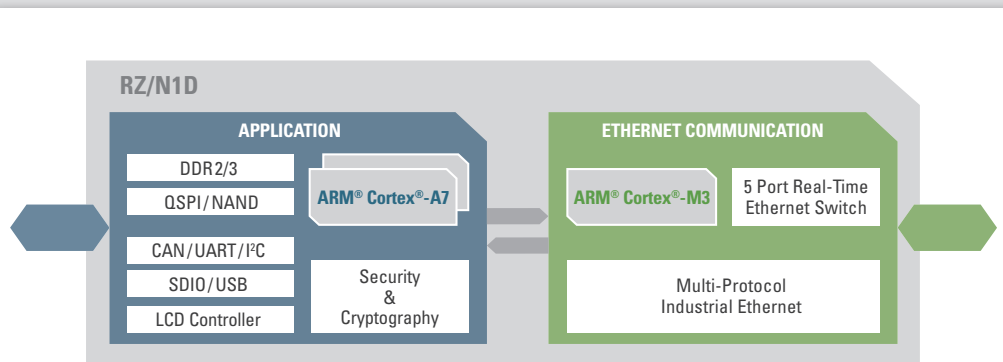# RZ/N1D

Industrial Ethernet Communication SoCs

RZ/N1D is a 5-port, industrial Ethernet communication SoCs with an optimal balance between performance and power consumption. It consists of two blocks integrated in a single package – a communication block based on the proven multi-protocol R-IN Engine, as well as an application block, featuring a dual ARM® Cortex®-A7 and a variety of peripherals. Due to the unique combination of hardware and software, developers can easily exchange various industrial Ethernet protocols and focus only on developing the application software.

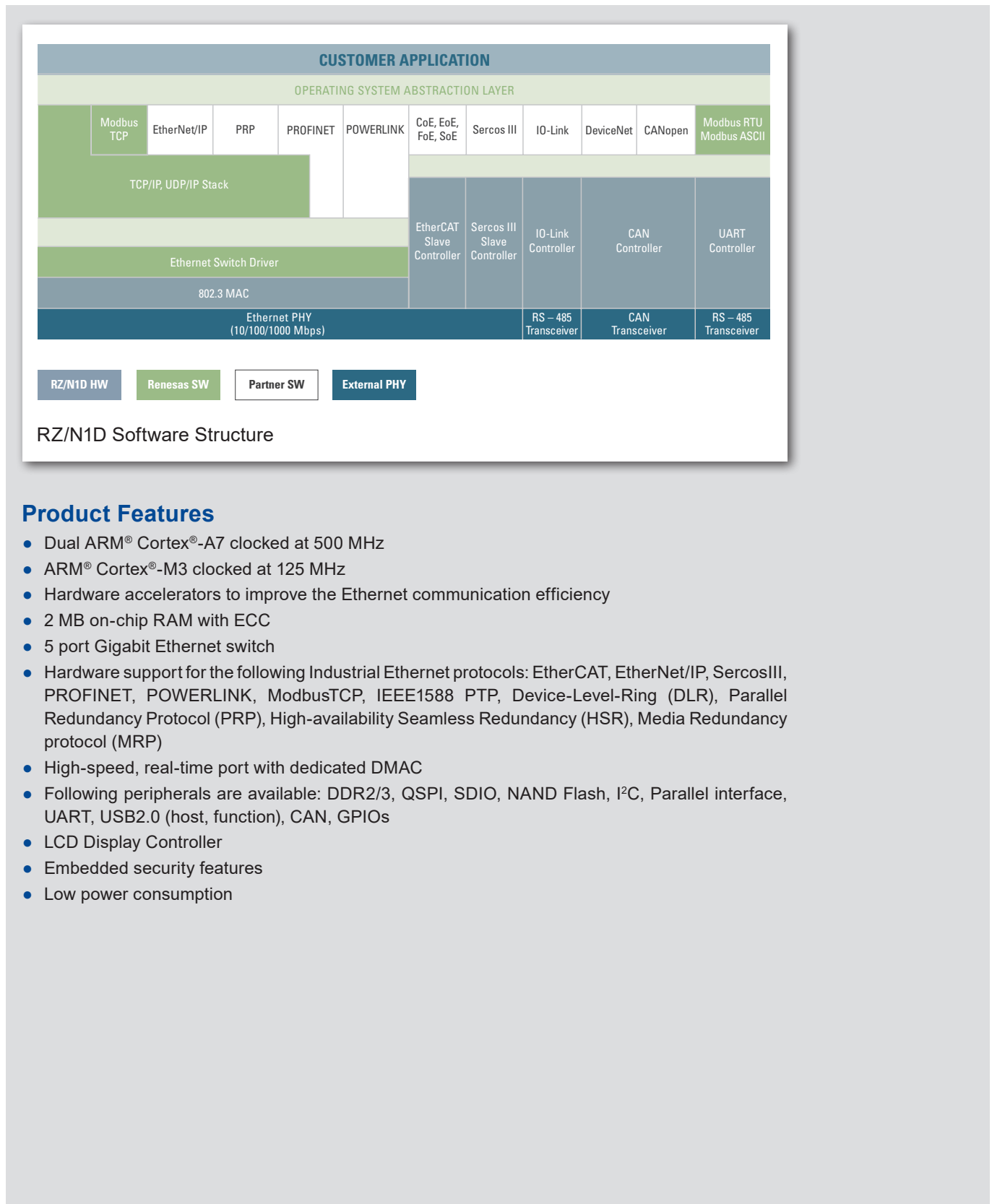RZ/N1D is ideal for applications like gateways, PLCs or operator terminals.

