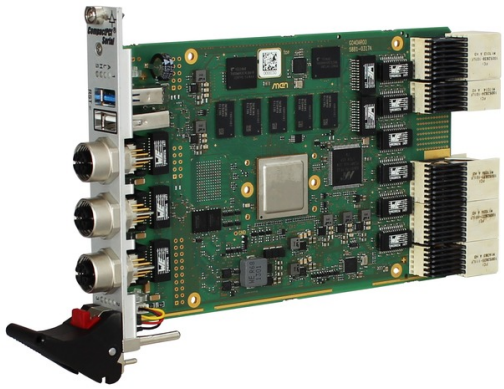
G40A

Embedded Single Board Computer with ARM Cortex A72

3U CompactPCI Serial

- *NXP QorIQ, 4 cores*
- *Up to 8 GB DDR4 DRAM soldered, ECC*
- *Non-volatile SRAM*
- *Standard front I/O: 3 Gb Ethernet, 1 USB 3.0 host, 1 USB configuration port (RS232)*
- *Standard rear I/O: 2 PCIe lanes, 4 USB 2.0, 1 SATA, 8 Gb Ethernet*
- *PICMG CPCI-S.0 CompactPCI Serial*
- *-40°C to +85°C operating temperature*
- *Fanless operation possible*
- *Virtualization-ready*



Virtualization-Ready

The G40A is a high-performance 3U CompactPCI Serial multicore CPU platform equipped with the NXP ARM Cortex A72 LS1046A processor.
Featuring ARM core technologies and NXP data processing accelerators and I/O interfaces, G40A secures your application for the future by being full-virtualization ready - memory and I/O sub-systems can be virtualized - and available for 15 years from product introduction.

Wide Range of I/O, Network Connectivity

The G40A provides modern serial interface technologies such as PCI Express generation 3.0 (up to 8 Gbit/s), USB 3.0, SATA generation 3 (up to 6 Gbit/s). It is network connection ready by providing front Ethernet interfaces and an Ethernet switch. Nevertheless, compatibility with legacy interfaces is ensured with communications interfaces such as UART, I2C, SPI, etc.

Board Supervision and Management

The G40A is monitored using an MEN proprietary board management controller (BMC) which controls parameters such as voltages, temperature and provides a user configurable watchdog, making it ready for applications where functional safety is required. It supports low-power mode to enable Wake-on-LAN when the board's power supply is off.

