SERVICES & PRODUCTS OFFER

AND

EXPERTISE

IN MICROELECTRONICS

AND

EMBEDDED & SOFTWARE DEVELOPMENT

Contents

About Systemcom Ltd.

www.systemcom.hr

Systemcom Ltd., Zagreb, Croatia, is a fabless design house, service and solution provider in microelectronics and ICT

- 100% privately owned, limited liability company, founded in 1993
- ~ 20 employees
- Success stories: Bosch, Intel, Compaq/HP
- Long-standing and fruitful collaboration with academic environment
- Recognized as one of the best Croatian companies, Ms Srebrenka Ursic listed in the "Golden Book of the Best Croatian Entrepreneurs and Managers"

Profile

Systemcom Ltd. offers services and products to global customers and partners in the following areas:

- microelectronics and electronics
  - Analog and Mixed Signal Integrated Circuits (IC) Design / Products
  - Digital Integrated Circuits (IC) Design and Synthesis
  - Lab Testing & Measurement
- embedded systems development and support
- software development and production
- consultancy and training

Systemcom's microelectronic goods and services are protected by the trademark:

MAR-WIN®

Services Offer (1)

Integrated Circuits (IC) Design

2001 - till today

- Analog and Mixed Signal IC Design
  - feasibility study, specification, architecture, chip-level system partitioning and modelling (MATLAB), system / block / circuit design levels (schematics), HDL behavioural modelling, physical design (layout), prototype, functional verification & assertion of system performance, documentation
- Digital IC Design
  - specification, architecture, HDL (RTL) description, synthesis, verification, prototype, functional verification & assertion of system performance, documentation
- Implementation
  - IP modules, SoC, ASIC, FPGA
- Lab Testing & Measurement
  - measurement system development (microcontroller based embedded system), PCB design, chip measurement & characterisation, data collection & analysis

Services Offer (2)

Embedded Systems and Software Development

2001 - till today

- Embedded systems - HW & SW co-design (µcontroller and/or FPGA)
  - Development of embedded systems based on microcontroller implemented either as standard microcontroller component or as soft microcontroller core in FPGA, together with supporting digital logic
  - PCB implementation and hardware/software integration
  - Development and porting of GNU based tool chain for target microcontroller
  - Development of Integrated Development Environment (IDE) for target microcontroller based on Eclipse framework
- New software products development and/or improving existing software solutions featuring:
  - Strong working knowledge in programming and script languages: C/C++, Java, Visual Basic, Tcl, Perl, Phyton, Bash, Tk, Tsch, Swing, etc.
  - Familiarity with various operating system like Linux, Microsoft Windows, Unix, etc.
  - Strong background in electronics, semiconductors and computer engineering

Success Stories (1)

Bosch, Intel, Compaq / HP

Contracted services in the areas of microelectronic design and software development

2005 - 2011 with Bosch, Germany

2002 - 2007 with Intel - U.S.A.

2001 - 2003 with Compaq / HP - U.S.A.

Excellent results achieved, concerning both quality & terms !

Values at company level

- intellectual property rights owner, fully independent, with established high intellectual property protection
- established industry know-how, well equipped facility
- in situ work at partner's premises as well as successful remote work through VPN
- seamless integration with an organization's core technology
- effective project management and excellent communication skills
- good English of all employees

Success Stories (2)

Recognitions

Robert Bosch and Bosch Sensortec, Germany (2005 - 2011)

Participation in the projects of IC design & testing for automotive industry and consumer (mobile)

"I can testify that Systemcom's Project Leader worked for us very professionally in a number of projects, mainly for signal processing applications. He has been professional, experienced, self-driving, and fully committed to fulfilling the project goals. From this experience I think that he is a win for any IC design project where his technical skills do fit."

Senior Vice President, Automotive Electronics
Engineering, Semiconductors and Integrated Circuits, January 2013

Intel, U.S.A. (2002 - 2007)

Participation in the development of Itanium 64 bit multi core architecture (65nm to 32 nm)

"Systemcom's engineers contributed and delivered high quality efforts and results during the years of the company's collaboration with Intel. Systemcom collaborated with Intel from the beginning of 2002 to the middle of 2007. They are a diligent and hardworking team focused on their deadlines. While they worked efficiently, they took a “whatever it takes” attitude to meet every deadline. I appreciated their enthusiasm and flexibility in smoothly assuming new tasks."

