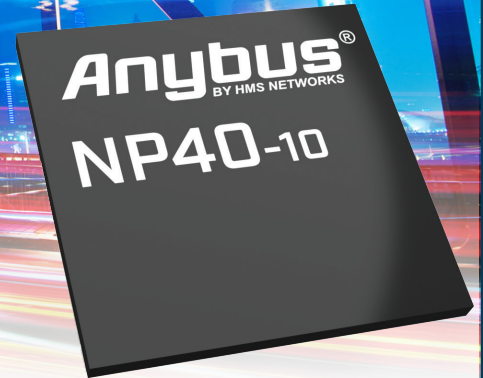# Anybus®

BY HMS NETWORKS

CompactCom™ C40

The Anybus® CompactCom C40 is a high-performance network communication solution in chip format. It consists of the Anybus NP40 network processor loaded with the software you need to connect an industrial device to different fieldbus or Industrial Ethernet network. The C40 is especially well-suited for demanding industrial applications requiring very fast data transfer.

Networks:

- PROFINET
- ETHERNET POWERLINK
- EtherCAT
- EtherNet/IP
- Modbus TCP
- CC-Link
- DeviceNet
- PROFIBUS

Add your own hardware around a communication chip

The Anybus CompactCom C40 solution includes all the functionality needed to handle communication between your device and any industrial network. A chip-based solution gives you a lot of freedom to design your own hardware and add connectors around the chip.

Based on the Anybus NP40 network processor

The Anybus NP40 network processor enables integration of optimized infrastructure solutions like high-performance Ethernet switches with on-the-fly processing and cut-through switching with very low latencies. This multi-network chip eliminates the need for different external communication ASICs and FPGAs drastically reducing the design complexity and cost.

Features and benefits

- Multi-network connectivity in a chip.
- A ready-made solution minimizing your programming efforts.
- New and future network updates and enhancements maintained by HMS.
- Fast data transfer: up to 1500 bytes of process data in each direction.
- Possibility to send a complete Ethernet frame via the socket interface (up to 1500 bytes). Support for more than 20 socket connections.
- Very low latency <15µs.
- Clock-synchronous operation.
- Event-based interface method enables easy to access input and output data at any time.
- Fast, event-based application hardware interfaces: 8/16-bit parallel and high speed SPI. I/O (shift register interface) is also available.
- Use the same chip for different Ethernet networks. Simply download new firmware to enable communication with another network.
- Firmware management tool enables easy download via FTP or serial connection.
- Flash-based file system with two-disc access (internal and external).
- Support for safety networks via the black channel to the IXXAT Safe T100.
- Solid security: Mandatory software signatures prevent unauthorized software to be downloaded to the module. Furthermore, encryption is used to prevent illicit copying.

CompactCom 40-series

The C40 is part of the Anybus CompactCom 40-series — communication products in chip, brick and module formats. These are all built on the Anybus NP40 processor making them especially suitable for modern and demanding industrial applications.

The chip:

- Combines a high-performance ARM® Cortex™-M3 with the flexibility of an FPGA fabric.
- Low cost, high performance with low power consumption combined with a compact size makes the chip optimal for high-performance industrial slave/adapter solutions.
- Based on the most reliable and secure programmable logic solution on the market.
- Deemed to be the best network processor on the market by independent analyst firm Frost & Sullivan.

HMS

TECHNICAL SPECIFICATIONS

Technical Details

Dimensions	17 • 17 mm
Silicon process	65 nm
BGA package	VF400
Pitch	0.8 mm
RoHS Compliance	Yes
Application interfaces	Parallel Dual Port Ram (DPRAM): 8 and 16 bit data bus. High speed SPI. Shift register. Asynchronous serial interface with baud rates between 19.2 kbps - 625 kbps
Application drivers	Standard drivers available depending on host application requirements
Drive Profile support	On selected networks. (Also, the transparent channel makes it possible for users to build their own drive profiles)
Ethernet features	Transparent socket interface, integrated 2-port switch, IT functions (FTP server, E-mail, web server with SSI support and JSON functionlity)

Certifications (for the CompactCom 40 series)

