GateMate™ FPGA

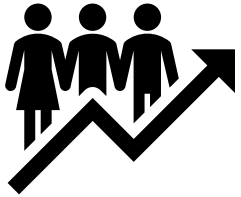
Overview – Applications – Sales

Agenda

Cologne Chip

GateMate FPGA

Fields of Application



Competition and Sales

Cologne Chip AG

Company overview

Cologne Chip AG – Overview

- Innovative technology company based in the heart of Cologne
- Development at the headquarter, production in cooperation with
  - SHARP
  - SAMSUNG
  - Vanguard (TSMC)
  - Global Foundries
- Excellent delivery times and long product lifetime
- Direct support from our own engineering team
- Over 25 years of quality „Made in Germany“

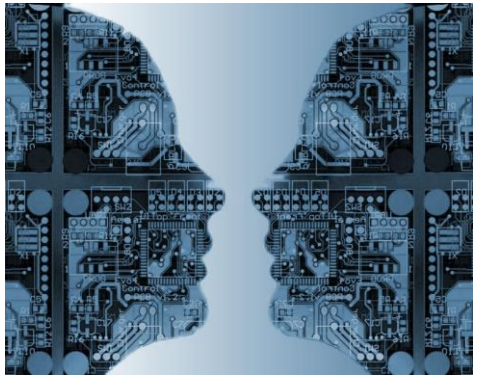
Our factors of success

Cost-efficient quality products

Highest efficiency at lowest cost due to new architecture of FPGAs

Continuous availability

Secure supply and planning due to continuous availability of our products



Individual support

Extensive customer support in all aspects of the design-in process

GateMate™ FPGA

The most important features

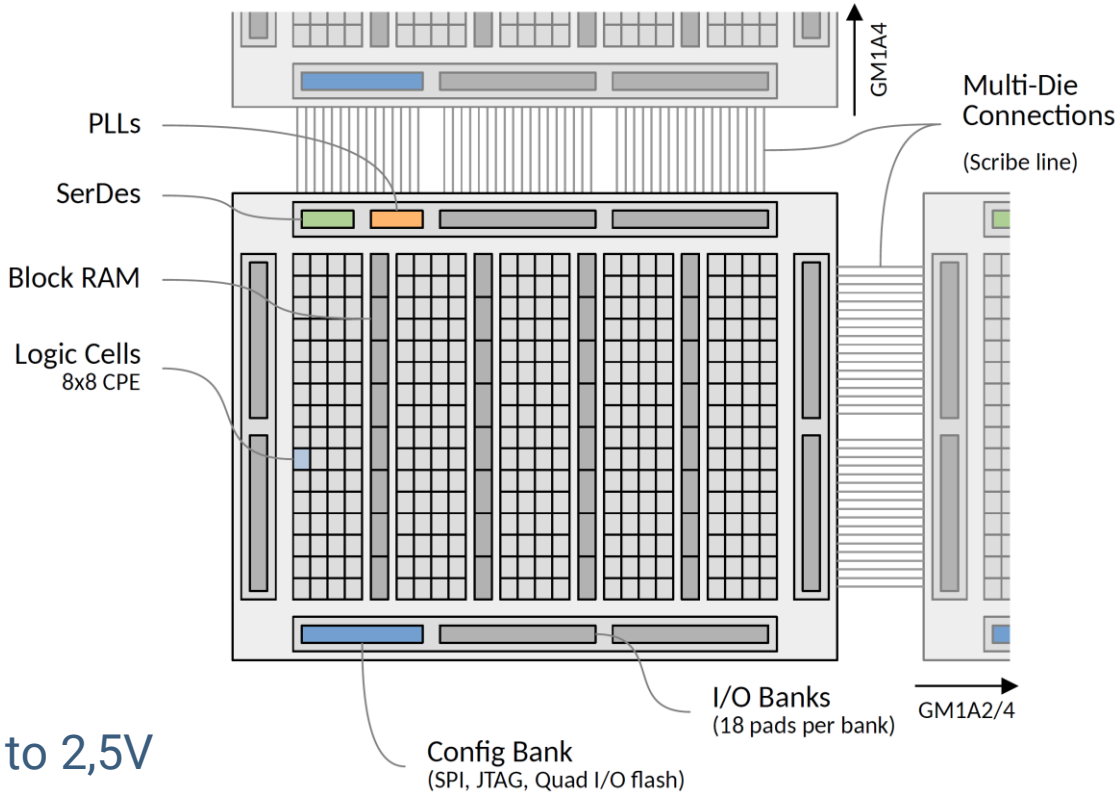
GateMate™ FPGA

It is an ASIC, but…

ASIC		FPGA
• Fixed circuitry for product‘s lifespan		• Reconfigurable cirtuitry after manufacturing
• High performance, low power consumption		• Low performance, higher power consumption
• High functional density		• Typically larger than ASICs
• Accurate validation required		• Comfortable prototyping

