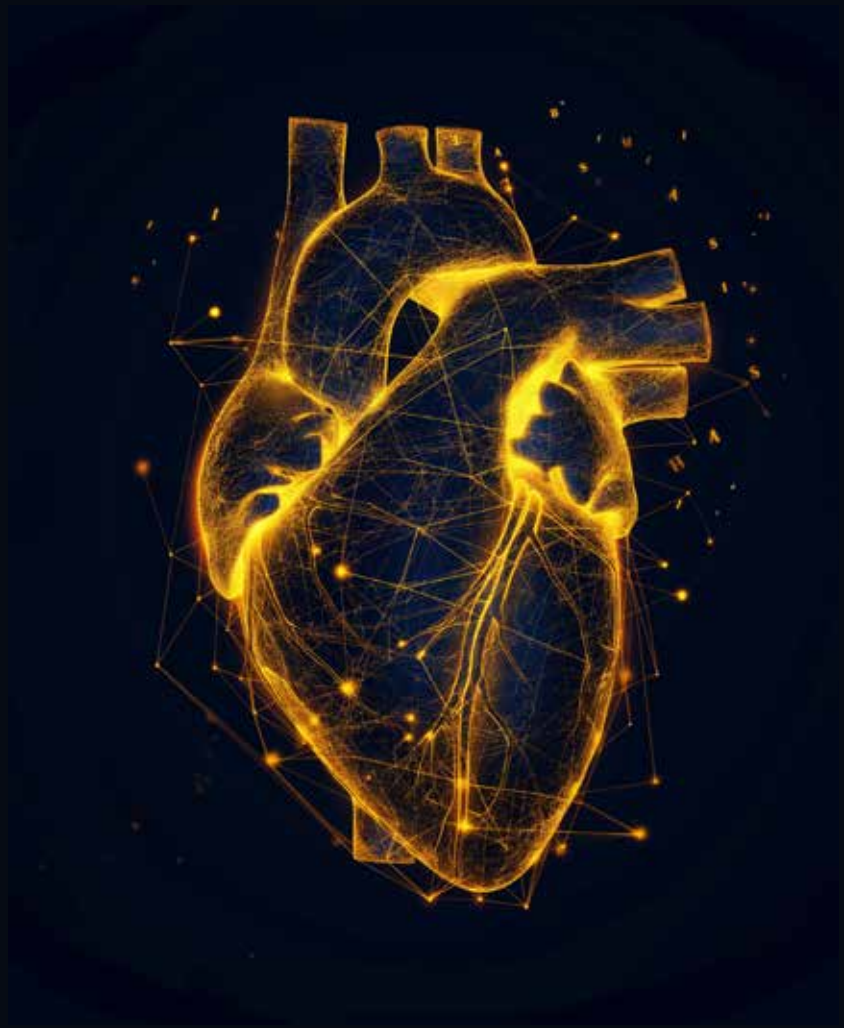
CUSTOMIZED
EMBEDDED VISION

DEVELOPMENT. PRODUCTION. LIFECYCLE.

defence
medical
industrial
automation
robotics
avionics

hema
electronic

THE HEART OF EMBEDDED VISION



hema electronic is a leading company in electronics design, specialized on embedded hardware and software solutions based on FPGA and embedded processors.

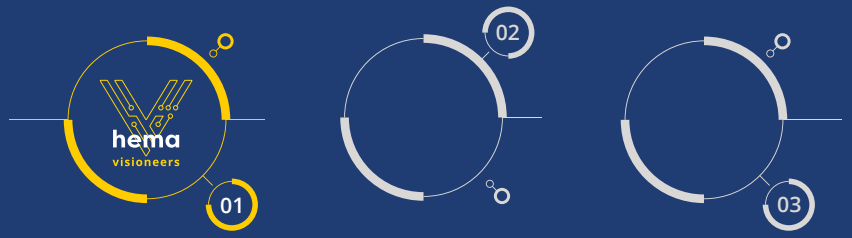
The customized vision and sensor boards that we develop and produce for our customers are the heart of next generation video, control and feedback systems, deployed by innovative leaders and proven in numerous industrial, defence and medical applications.