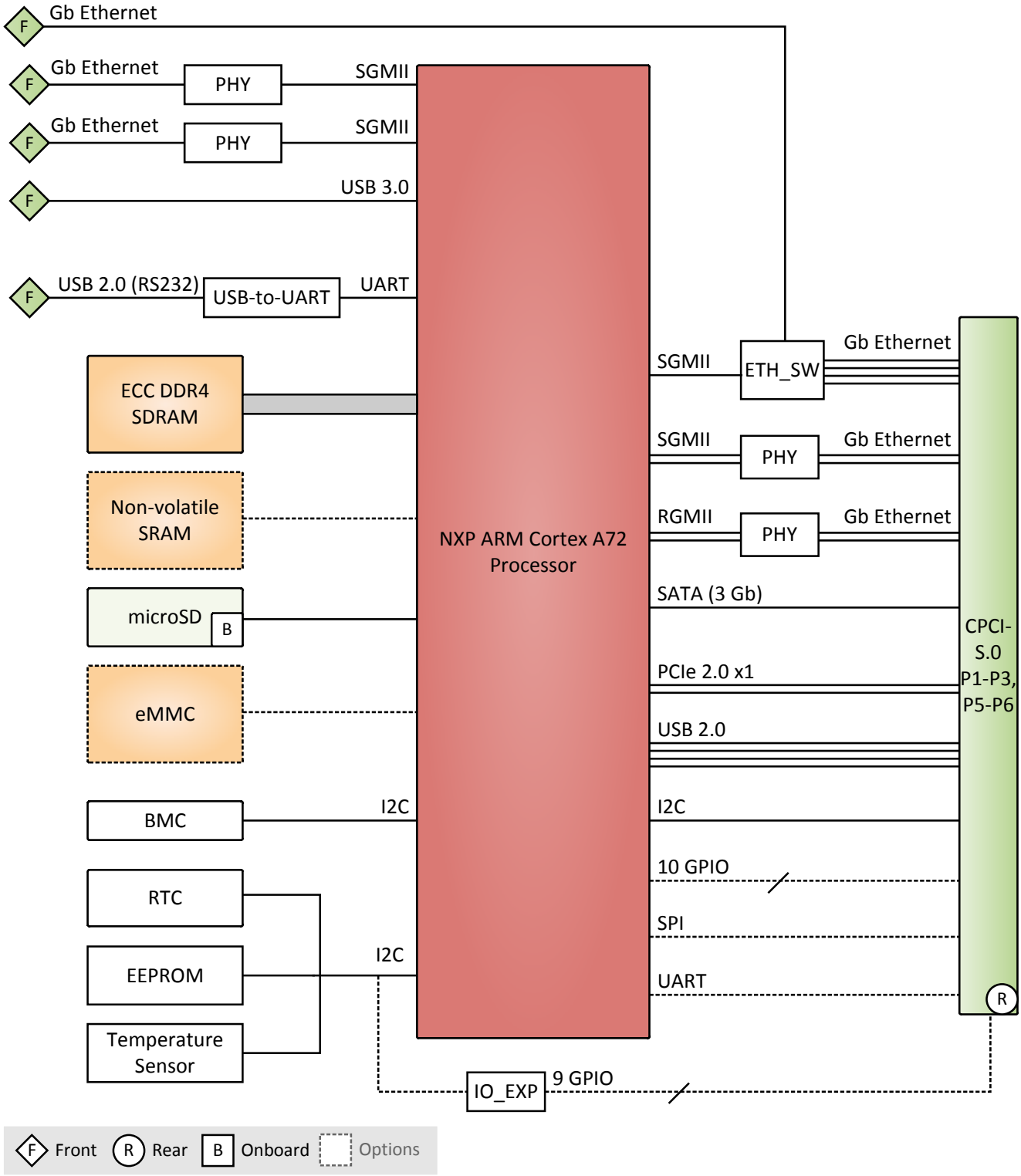
Extensive Memory

The memory configuration of the G40A includes a fast DDR4 DRAM with ECC soldered to the board to guarantee optimum shock and vibration resistance. A non-volatile SRAM, an eMMC NAND Flash device and a microSD card can also be assembled offering space for user applications or usable as a local boot medium.

Perfect for Harsh Environments

With small 3U dimensions, G40A is perfectly suited for use in harsh environments, making it an ideal solution where space is limited but high processing capabilities are needed, e.g. in data collection applications on board trains. The board can be ordered in a version which enables fanless operation.
The G40A comes with a tailored heat sink. All components are soldered for protection against shock and vibration according to applicable railway standards. The G40A is also coated so that it can be used in humid and dusty environments.

Data Sheet


Gb Ethernet
F
Gb Ethernet
PHY
SGMII
Gb Ethernet
PHY
SGMII
USB 3.0
USB 2.0 (RS232)
USB-to-UART
UART
ECC DDR4 SDRAM
Non-volatile SRAM
microSD
B
eMMC
BMC
I2C
RTC
EEPROM
I2C
Temperature Sensor
NXP ARM Cortex A72 Processor
SGMII
ETH_SW
Gb Ethernet
SGMII
PHY
Gb Ethernet
RGMII
PHY
Gb Ethernet
SATA (3 Gb)
PCIe 2.0 x1
USB 2.0
I2C
10 GPIO
SPI
UART
CPCI-S.0 P1-P3, P5-P6
R
IO_EXP
9 GPIO
F Front
R Rear
B Onboard
Options

Diagram

CPU

- The following CPU types are supported:
  - NXP ARM Cortex A72 LS1046A, 4 cores, 1.2 GHz
  - NXP ARM Cortex A72 LS1046A, 4 cores, 1.4 GHz
  - NXP ARM Cortex A72 LS1046A, 4 cores, 1.6 GHz

Security

- QorIQ Trust Architecture (Secure Boot)

Memory

- System RAM
  - Soldered DDR4, ECC support
  - 1 GB
  - 2 GB
  - 4 GB
  - 8 GB
- Boot Flash
  - 32 MB
- Non-volatile SRAM
  - 2 MB

Mass Storage

- The following mass storage devices can be assembled:
  - eMMC (soldered)
  - microSD card

External Interfaces

- SATA
  - 1x SATA Revision 3.x, backplane
- USB
  - 1x USB 3.0, Type A
  - 1x USB-to-UART, Type A
  - 4x USB 2.0, backplane
- PCI Express
  - 2x PCIe 2.0, x1, backplane
- Ethernet
  - 3x 1000BASE-T, M12, X-coded
  - 8x 1000BASE-T, backplane
- Serial
  - 1x UART, backplane
- I2C
  - 1x, up to 400 kbit/s
- SPI
  - 1x, with two chip selects
- GPIO
  - 10x, from processor
  - 9x, from I/O expander
- Reset signals
  - Carrier board reset output
  - System reset input
- LED
  - Status: board status
  - Ethernet: link, activity
  - CPCI hot-plug

Supervision and Control

- Board management controller
- Watchdog timer
- Temperature measurement
- Real-time clock with supercapacitor backup

Backplane Standard

- Compliance with CompactPCI Serial PICMG CPCI-S.0 Specification
- System slot

Electrical Specifications

- Supply voltage
  - +12 V (-5%/+5%)

Mechanical Specifications

- Dimensions
  - 3U, 4 HP

Environmental Specifications

- Temperature range (operation)
  - -40°C to +85°C (qualified components), compliant with EN 50155:2007, class TX
- Temperature range (storage): -50°C to +85°C, compliant with EN 60068-2-1 - Ab, EN 60068-2-2 - Bb
- Cooling concept
  - Depending on heat sink design
  - Air-cooled, airflow 1.5 m/s min.
  - Fanless operation, natural convection (on request, with special heat sink)
- Humidity: EN 50155:2007 (+25/+55 °C, 90-100 %)
- Shock: EN61373:2010
  - Location: Vehicle body (Cat. 1; Class B)
- Vibration: EN61373: 2010
  - Location: Vehicle body (Cat. 1; Class B)

Reliability

- MTBF: 548 000 h @ 40°C according to IEC/TR 62380 (RDF 2000) (model 02G040A00)

Safety

- Electrical Safety
  - EN 50155:2007
  - EN 50153:2014
  - EN 50124-1:2001 + A1:2003 + A2:2005
- Fire Protection
  - EN 45545-2, hazard level HL3

EMC

- Radiated Emission
  - EN 50121-3-2:2015
- Conducted Emission
  - EN 50121-3-2:2015
- Immunity
  - EN 50121-3-2:2015

BIOS

- U-Boot Universal Boot Loader

Software Support

- Linux

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www.men.de/products/g40a/

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