GateMate™ FPGA

- Globalfoundries™ 28 nm SLP process
- 20.480 programmable elements per FPGA-die
  - 8 inputs or 2x4 independent inputs + 2 flip-flops
  - 1- or 2-bit full adder or 2x2-bit multiplier
- 32 40KBit RAM cells (Total 1.280 Kbit)
- 4 Clock Generators (PLLs)
- 2,5 Gb/s SerDes Controller
- Core voltage from 0,9V to 1,1V, I/O voltage from 1,2V to 2,5V
- All 162 GPIO configurabe as single-ended or LVDS differential pairs with DDR-support
- A1, A2, A4: 324-ball FBGA package (15x15 mm, 0,8 mm pitch)



GateMate™ FPGA

Cologne Chip

Feature summary by device

Device	Size	CPEs	FFs	Block RAM		PLLs	SerDes	GPIO		Package
				20K	40K			Single-ended	Diff. Pairs (LVDS)	
CCGM1A1	1	20,480	40,960	64	32	4	1	162	81	324 FBGA 15x15 mm
CCGM1A2	2	40,960	81,920	128	64	8	2	162	81	324 FBGA 15x15 mm
CCGM1A4	4	81,920	163,840	256	128	16	4	154	77	324 FBGA 15x15 mm
...										
CCGM1A25	25	512,000	1,240,000	1600	800	100	25	tba	tba	tba

Cologne Programmable Element

Combinatorical

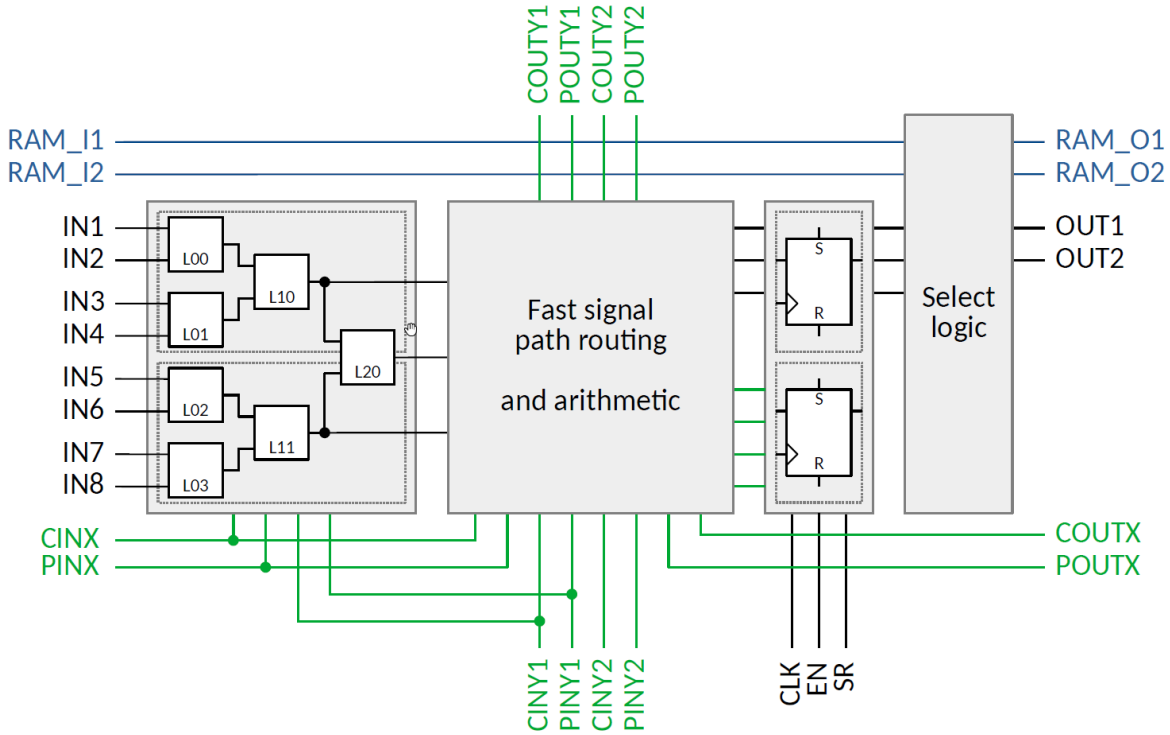
- 8-input function with LUT2-tree
- 2 independent 4-input functions
- 6 inputs for MUX-4 function