Our clients rely on our consistent services starting with consulting, design and verification up to long-term availability and support over the complete product life cycle. All this empowers these companies to achieve and to keep their unique market position.

hema electronic is a family owned company with over 45 years of experience in electronics and related services. We combine the strength of the German Mittelstand with a strong future oriented strategy of technological leadership.

The hema mission: To make your vision sensor data available. Everywhere and anytime!

EMBEDDED VISION EXPERTS



Our customers and partners describe us as embedded vision experts. And yes, the description fits: Since we developed the first products for image processing over 30 years ago, hema electronic has made numerous innovations in embedded vision electronics a series success. Customers such as Hensoldt, Bosch and Daimler use our solutions worldwide, the readers of ELEKTRONIK magazine voted our embedded vision platform „Product of the Year“ and AMD named us AMD Adaptive Computing Partner Premier, as one of only five companies from Germany and as one of the few developers of mainboards for the AMD Kria platform at the highest partnership level.

Today we proudly say: We are embedded vision experts. And by that we mean: Your experts for embedded vision. Because we bring our knowledge and expertise to your projects – as part of your team and working together as equals.

In which area are you an expert? Together we will empower you to be the global market leader of tomorrow.

AMD Adaptive Computing Partner PREMIER

ONE-STOP SOLUTION

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Development – Production – Lifecycle: All of our departments work under one roof at our site in Aalen. This ensures short distances and flexibility, close co-operation and direct coordination between the parties involved. At the same time, we also involve you directly in these processes: With state-of-the-art project management from concept to prototype to series production. Our customer portal gives you an insight into the current status of your projects at all times, informing you of milestones reached, the next steps and any action required. All important information is displayed here for you and supplements the direct exchange between development, production and the test field.

If you do have any questions, a dedicated contact person is available to you – throughout the entire life cycle of your product. This is because hema's One-Stop Solution includes comprehensive services, from support with hardware and software development to active obsolescence management.

HEMA PLATFORM

Our services are geared towards highly complex projects, and towards making them a success in the shortest possible time. Our hema embedded vision platform and the Fastlane Boardservice form the basis for this: In our configurator or during a workshop, you define the required specification for your electronics and select one or more System on Modules, e.g. from the AMD Kria series, for the computing power. We support you with our expertise, develop the circuit diagram and layout and produce your first prototype, ideally within 30 days.

We use the hema Design Library with over 45 predefined building blocks. This means you benefit from series-proven circuits and fewer design risks. We also integrate customised circuits and produce your electronics directly on the same lines as the subsequent series production.

„Fastlane“ means that all processes are optimised for prototype production, from layout and design to purchasing and warehousing through to flexible assembly and logistics.

The result of comprehensive preliminary work, the modular principle and Fastlane production: you receive your prototype at the earliest possible time, achieving series production readiness and market success more quickly.

LEVEL 1 - Hardware

The hardware ensures the connection of sensors and signals to the system. Interfaces, power supply and processor technology are combined here and provide the basis for intelligent latency-reduced video processing.

Example: Video inputs for analog and digital signals lead the video channels to the FPGA. There they are processed by the software and then transferred to the appropriate users.

LEVEL 2 - Software and IP

To be able to recognize situations, a large amount of data must be evaluated and compared. The sensor data passes through a variety of image processing software packages (superimposition, compression) to prepare the captured scenes.

Example: Sensor fusion of lidar, TOF and day vision cameras for the detection of persons and objects. The images are processed, superimposed and receive graphic overlays.