VicePresident, Intel Architecture Group, January 2013

Success Stories (3)

Recognitions

Compaq / HP, U.S.A. (2001 – 2003)

Participation in the development of Alpha 64 bit microprocessor in 130 nm SOI technology

"I will add my words of appreciation. Your team's outstanding performance has built much appreciation and confidence. We look forward to many joint successes and growth in the future. Keep up the great work there is many more challenges ahead."
Director Alpha Design and CAD, 2001

"Outstanding work and very much appreciated. We certainly could not deliver ..... on our aggressive schedule without your efforts."
VP Alpha General Manager, 2001

Professor Paul Jespers, Université Catholique de Louvain, Louvain-la-Neuve, Belgium:
"I like to tell you that I am very impressed by the achievements of your group and the professional presentation of the data sheets."

Design and Reuse Catalogue: http://www.design-reuse.com/sip/supplier/1030/systemcom/

DIGITIMES, April 2013:
The article "Case study of 2 AFE ICs confirms significant potential for small IC vendors"
written by the consulting company Petrov Group, U.S.A.

Products Offer

Analogue Front End (AFE) Family (1)

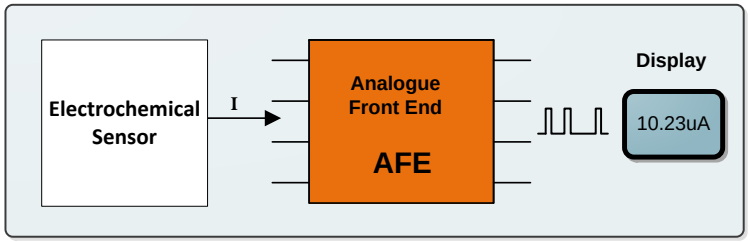
In 2012 Systemcom released new analogue/mixed signal products:
Analogue Front End (AFE) Family with Current Input
offered on IP & SoC market: Design and Reuse Catalogue

- AFE Family consists of five compatible IP modules / ASICs:
  - SC-I-AFE-180F110 Current Input Analogue Front-End with 13-bit ADC
  - SC-IQ-IUC-180F310 Current to Voltage Converter
  - SC-IC-AFE-180F209 Current Input Analogue Front-End - Core
  - SC-I-AFE-180F210 Current Input Analogue Front-End with SPI Interface
  - SC-FD-ADC-180F410 Fully Differential 13-bit ADC

www.systemcom.hr/ipmodules/

Products Offer
AFE Family (2)
Market Attractiveness and Applications

- There is a high demand for more sensing functions in all application fields with the emphasis on sensors with current output
- Smartphones, tablets, bio/medical and car/automotive/aerospace market segments lead the growth in semiconductors market as per predictions given by IDC, TechNavio, Yole Développement, Gartner
- The trend is to incorporate much more sensors for improving the quality of everyday life (i.e. ambient light, UV light for sun light strength, proximity, radiation, smoke-alarm, air quality, humidity,specific gases, non-invasive glucose meter, blood oxymeter, alcohol detector ...)
- New sensors brought to the market by mature MEMS and nano-technology every day contribute very much to demand for the current input AFE



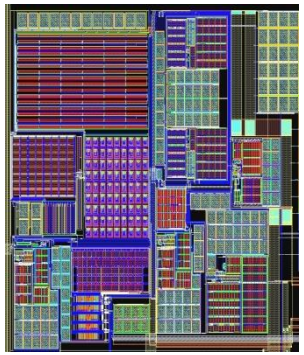
An example: electrochemical sensor with nanostructure electrodes for toxic gas detection (H2S, NO2, SO2).

Products Offer

AFE Family (3)

Main Features

- Unique low power AFE solution with **current input**
- There is the lack of AFE products with current input at the market
- Ideal for processing signal from sensors with current output like **light detectors, biosensors, electro-chemical, radiation sensors**
- Input current range as wide as 7 orders of magnitude (**hundreds of picoA to 1 mA**), full scale high linearity
- Maximum gain setting of 1296 supporting smaller input signal swing, high resolution and low-noise
- SPI interface
- Extended temperature range from -40°C to +125°C



- IP modules silicon validated at TSMC @ CMOS 180nm technology
- Modular design enables easy customization and add-ons like: multichannel, current & voltage inputs, DSP or µcontroller, etc.
- Systemcom is fully independent intellectual property rights owner