Arithmetic

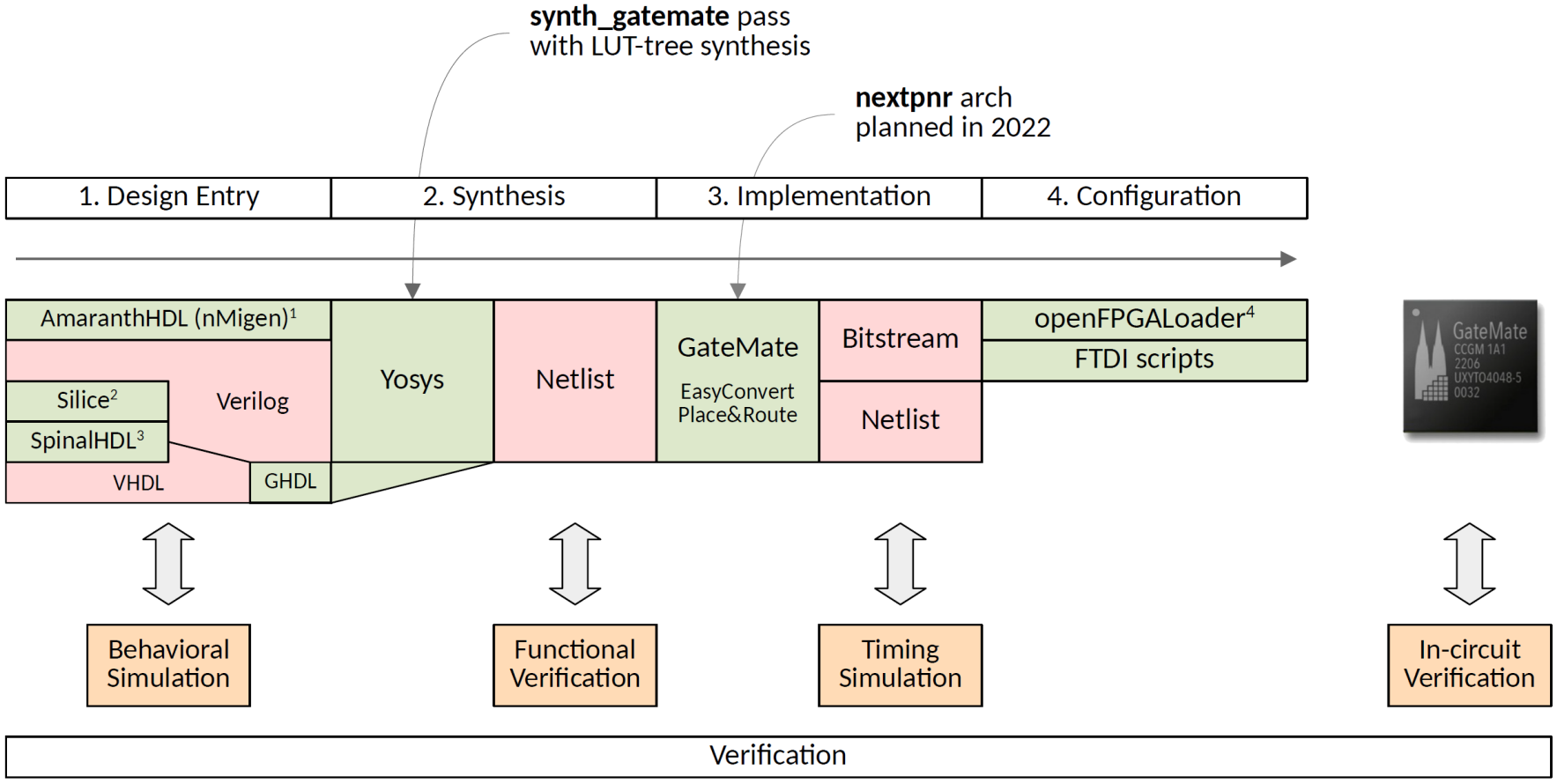
- 1-bit or 2-bit full adder, horizontal or vertical
- 2x2-bit multiplier, expandable to any size