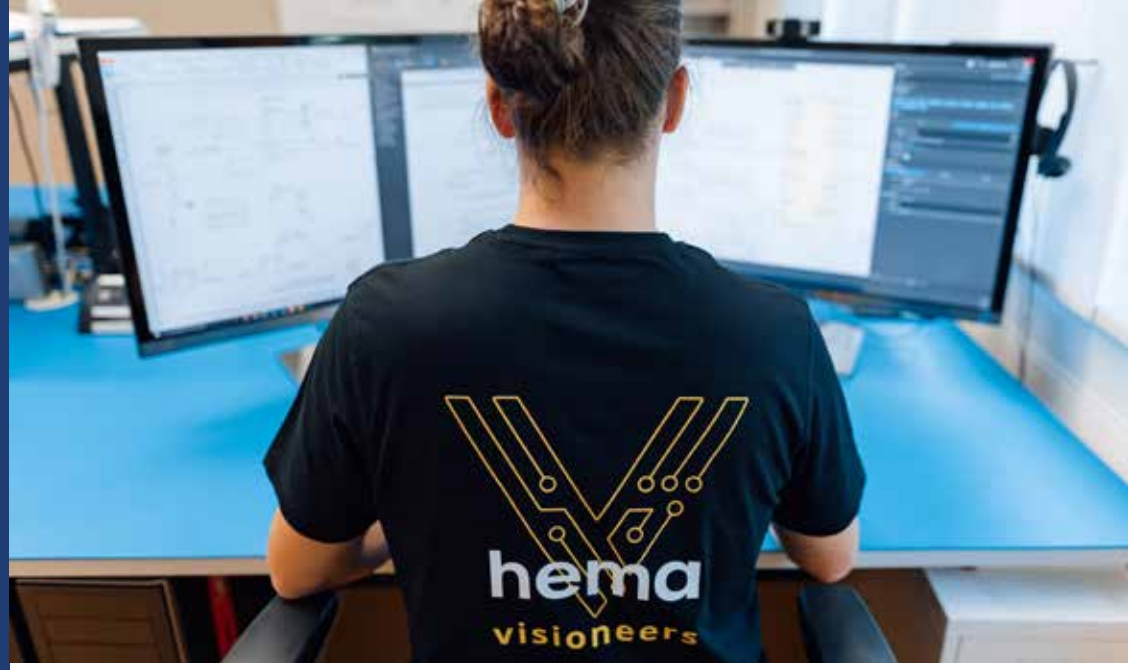
LEVEL 3 - Software and Application

The customer application is the face of the system. The user or the automatic system interacts with it. He or she receives the information generated by the system from the large amount of data and can act according to the situation and task.

Example: Recognition of persons and objects, transmission of coordinates and information, and subsequent classification into categories that trigger appropriate actions.

hema visioneers

YOUR EMBEDDED VISION EXPERTS



Hardware-, Software- and FPGA-Development for high end customer specific vision applications and systems

Interfaces for:
- Analog video (PAL, NTSC)
- Digital video (SDI, MIPI, CoaxPress, ...)
- CMOS sensor technology with HDR imaging up to 170 dB dynamic range
- VIS, IR, Thermal camera

Applications and Services:
- Intelligent video management unit
- Image acquisition, processing and transmission
- Rugged designs for mobile applications
- Hardware and software testing
- Long-term availability by system design
- In-house prototype manufacturing
- Obsolescence management

Video Processing:
- Video multiplexing up to 4K
- Format scaling, color conversion, flipping, rotating, warping, lens correction
- Sensor data fusion
- Image fusion
- Realtime graphic overlay
- Split screen
- Digital video recording
- Video + audio multiplexer
- Video streaming h.264 and h.265
- Low latency video transmission/TSN

OBSOLESCENCE MANAGEMENT

Reactive OM

Action after an end-of-life message has been received.

(increased risk)

Measures

Identify in which assemblies the component is present and contact the customer with the following suggestions:

- Last time buy
- Long-term storage
- Form Fit Function (an alternative for a component part)
- Redesign
- Development of a sustainable new design

Proactive OM

Action before an end-of-life message is received.

(early warning, long scope for action)

Measures (1x per year)

- Availability check of all components incl. risk assessment of the components
- Lifecycle analysis of parts lists as early as the development phase
- Partnerships and contracts with manufacturers and suppliers
- Electronic monitoring of key components
- Regular coordination with customers

+ Reactive OM

Strategic OM

Long-term strategy: Regular forecasting and cost analyses over the entire product life cycle; as early as the development phase.