Expertise: Special Skills & Strengths (1)

Analogue, Digital and Mixed Signal IC Design

- Flexible team of IC designers with excellent knowledge and experience in complete design flow from the specification to tape-out, e.g. developed own sensor interface AFE family, from the scratch to the silicon validated IP modules & ASICs
- Analogue/mixed signal design: low voltage & low power
- Original circuit solutions
- Digital design: proven experience at different level of complexity, from digital logic in ASIC design to microprocessor design
- DSP design & implementation
- Synthesis skills for implementation of digital logic in ASIC and FPGA
- Experience in measurement procedures and setup, PCB design, DFT (Design for Test) design, chip characterisation, data collection & analysis
- Designers are familiar with various technologies

Expertise: Special Skills & Strengths (2)

Embedded Systems and FPGA

- Development and porting of GNU based tool chain for target microcontroller
- Software applications for embedded systems
- In-house developed embedded system solution for flexible ASIC measurement environment with RTOS (Real Time Operating System) running on microcontroller
- Embedded system development based on soft microcontroller core and supporting digital logic in FPGA
- Diverse FPGA experience in digital design development, prototyping and implementation

Expertise: Special Skills & Strengths (3)

Software Development

- Experience in comprehensive software engineering projects featuring:
  - Knowledge of algorithms and data structures
  - Complex graphical solutions
  - Good software debugging skills
- More than ten years experience in EDA software development
- EDA tool chain modules development for supporting and/or improving IC design process
- Strong support to hardware design team by internally developed: proprietary EDA tool chain SILBA-TC©, technology adoption (various data and netlist formats, etc.) and computing environment
- In-house developed database repository OLIB© for designed and validated circuit solutions
- Eclipse based GUI development

Special Skills & Strengths (4)

Skills in EDA Tools Use

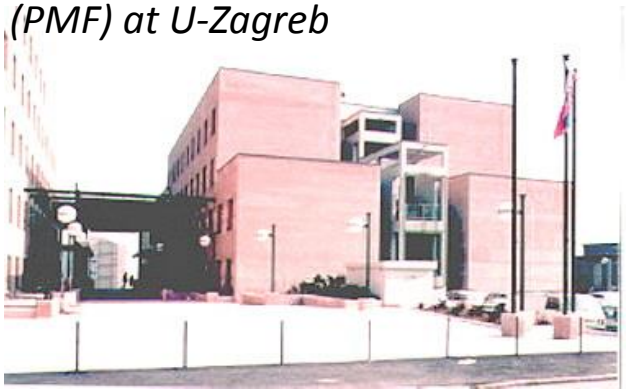
- Complete analogue and mixed signal Cadence tool chain: Virtuoso Composer, Assura, Spectre, Analog Environment
- Circuit simulation: PSPICE, Ng-SPICE, HSPICE
- Synopsys synthesis tool chain
- Xillinx ISE
- Mentor Graphics ModelSim
- MATLAB, *Mathematica*
- In-house tools
- Vendor proprietary tools (Intel, Compaq/HP, etc.)

Engineering Education in Croatia

- Attitude towards good education is traditional
- High Schools are known by high quality education. Special emphasis on mathematics, physics, information technology and English.
- Universities in Zagreb, Osijek, Rijeka, Split, Zadar, Dubrovnik and Pula
- University of Zagreb is the oldest (established in 1669) and biggest one (~ 70.000 students). It covers technical, science, biomedical and social fields.
- Faculty of Electrical Engineering & Computing and Faculty of Science & Mathematics at U-Zagreb are especially recognized as the source of excellent engineers from the field.
  Systemcom Ltd. has long-standing collaboration contracts and active projects with both faculties.
- R&D activities at universities are strong

Faculty of Electrical Engineering and Computing (FER) at U-Zagreb

Faculty of Science & Mathematics (PMF) at U-Zagreb



Some Advantages in Doing Business in Croatia

- Good education, fundamental knowledge, experience and skills of Croatian engineers and managers
- Long-standing involvement in microelectronics from ~1960
- Strong ICT sector
- Recognized and supported on the state level:
  Intellectual Property Protection, Legal Regulations, International Standards
- Member of the European Union with advantageous overall business costs
- Good geographic position on the Adriatic sea, in the middle of Europe, with nice climate

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Regards from Croatia