Sequential

- 2 Flip-flops or latches
- 8+3 inputs for MUX-8 function



FPGA Design Flow

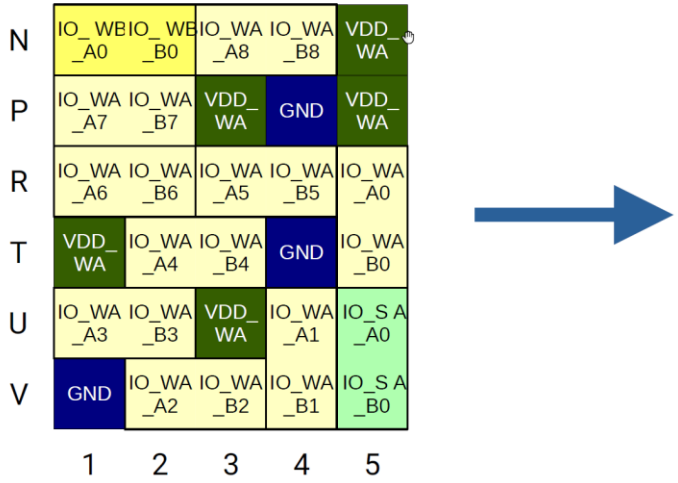


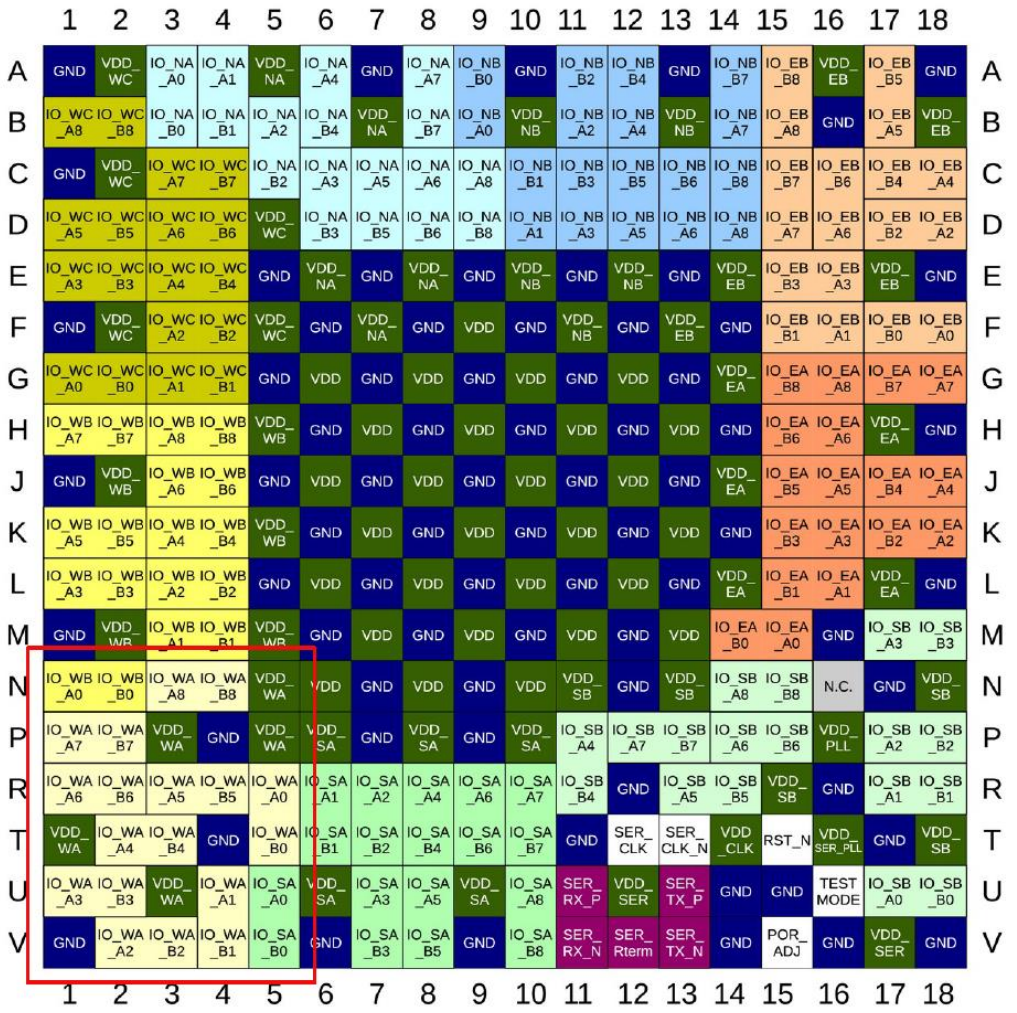
[1] https://github.com/nmigen/nmigen
[2] https://github.com/sylefeb/Silice
[3] https://github.com/SpinalHDL/SpinalHDL
[4] https://github.com/trabucayre/openFPGALoader