(anticipatory action)

Measures (1x per year)

- Checking the current replenishment times
- Second source strategy (multiple suppliers from the same manufacturer and/or alternative components from other manufacturers)
- Inventory management (active monitoring of key components at the suppliers)

+ Reactive OM
+ Proactive OM

DEFENCE

Solution	Mainboard with digital and analog video interfaces. High performance FPGA video processing unit, interchangeable modules.
Customer benefit	Long-term availability (30+ years) with options for additional demands in the future, FPGA modules with integrated software, interconnection with other industrial components.
Core expertise used	Hardware and software design, video management, optronics, prototyping, PCB assembly,
Application	Integrated video management system, control unit for various sensors and cameras, mobile platforms
Sector	Defence and Security
Requirements	Integration and combination of multiple camera systems. Main unit with scalable performance in hardware and software. Video management IP, real-time imaging and processing.

MEDICAL IMAGING

Solution	Mainboard with digital video interfaces. High performance FPGA video processing unit, interchangeable modules.
Customer benefit	Long-term availability (30+ years), modular futureproof design, FPGA modules with integrated software, interconnection with other industrial components.
Core expertise used	Hardware and software design, video management, prototyping, PCB assembly
Application	Integrated video management system, control unit for multiple sensors and cameras.
Sector	Medical imaging, Endoscopy
Requirements	Integration and combination of multiple camera systems. Main unit with scalable performance in hardware and software. Video management, real-time imaging and processing.

