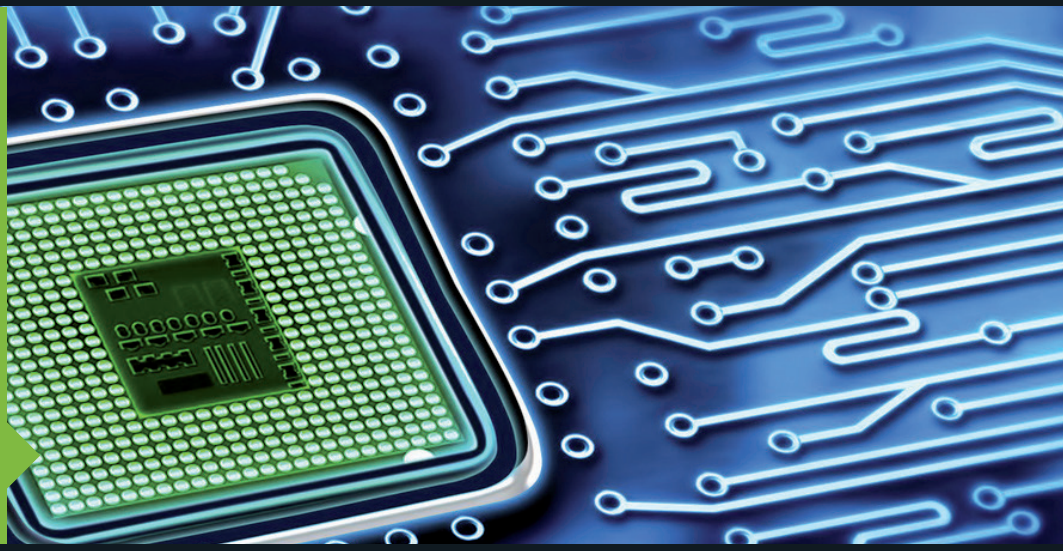
solectrix
high end electronics solutions

Design house for **embedded systems**



With a team of qualified and specialized engineers and technicians,

Solectrix considers itself an innovator and independent service provider in the development of high-end electronics solutions.

Solectrix stands for strong customer orientation, flexibility, expertise and many years of experience distinguish Solectrix during the realization of all projects.

Solectrix is active in the following markets:

- Camera systems
- Medical technology
- Industrial applications
- Measurement engineering
- Automotive
- Tele- and data communications

About us

By this Solectrix means systems and modules composed of the components electronics, software and mechanics, always taking into account the specific environmental conditions. On the electronics level, Solectrix delivers solutions in the field of highly integrated electronic and high-speed processor assemblies with complex user interfaces and programmable logic. The device-specific software component is handled with associated firmware and the connection to the respective operating systems.

Embedded electronic engineering puts forward a multitude of complex requirements that cannot be met with simple standards, but that require exclusive solutions of highest quality. That's exactly the point where we define ourselves:

Innovative thinking in
embedded electronic engineering
at the highest level.

+ www.solectrix.de

R&D Services

Our R&D services cover all steps
of the development process for these fields:

Cameras **FPGA** Hardware **Software** Systems

Embedding your interests

From simple drivers to complete systems: Solectrix offers a wide range of services, covering all phases in the development of embedded systems.

Consulting	Project Management	Qualification
Analysis	Rapid Prototyping	Production
Design	Verification	Lifecycle Management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Medical Handheld D
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Solectrix

Cameras

From the initial sensor readout to advanced image processing and video compression, we have mastered all steps of digital imaging.

Our camera experience includes the hardware design of the digital core for a variety of ARRI camera models built over the past 10 years, especially the ARRI ALEXA and the 6.5K camera ALEXA 65. We have also developed our original proCAM camera platform that serves as the basis for our sinaCAM 2D/3D remote head camera and the medCAM, a camera model for medical applications. Whether it's 3D, 4K, 3G-SDI, DNxHD or something previously unheard of – we're always ready for the latest challenge in the imaging field!

+ 3.5K camera platform for the modular ARRI ALEXA series
+ 6.5K camera platform for the exklusive ARRI ALEXA 65 camera
+ 4.5K camera platform for the latest ARRI ALEXA LF camera

ARRI ALEXA

ARRI ALEXA and its successors are the keystone of a modular and upgradeable camera system with exceptional image performance that is simple to operate, reliable in even the most extreme environments and versatile enough to cover a wide range of workflow and budget requirements.

ARRI ALEXA 65

Solectrix developed the digital core for the ARRI ALEXA 65, the world's first 65 mm digital camera.