324-BGA Pinout

CCGM1A1

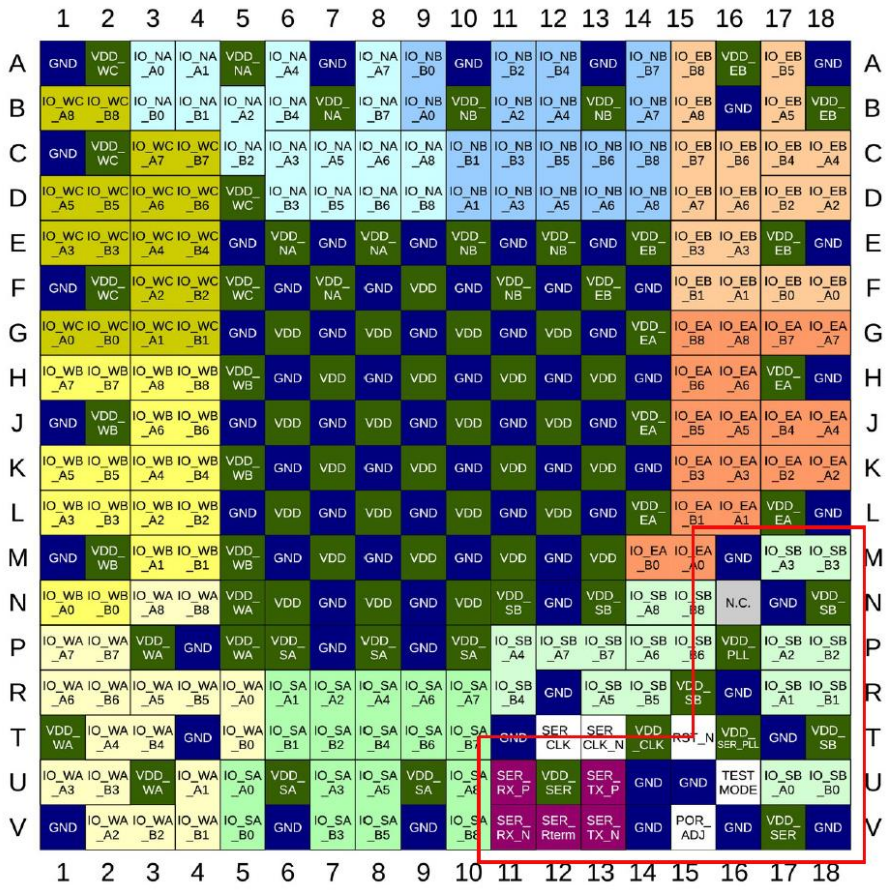
- 0.8 mm Pitch
- Only 2 signal layers required
- Altium + KiCAD footprints available
- Configuration bank switchable to GPIO



