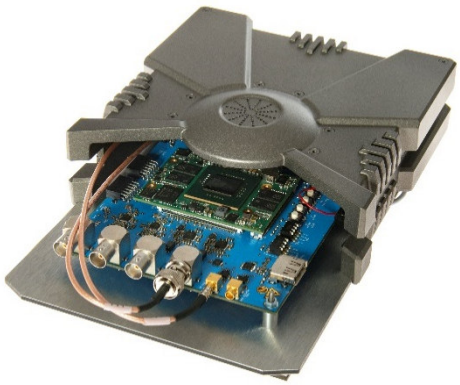
Everything in view: Rapid development of optronic systems

Alternatively: Everything in view: Rapid electronics development for systems for video data processing



Embedded vision board with video processing unit and robust housing: made for use in rough working environments

Surveillance vehicles, drones or target systems use data from numerous sensors - from daylight and thermal imaging cameras for all-round vision to radar and LIDAR systems and time-of-flight. Special electronics ensure that the relevant images and data are available to all users at all times, often even with overlaid information on a single screen. This sets high demands on development. The embedded vision platform from hema electronic in Aalen saves time and cost: With their modular system, individual electronics for pre-processing and distribution of video data can be realized in only six weeks - production-ready, reliable and made for applications in defence and security technology.

Proven in military technology

In general, the design platform is suitable for numerous applications involving image processing. The company recently implemented an optronic system similar to the exemplary video matrix presented here. Development from when the initial order was placed to completion of the prototype took only six weeks, thus significantly shortening the time required for the overall solution to be ready for series production. Manufacturers of surveillance solutions, situational awareness systems and other stationary or mobile image processing applications are therefore able to more quickly integrate the rapid technological advances in sensor technology and digitization into their products. The modular design and scalable computing power with seamless upgradeability also help in withstanding the increasing pressure to innovate and the ever shortening development cycles in the armaments and defence industry.

User-configurable hardware

The design platform is based on over 45 building blocks for interfaces and functionality, from which hardware can be freely configured. Developers only need to select the required interfaces from the hema library. Standard interfaces such as Ethernet, USB, CAN and Wi-Fi/Bluetooth are available as well as the usual video interfaces. For the video matrix described in this example, 16 camera inputs with different video sources were used, as well as Ethernet, USB, CAN and UART as communication interfaces. GPS, Bluetooth and mobile radio are wireless sensors installed on the mainboard, and media SD-Card 3.0, SATA and M.2 provide storage. Of course, the board format is also freely selectable, so the electronics can be adapted to existing housings. On request, hema also supplies complete solutions, including customized housings.

In hardware design, there are corresponding templates for the circuit diagram and layout of each of the building blocks. The advantage for the customer is that they receive customized electronics within a very short time and at manageable development costs. Contrary to development from scratch, we use circuits proven and suited for industrial use. Customer-specific circuits and functions not yet available in the hema library can be easily integrated. Hardware development and production takes place under one roof at the company's offices in Aalen, Swabia. This ensures short distances, speed and flexibility in development, production and delivery.

Modules allow for upgrades and product variations
The computing power of the electronics is provided by System on Modules (SoM) with powerful ARM processors and FPGAs. All EMC-critical components around the processor are already integrated on the modules, which simplifies board development and thus contributes to lowering costs and shorter development times. Modules are available in different performance classes, and with different processor and memory expansion configurations. A standardized interface ensures compatibility and makes upgrades and product variations possible without costly board redesigns.

The FPGAs on the modules manage video data: They process data of the 16 HD-SDI inputs from sample electronics and distribute it to outputs. All functions are implemented with low latency times of less than 35ms. In addition, processors and FPGAs can be used to combine video streams into Dual and QuadView or Picture-in-Picture data, or to play out overlays via video outputs. If desired, the electronics can also supply finished video data, e.g. for panoramic views, which can be stitched together and straightened. For this pre-processing, the electronics include comprehensive software libraries and sample applications on which customers can base their own application development.

Fast implementation of individual optronic systems
Whether for surveillance tasks, for all-round vision of land and air vehicles, boats and drones or for target and defence systems: video processing units and other electronics for sensor data processing that are based on the hema embedded vision platform are suitable for use in numerous applications in defence and military technology. Within about six weeks, customers receive customized solutions with which they can quickly and easily develop, implement and test their own applications. Thanks to proven circuits and components suited for industrial use, hema's prototype is typically already very close to the final series hardware, so that series optimization and production start can also take place within a few weeks.

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About hema electronic

hema electronic GmbH – the embedded vision expert

hema is a leading development service provider in the electrical industry, providing hardware and software design for embedded vision boards and systems for applications in industrial automation, defence and security. From consulting and conception to design (FPGAs, DSPs, embedded processors), qualifications, rapid prototyping and small series production up to lifecycle management – hema offers everything from one source. hema supports their customers effectively in being the world market leaders of tomorrow.

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