UL, cUL	Yes
Network conformance	Yes: Pre-certified for full fieldbus and Industrial Ethernet network conformance
CE - Declaration of Pre-Conformity	
Emission EN 61000-6-4	EN55016-2-3 Radiated emission EN55022 Conducted emission
Immunity EN 61000-6-2	EN61000-4-2 Electrostatic discharge, EN61000-4-3 Radiated immunity. EN61000-4-4 Fast transients/burst, EN61000-4-5 Surge immunity. EN61000-4-6 Conducted immunity.
Environmental Characteristics	
Operating temp	-40 to 85 °C, -40-176 °F
Starter kit	
Available for the entire CompactCom 40-series (Chip, Brick and Module)	

INSIDE THE CHIP

Microprocessor

CPU Core	ARM Cortex-M3
Microprocessor MHz (max)	166
Instruction Cache	8 kB
On-chip RAM	80 kB
EDAC	Yes
On-chip FLASH	256 kB
Integrated FPGA	Yes

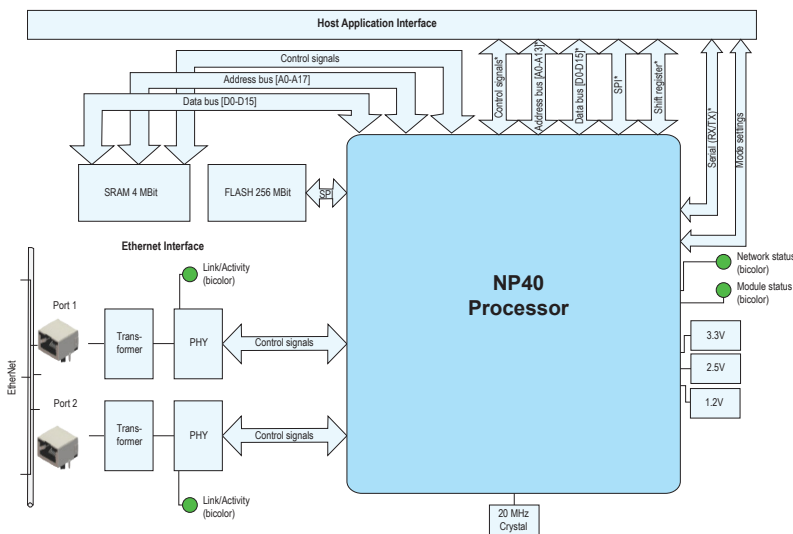### Power

Power supply	3.3 V, 2.5 V, 1.2 V
Typical power consumption	0.6 W - 1 W

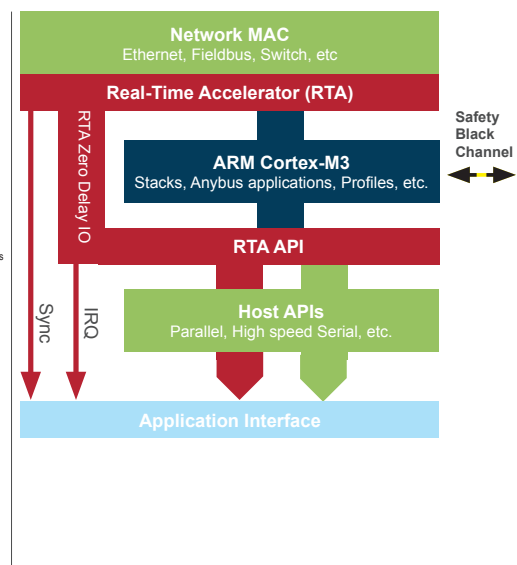### Real-Time-Accelerator for best-in-class latency

NP40 integrates HMS unique IP to provide best-in-class latency and deterministic
real-time for demanding industrial
applications like motion control. The Real-Time Accelerator (RTA) works on several levels from "on-the-fly" protocol pre-processing on the network controller level to a zero delay API which guarantees instant access to network control data.

The configurable RTA interrupt with several
network event indications provides the means for an optimized integration with the host application.

C40 Ethernet 2-Port Block Diagram

* Not all interfaces are required in the same design

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Anybus NP40 and the technology contained within have patents pending.