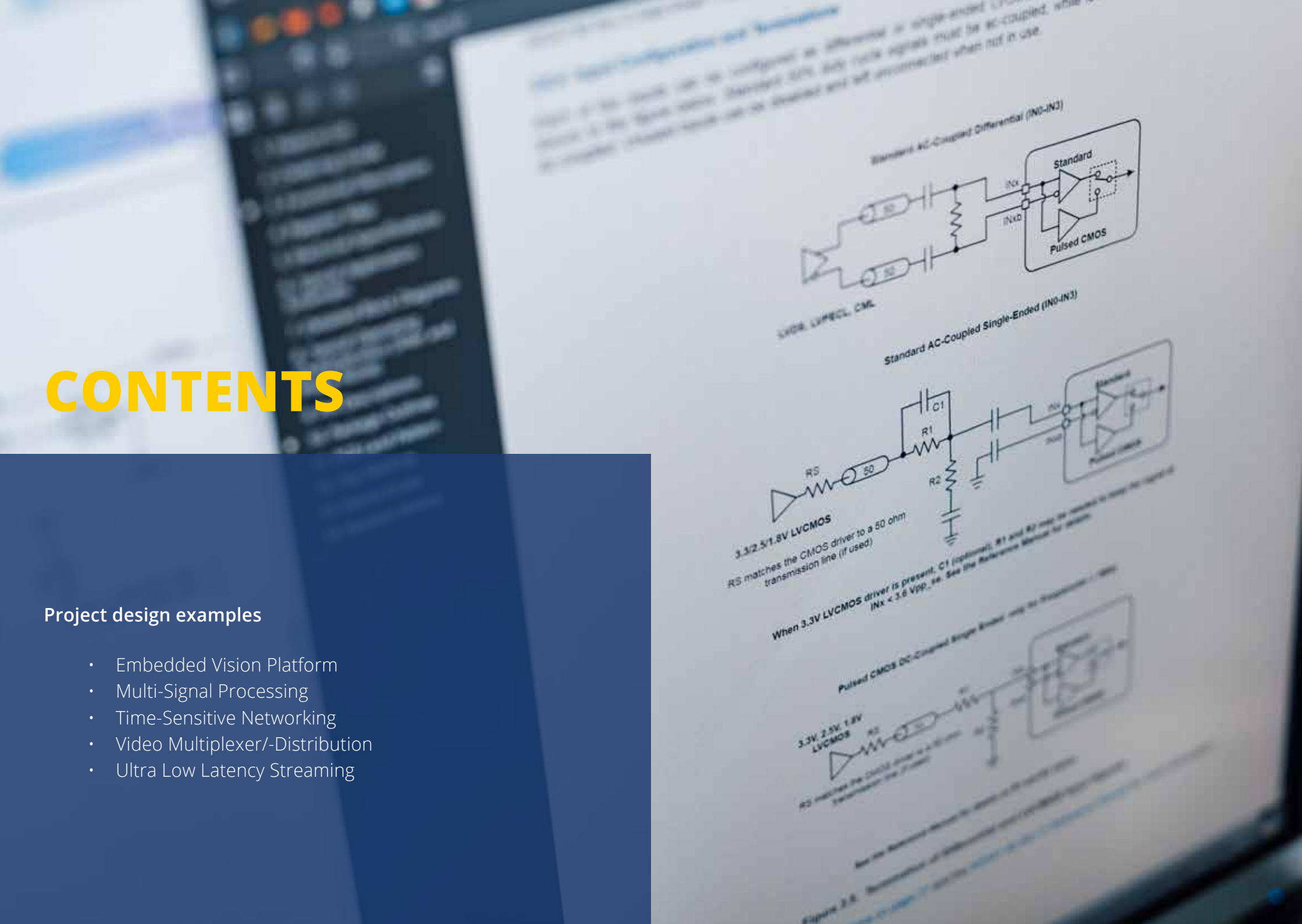
INDUSTRY

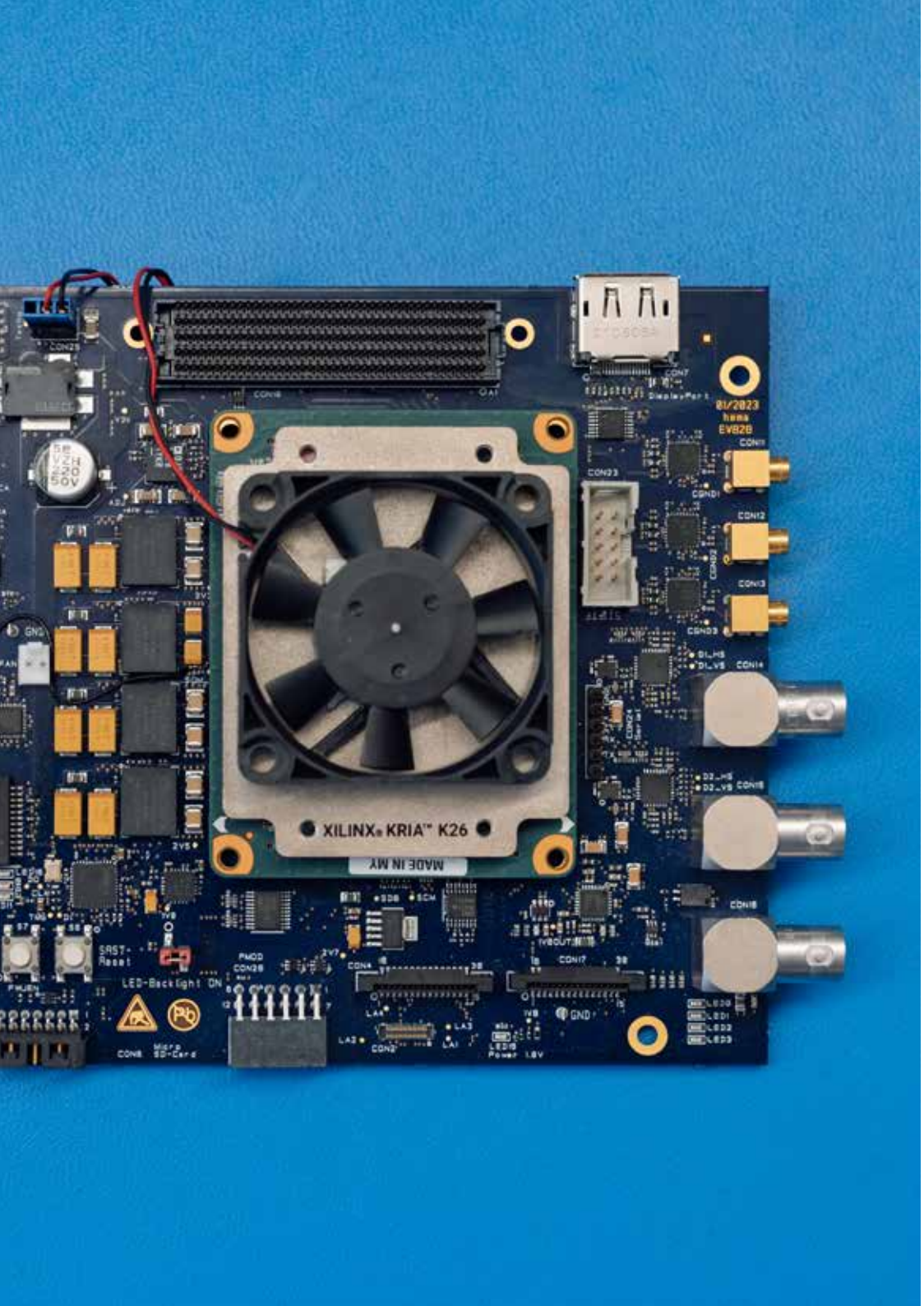
Solution	Mainboard with digital video interfaces. High efficient FPGA video processing unit, interchangeable modules.
Customer benefit	Long-term availability (30+ years), modular futureproof design, FPGA modules with integrated software, interconnection with other industrial components, low power mobile solution.
Core expertise used	Hardware and software design, video management, prototyping, PCB assembly
Application	Integrated video management system, control unit for multiple sensors and cameras
Sector	Industrial imaging, Automation, Robotics
Requirements	Integration and combination of multiple camera systems. Main unit with scalable performance in hardware and software. Video management, real-time imaging and processing.