Simplified migration between protocols and Renesas SoCs

Simple exchange of IE protocols

Numerous industrial Ethernet protocols have already been developed over a unified communication abstraction layer. Transparent for the software application, this abstraction layer has a documented API so the application software can be developed without having to worry about the industrial Ethernet communication protocols. Even more, these protocols can be easily exchanged, with minimal impact on the application software. With the unified communication abstraction layer, a simple migration between various Renesas R-IN Engine based SoCs is also possible.

Apart from the already available software, RZ/N1D is open for software from any other vendor. Renesas' highly responsive support will answer questions and therefore assist the software implementation. Basic RZ/N1D features can be easily evaluated with the solution kit "CONNECT IT! ETHERNET RZ/N1D". The optional expansion board, "CONNECT IT! RZ/N1 Expansion" gives access to the full chip functionality. For more information please check the RZ/N1D product page: https://www.renesas.com/en-eu/RZ_N1D

RZ/N1D Industrial Ethernet Communication SoCs

CUSTOMER APPLICATION

OPERATING SYSTEM ABSTRACTION LAYER

| Modbus TCP | EtherNet/IP | PRP | PROFINET | POWERLINK | CoE, EoE, FoE, SoE | Sercos III | IO-Link | DeviceNet | CANopen | Modbus RTU Modbus ASCII |

TCP/IP, UDP/IP Stack

| EtherCAT Slave Controller | Sercos III Slave Controller | IO-Link Controller | CAN Controller | UART Controller |

Ethernet Switch Driver

802.3 MAC

Ethernet PHY (10/100/1000 Mbps)

| RS – 485 Transceiver | CAN Transceiver | RS – 485 Transceiver |

| **RZ/N1D HW** | **Renesas SW** | **Partner SW** | **External PHY** |

RZ/N1D Software Structure

Product Features

- Dual ARM® Cortex®-A7 clocked at 500 MHz
- ARM® Cortex®-M3 clocked at 125 MHz
- Hardware accelerators to improve the Ethernet communication efficiency
- 2 MB on-chip RAM with ECC
- 5 port Gigabit Ethernet switch
- Hardware support for the following Industrial Ethernet protocols: EtherCAT, EtherNet/IP, SercosIII, PROFINET, POWERLINK, ModbusTCP, IEEE1588 PTP, Device-Level-Ring (DLR), Parallel Redundancy Protocol (PRP), High-availability Seamless Redundancy (HSR), Media Redundancy protocol (MRP)
- High-speed, real-time port with dedicated DMAC
- Following peripherals are available: DDR2/3, QSPI, SDIO, NAND Flash, I²C, Parallel interface, UART, USB2.0 (host, function), CAN, GPIOs
- LCD Display Controller
- Embedded security features
- Low power consumption

Before purchasing or using any Renesas Electronics products listed herein, please refer to the latest product manual and/or data sheet in advance.

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