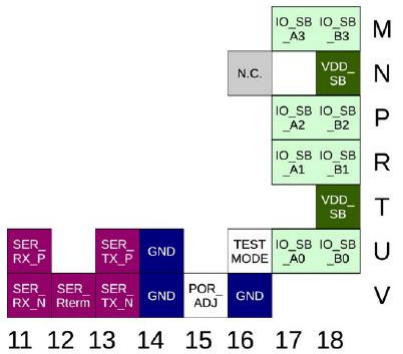


324-BGA Pinout

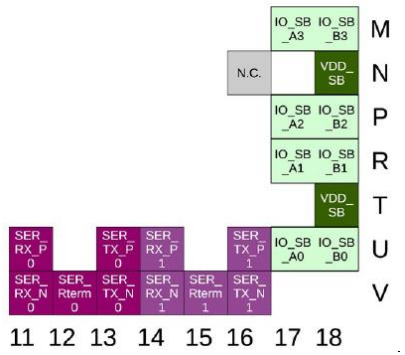
Pin compatibility



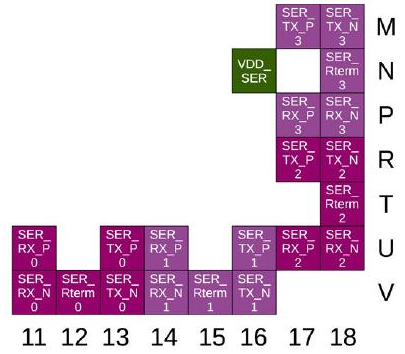
A1



A2



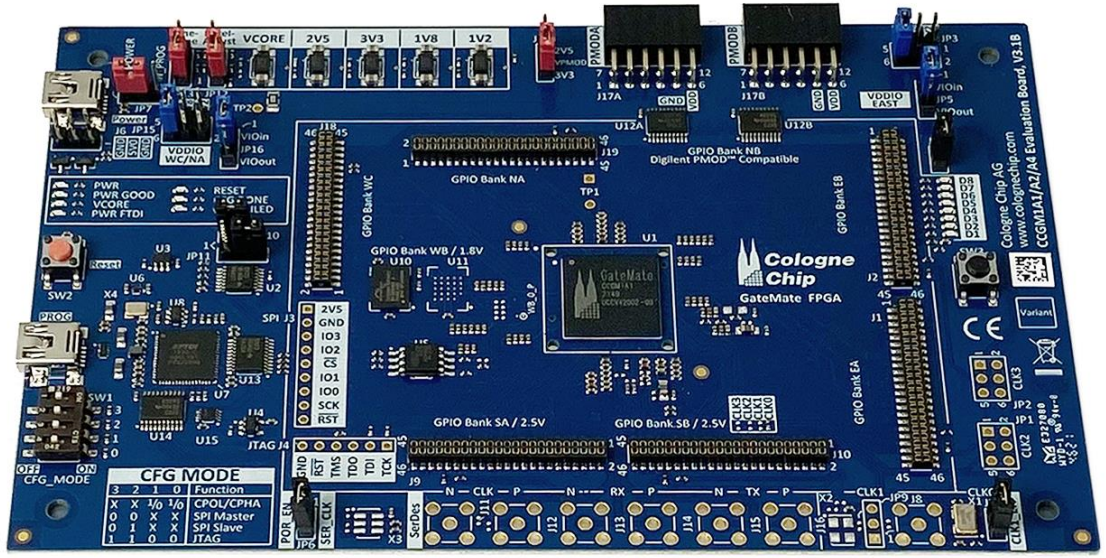
A4



GateMate™ Evaluation Board

Interfaces

- Six I/O banks + access to SPI/JTAG signals
- Two standard 12-pin Pmod™ connectors
- One high-speed 2.5 Gb/s SerDes connector
- Access to all clock inputs
- Configuration via flash or on-board USB to SPI/JTAG bridge



Memory

- 64 Mbit Quad-I/O SPI flash
- Up to two HyperBus modules (HyperRAM / HyperFlash)