ARRI ALEXA LF

The ARRI ALEXA LF is the culmination of over 10 years of close collaboration with the Munich-based camera manufacturer.

sinaCAM

+ 2D / 3D Remote Head Camera Systems

sinaCAM

sinaCAM is a new kind of “real 3D” HD camera system based on the proCAM platform and featuring remote camera heads. It was developed by Solectrix in collaboration with Anadicon Solutions for the professional film market.

medCAM

medCAM is a 2D/3D camera system for medical applications based on the proCAM platform and developed by Solectrix.

sinaCAM LT

The sinaCAM LT is a 2D offshoot of the original sinaCAM.

Codex Action CAM

Action CAM combines camera electronics from Solectrix with recording and workflow technologies from Codex in a compact camera and recording system.

FPGA

It's not just within the realm of image processing for camera electronics that our expertise utilizing FPGAs for high-speed interfaces and data processing comes in handy.

For example, our SXoM series System-on-Modules (SoM) provide complete systems based on SoC System-on-a-Chip (SoC) ICs that combine hard processors with FPGAs. The resulting systems offer a great number of interfaces, many of them implemented as FPGA IP cores – for example, the SXoM MS1-C5 has its FPGA's DDR3 SDRAM and QSPI Flash implemented with the help IP cores and many of its interfaces are realized via IP cores as well as I^2C, I^2S, UART, CAN, RS-232 and 24-bit display signals. And all this with plenty of logic elements left for your project's main application!

FPGA Design in VHDL

+ **Excellence at Demanding Applications**
  SoC, DSP, high-speed, hard real-time
+ **Tools**
  Mentor ModelSim, vendor tools, ALINT, MATLAB
+ **Solectrix IP and Technologies**
  Soft-core CPUs, Wishbone interconnect, fieldbuses (CAN, EtherCAT), motor control, sensor systems, SPI, UARTs, I²C, 1GbE and 10GbE MAC, DMA engines, DDR3, HD-SDI, GigE Vision, CoaXPress, Camera Link, SATA, FFT, DCT, Filters (1D, 2D), statistics, PCIe-based video stream server framework, image processing pipeline and compression, timestamp-based mechanism and modules
+ **Analysis**
  Hardware analyzing blocks for real-time adjustments, pattern recognition
+ **Streaming Server and Interfacing**
  Framebuffer with multi-port arbiter, storage and compression, HD-SDI, HiSPi, FPD-Link, CoaXPress, GigE Vision, PCI Express
+ **Unburdening the CPU**
  Control loops for color and compression adjustments, tone-curve calculations

Solectrix SXoM series: System-on-Modules with embedded FPGAs

+ SXoM MS1-C5 with Altera Cyclone V SoC, Cyclone V FPGA fabric
+ SXoM MS2-K7 with Xilinx Zynq Z-7035/7045 SoC, Kintex-7 FPGA fabric
+ SXoM-SF2 with Microsemi Smartfusion 2 M2S050 SoC, Flash-based Microsemi FPGA fabric

+ www.fpga.sx

Software

Our projects often require turnkey embedded software solutions, for example for handheld medical devices.

This covers BIOS, bootloader customizations, board support packages, firmware for microcontrollers, customer-specific application software and software tools for use during the verification and certification of the device. For another project we developed a PC application for remote control of a medical lab device.

Firmware Development for Microprocessors

Atmel, NXP, STM, Texas Instruments, Renesas, soft-core CPUs ...

BIOS, Bootloader and BSP Development

Linux, Android, VxWorks, QNX, Windows 7/10, eCos, EUROS, MQX ...

Customer-Specific Application Software

GUIs, secure communications, inter-processor communications, process control ...

Software for Production, Maintenance and Service

ISP, update management, board and system level tests

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Hardware

From a circuit diagram to a fully realized PCB: Solectrix offers all services related to hardware design.

Depending on your needs we can take care of design, layout, verification, and even small series in-house production. We've worked on everything from simple I/O adapter boards to powerful control units for complex modular industrial systems, implementing state-of-the art processors and microcontrollers (ARM, Cortex, PowerPC).

Today's demands for high-speed I/O mean that signal integrity cannot be taken for granted. Profit from our experience with high-speed memory interfaces (DDR3, DDR4...), high-speed I/O like PCI Express 3.x (up to 8 Gbit/s per lane) and SerDes design at up to 12.5 Gbit/s. We use tools like Mentor Graphics HyperLynx to simulate complex multi-board systems and ensure signal integrity.