CONTENTS

Project design examples

- Embedded Vision Platform
- Multi-Signal Processing
- Time-Sensitive Networking
- Video Multiplexer/-Distribution
- Ultra Low Latency Streaming





EMBEDDED VISION PLATFORM

Application

- Creating product families with optimized features by modular design
- Image processing components, optical measuring systems, measurement technology, surveillance

Sector

- Defence, Medical imaging, Industry

Requirements

- Mainboards with scalable performance in hardware and software
- Optional interfaces, standard software, test and start up concept

Solutions

- Mainboard with FPGA module, design blocks library for for hard- & software

Customer benefit

- Long-term availability (30+ years) of mainboards with expansion options
- FPGA modules with integrated software
- High efficiency

Core expertise used

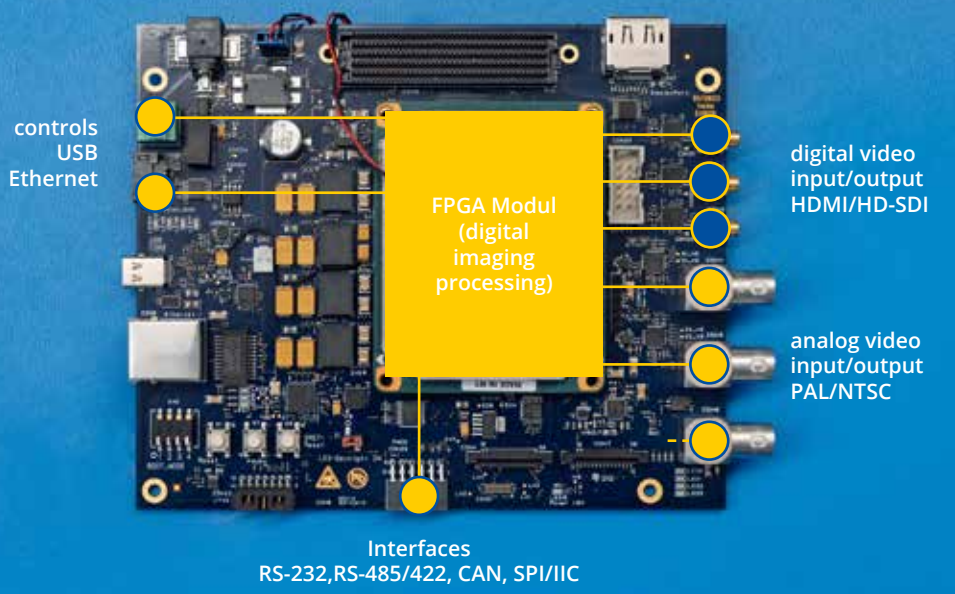
- Hardware and software design, partner network, inhouse production