Power

- User-selectable core and I/O voltages

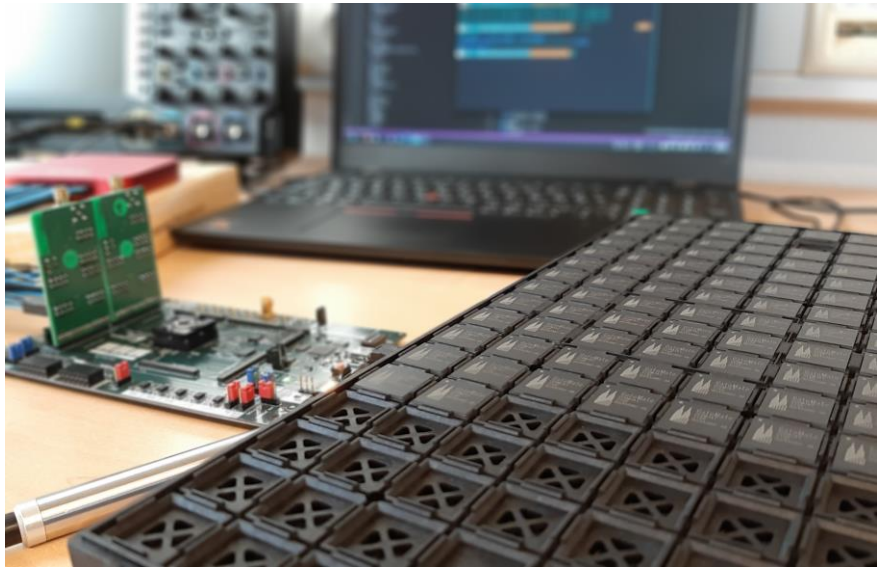
Fields of Application

for GateMate™ FPGA

Fields of application for GateMate™ FPGA

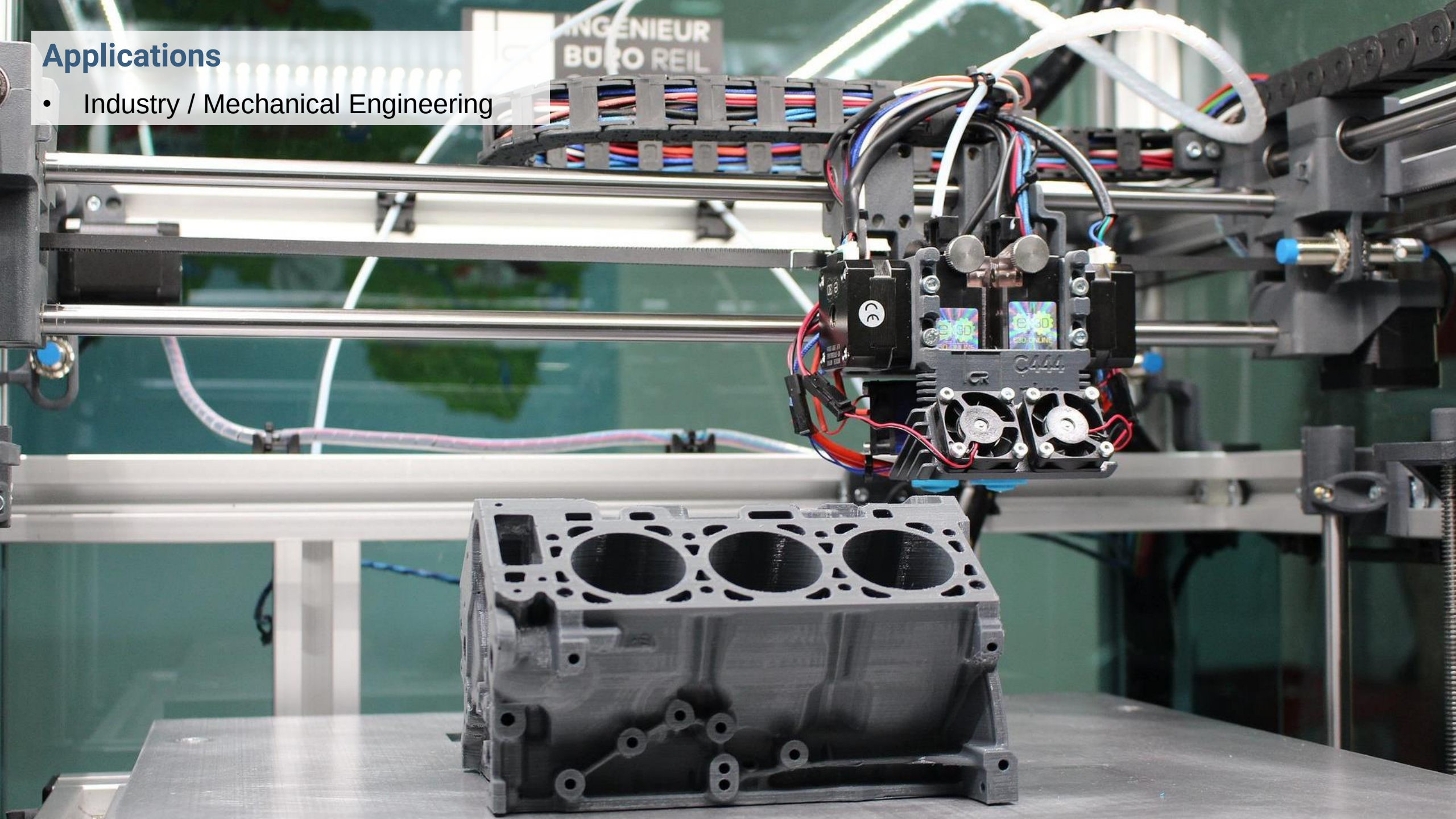
Possible areas of application

- Small to medium sized FPGAs
- Low-power FPGAs in mass-markets
- Discontinued FPGAs (e.g. Xilinx Spartan 3)
- Typical FPGAs that can be replaced
  - Xilinx: small Spartan series e.g. Spartan 6/7
  - Cyclone II, IV or V