State-of-the-art processor and microcontroller systems

ARM, Cortex, PowerPC, 8...32-bit microcontrollers, x86 module integration

Technologies

SATA Rev. 3.x, DDR4, NAND storage, 10GbE, VMEbus, Firewire, CAN, USB, MOST, Profibus

Analog Design

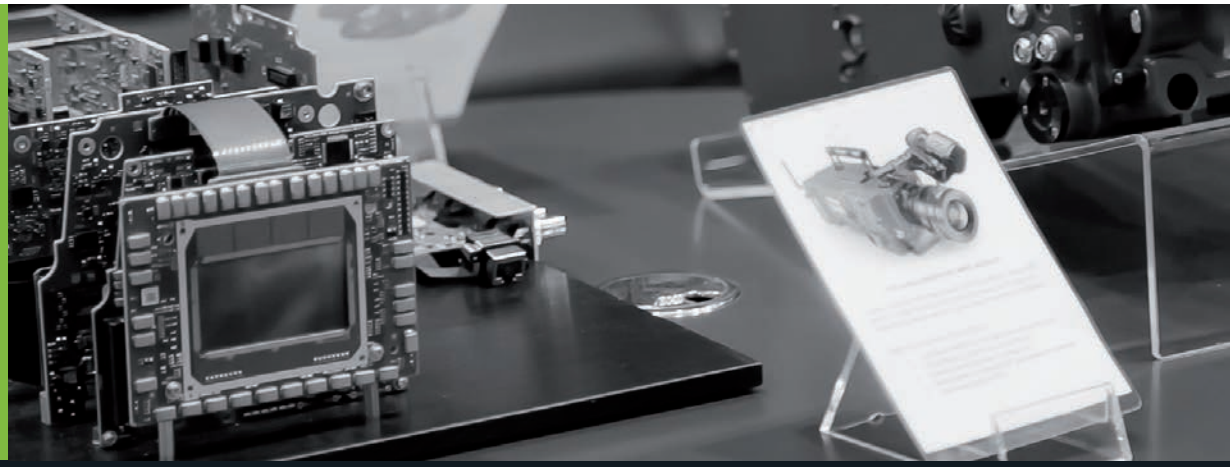
ADC, DAC, power supplies, signal conditioning, EMC and EMI protection, signal integrity

Measurement Equipment

High-speed oscilloscope, spectrum and protocol analyzer, HF antennas, meters, temperature chamber

Tools

Mentor DxDesigner, PADS, Expedition, HyperLynx; Cadence OrCAD; Altium Designer; CadSoft Eagle



Systems

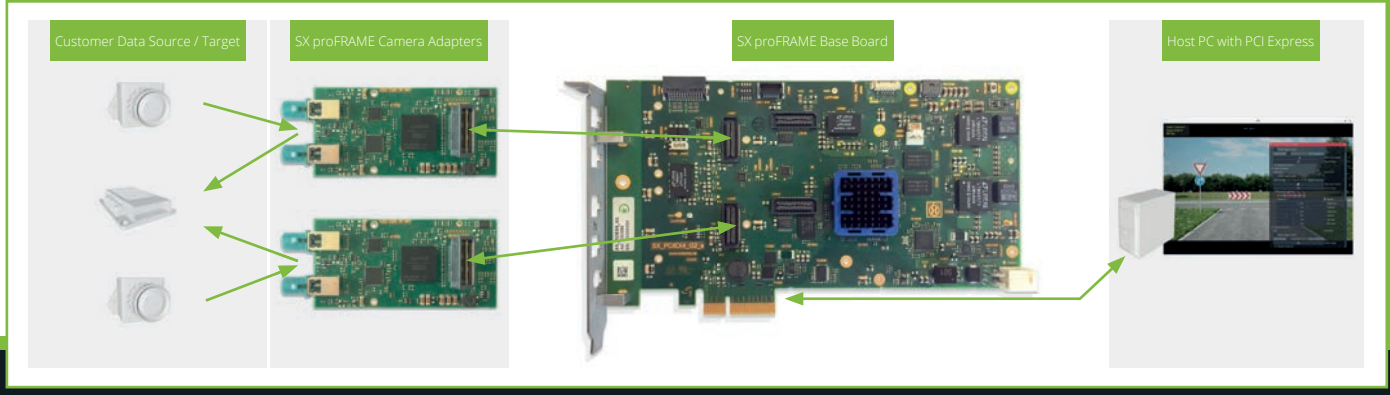
Our R&D services cover the development of everything from small building blocks like drivers to complete turnkey systems.

