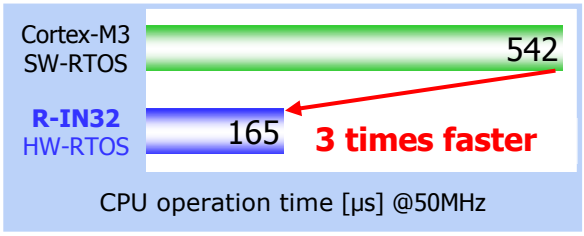
■Quick Interrupt Response

Measurement operation time (Interrupt insert ~ Task Start)



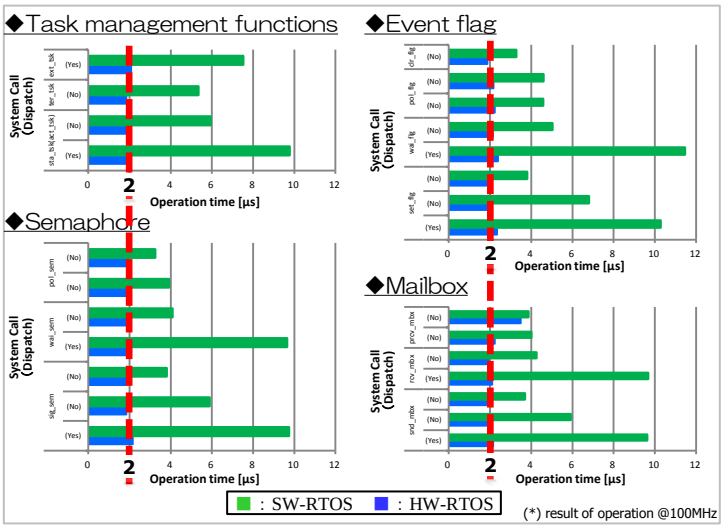
■Real-time multi task operation

Measurement of task change operation time.



■Synchronous real time operation

Measurement the OS operation time operating various system calls



Low jitter Real-time OS operation

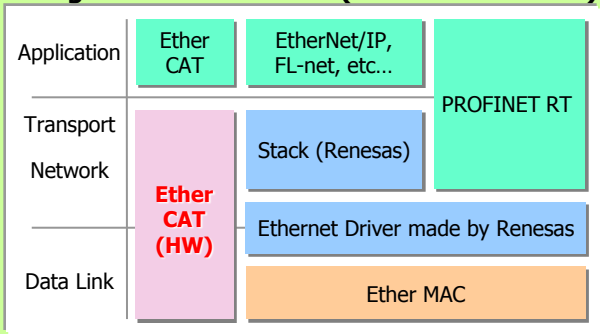
Protocols

R-IN32M3-EC corresponds the multi protocols as following not only Industrial Ethernet Protocols but also the conventional Open Network Protocols.

■Industrial Ethernet Protocols :
EtherCAT, EtherNet/IP, PROFINET RT ,
Modbus TCP(TBD), POWERLINK(TBD), FL-net(TBD)

■Conventional Open Network Protocols :
CANopen, CC-Link, DeviceNet

Image of Protocol stack (Ethernet Protocol)



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