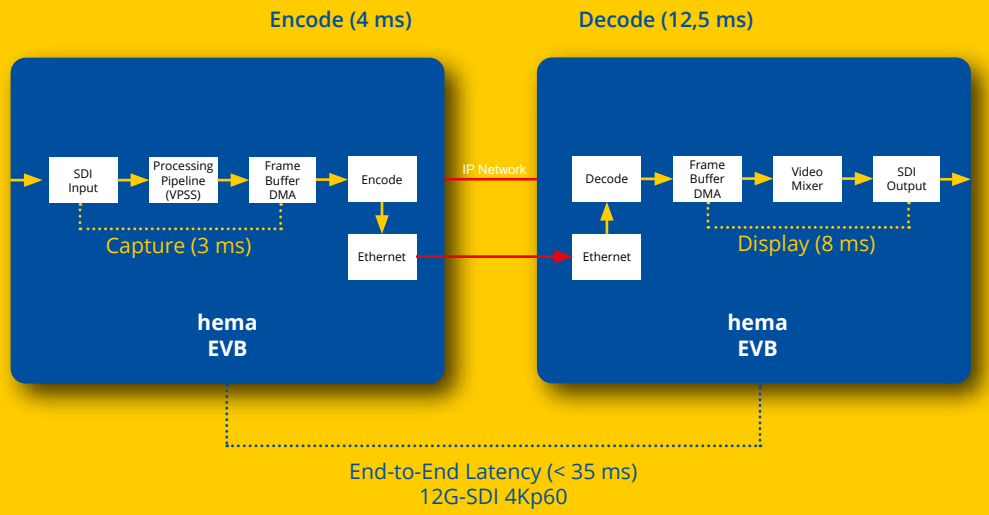
MULTI-SIGNAL PROCESSING

Application	Video and sensordata management
Sector	Indoor logistics, AGV, smart farming, mobile applications
Requirements	Manage 3x different video sensors (SDI, MIPI, IR) plus radar and identification sensors, FPGA for AI application, output for driver and remote operation, power sensitive
Solution	Mainboard with FPGA SoM, BSP programming for customer application and AI IP Cores.
Customer benefit	Fast prototyping for design and verification, modular platform for customization and long-term availability.
Core expertise used	Design experience in data management and FPGA hardware, embedded vision platform for fast prototyping, mainboard with SoMs for scalable solution.

TIME-SENSITIVE NETWORKING

Application	Deterministic and high quality video transmission over Ethernet
Sector	Defence and realtime industrial applications
Requirements	Network traffic with deterministic latencies and bandwidth to ensure the quality of service of time sensitive video transmission.
Solution	TSN Network IP from SoCe on hema FPGA Hardware platform
Customer benefit	Deterministic and high quality video service for communication over Ethernet
Core expertise used	Hardware and software design, embedded video experience, partner network





VIDEO-MULTIPLEXER/-DISTRIBUTION

Application	Technology upgrade for infrastructure installations e.g. video surveillance in public space in the railway technology sector
Sector	Defence, Security, Building, Automation, Transportation, Surveillance, Communication audio/video
Requirements	Distribution and multiplexing of analog and digital video channels in real-time, backward compatible, latest digital interfaces, use of new software features.
Solution	Embedded vision board with FPGA module and analog and digital (video-) interfaces, 8-channel video distribution.
Customer benefit	Existing analog (PAL/NTSC) infrastructure can be retained, upgrading existing systems with new functionalities, state of the art FPGA solution, modular and scalable in performance and functions, fast implementation through predefined design blocks.
Core expertise used	FPGA programming, IP cores, Hardware platform

ULTRA LOW LATENCY STREAMING

Application	Vehicle control, machine control, video surveillance, real-time video conferencing
Sector	Defence, Security, Industrial automation
Requirements	Ultra low latency applications (from capture to display in less than 35 msec) multi-streaming, multi-view, video distribution
Solution	Mainboard with FPGA modules, h.264/h.265 compressing, 3G-SDI 1080p60, 12G-SDI 4Kp60, SDI capture + output, OSD
Customer benefit	Fast development by using predefined hardware and software. Design blocks for very short time to market, easy to upgrade.
Core expertise used	Hardware and software design, rapid prototyping and production by using inhouse facility

hema electronic GmbH
Röntgenstraße 31
73431 Aalen
Germany

Phone: +49 7361 9495-0

E-Mail: info@hema.de
Web: www.hema.de