Whether it is for handheld medical devices or complex Hardware-in-the-Loop (HiL) systems for automotive applications, our experience with hardware, firmware and software development ensures that all components of your system are perfectly matched.

SX proFRAME - The modular video and data grabbing solution by Solectrix

The SX proFRAME system builds on years of experience developing Hardware-in-the-Loop systems for safety-critical automotive applications. Utilizing the flexibility of a powerful FPGA core, its modular approach provides the perfectly matched high-end solution for your HiL needs and is ideal for rapid prototyping.

The unique range of our camera adapters allows you to connect nearly all types of automotive cameras based on FPD-Link III, GMSL, GMSL2, etc. Adapters for other camera interfaces or other vehicle bus types (e.g., GigE Vision, Camera Link, HD-SDI, CAN) are available on request.



Medical Case Study

LED Temperature Chamber

Efficient temperature regulation without using expensive Peltier elements or heating cartridges combined with a contactless temperature measurement via RFID - these are the strengths of the temperature chamber for moving, fluid samples developed by Solectrix GmbH.

The temperature inside the measurement chamber is regulated by individually controlled LEDs, which enables a far more constant temperature level on the rotating disc than with conventional heating systems. The result is a temperature accuracy of ±0.35 °C at 7500 rpm.

A PCB including the measurement electronics is mounted directly underneath the disc with the fluid on top. It does not require an individual power source because it can be completely sourced by RFID.

Point-of-Care diagnostic devices as Lab-on-Chip systems are part of the far-reaching possibilities for applications that can be realized using the technology of our case study. „Our LED heating system is a very elegant and cost-effective way for all use cases where a moving sample needs to be temperature-regulated while reading out data," says Jürgen Steinert, CEO and project lead at Solectrix.

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Automotive

With Advanced Driver Assistance Systems becoming more important every day, car designers offer vast possibilities of modern applications for automotive imaging systems.

Digital rear-view mirrors enable night vision or act as a glare shield through the clever use of HDR-imaging, while front-facing cameras provide features like collision avoidance and intelligent speed adaptation. The blind spot detection improves safety while changing lanes and advanced image processing algorithms are able to spot pedestrians or traffic signs early on.

But these systems face tough certification procedures and must meet hard real-time requirements when they feed the car's electronics with input data while simultaneously recording the resulting system response. This is where our expertise with Hardware-in-the-Loop systems applies in order to ensure reproducible results, leading to maximum system stability and safety.

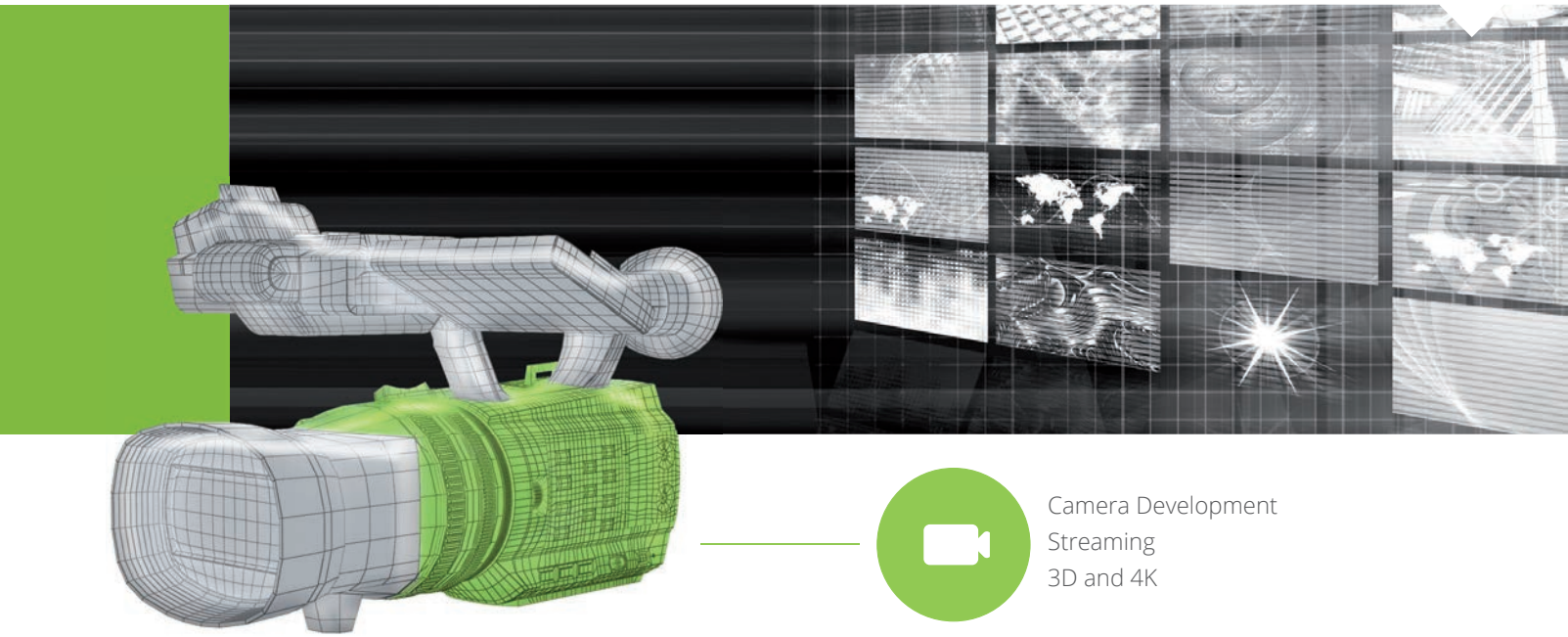
Advanced Driver Assistance Systems
HDR Imaging
Hardware-in-the-Loop