Applications

- Industry / Mechanical Engineering



Applications

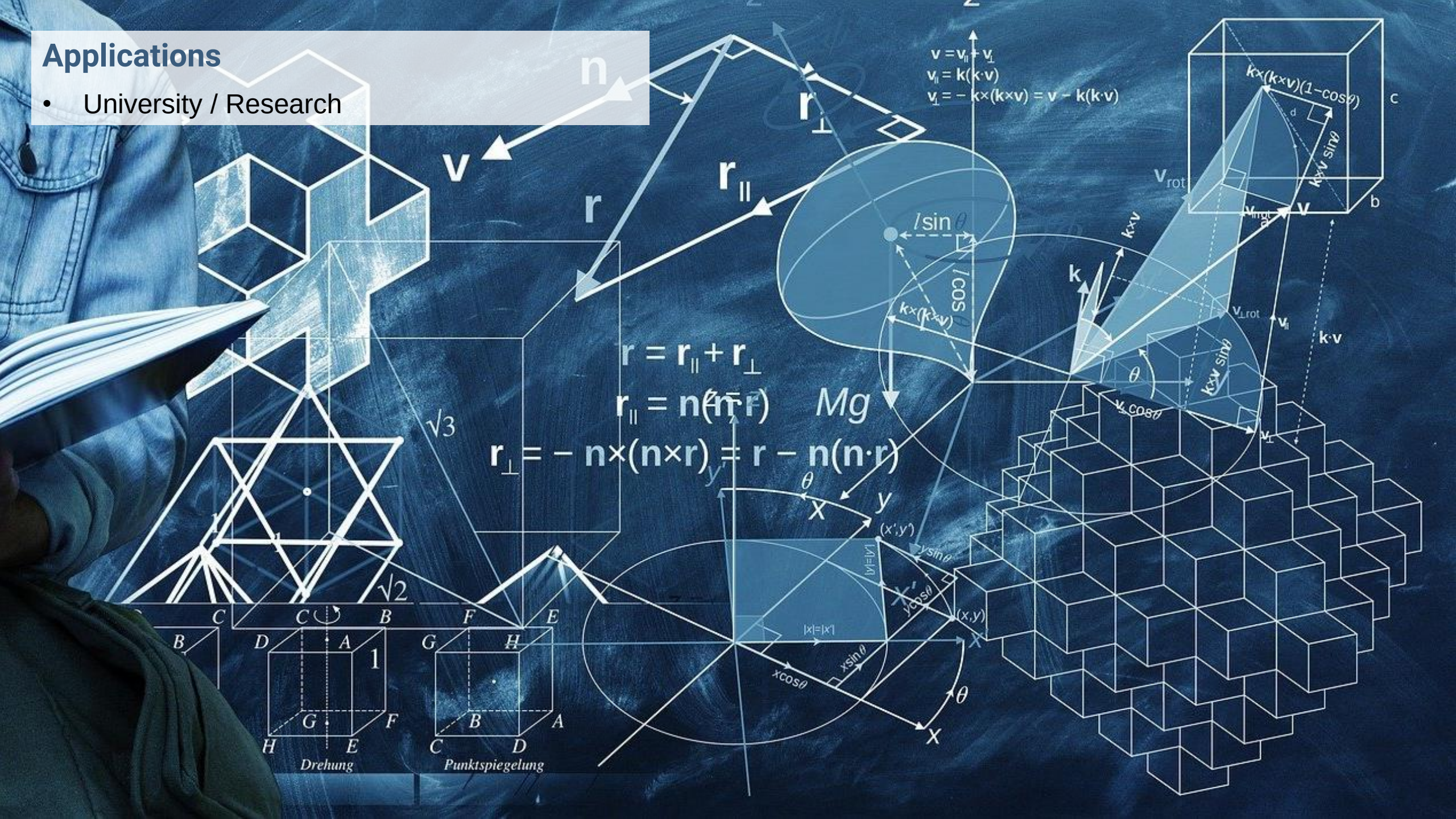
- Telecommunication / Networking technology

Applications

- Sensors and control technology

Applications

- University / Research



The smart semiconductor company

Quality and Service „Made in Germany“

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