Broadcast

Whether it's TV productions, live broadcasts or movies for the big screen: the quality demanded from digital imaging solutions is constantly increasing.

4K resolution, stereoscopic 3D, direct recording to formats like MXF and ProRes or the streaming of video data over Gigabit-Ethernet or PCIe-cable: these are just a few of the challenges we have gladly accepted in past years.

Our vast experience from designing the digital system core of the ARRI ALEXA, a true Hollywood mainstay, and the complete system design of our very own sinaCAM, a remote head 2D/3D camera system, makes us ideal partners for advanced camera development. From sensor linearization and image enhancement to UHD-SDI outputs and real-time compression for digital recording formats, we cover the entire image processing chain of digital cameras. Our own solutions for image processing steps like de-mosaicing, adaptive noise reduction, stepless scaling and FPGA-based compression produce results that satisfy even the most demanding filmmakers.



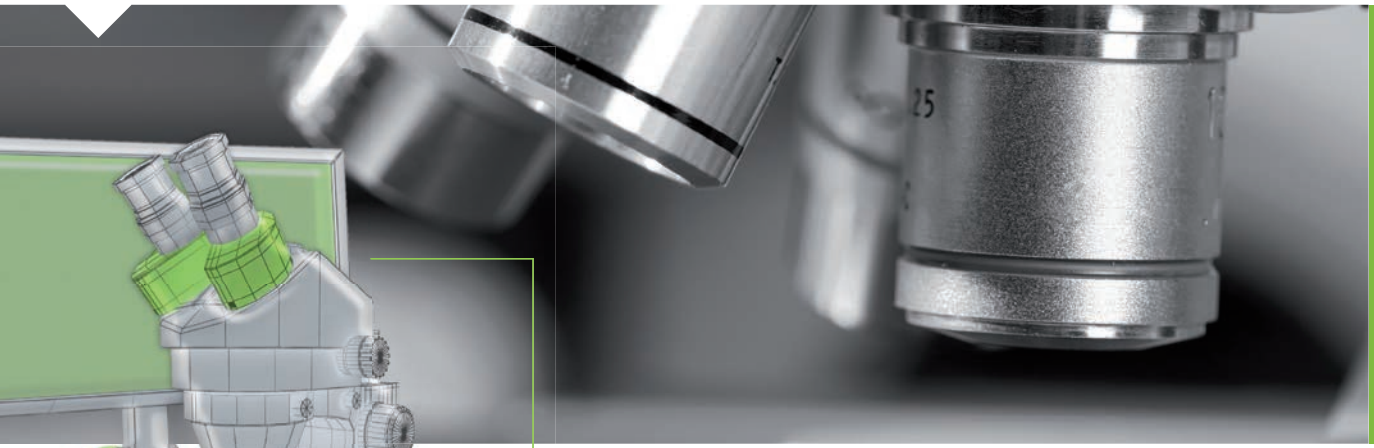
Camera Development
Streaming
3D and 4K

Medical

With human lives at stake, medical applications leave no room for error. That's why reliable image reproduction is of great importance.

From the initial sensor readout to the final display presentation, we provide the best image processing chain possible. Whether you require encoding of secure HD streams or frame grabbing of impeccable still images, our imaging expertise ensures visuals of the highest quality. The medCAM is the systematical adaptation of our successful sinaCAM concept to the requirements of medical applications. It is available as a stand-alone product but the technology can also be integrated in new OEM based systems. Its tiny remote camera heads are ideal for microscopic recordings, for example to document eye surgeries in 3D for teaching purposes.

Another practical example is our SoC-to-Go platform, which is designed as a modular image processing system capable of high-performance DSP applications, making it ideal for real-time processing and analysis tasks by using advanced pattern recognition algorithms.

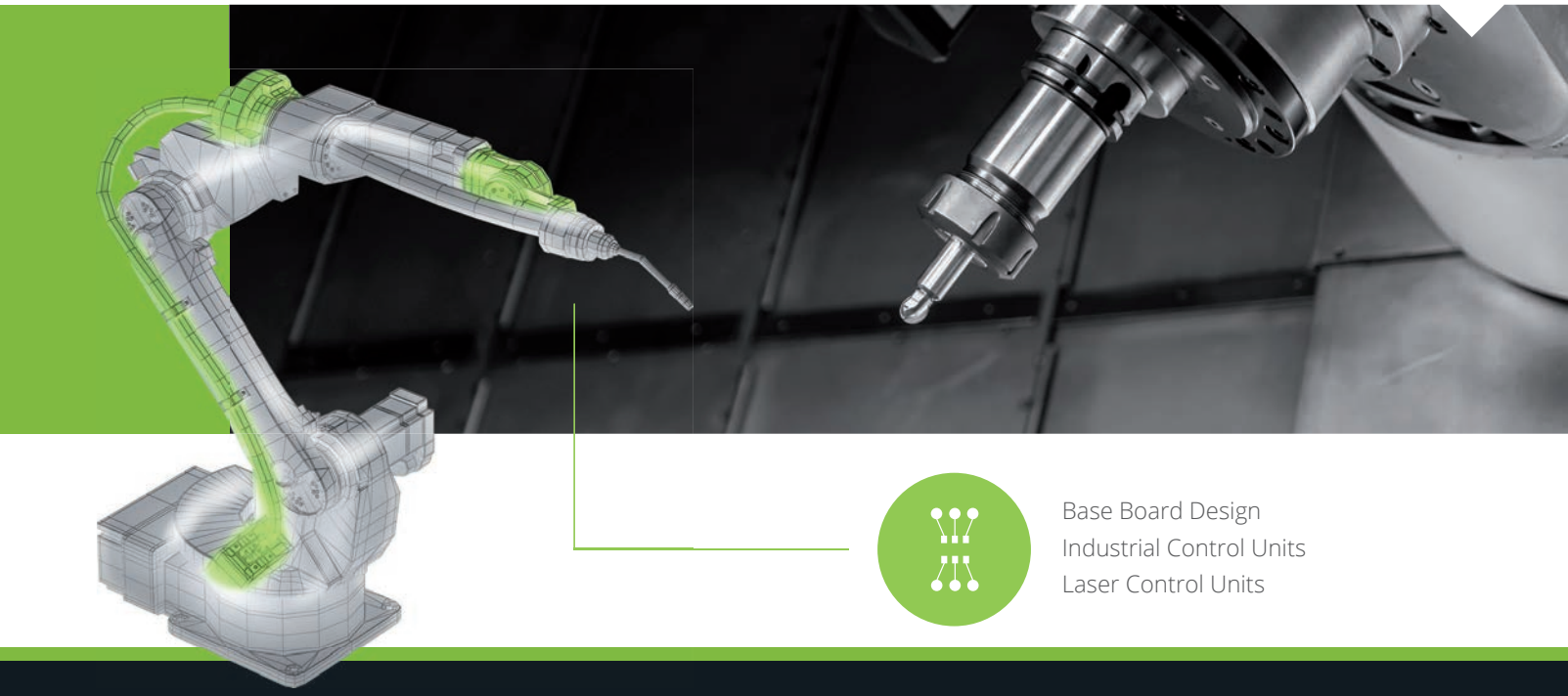


Medical Device Development
2D and 3D Medical Imaging
Documented Development Processes

Industrial

Our experience with digital imaging and advanced pattern recognition algorithms can also be applied to industrial automation.

Other industrial applications we have worked on include the control of potentially dangerous devices like lasers or heavy machinery where safe operation is paramount, leading to tough requirements for the embedded electronics.



Base Board Design
Industrial Control Units
Laser Control Units

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