CATALOGUE

ENTERPRISES
AND ORGANIZATIONS,
PRODUCTS AND SERVICES

CLUSTER
ZELENOGRAD

MOSCOW 2016
INNOVATIVE TERRITORIAL CLUSTER "ZELENOGRAD"

Moscow 2016
INNOVATIVE TERRITORIAL CLUSTER “ZELENOGRAD”

Innovative territorial cluster “Zelenograd” (referred to below as cluster “Zelenograd”) corresponds to a self-standing scientific and industrial Moscow area with specialization in microelectronics and high technology business. It unites educational institutions, scientific and industrial institutions of Moscow with specialization in the field of microelectronics and high-tech business.

Cluster’s enterprises work in sectors of special and military equipment, rocket-space industry, instrumentation and industrial application equipment, as well as design of microelectronic products, medical technology, IT security and Energy efficiency.

Cluster “Zelenograd” provides various kinds of support to enterprises within the cluster. Cluster members can rely on the quality support of our experts in a variety of ways of doing business.

1. Financial support.
2. Expert advice on the organization and operation of investment projects.
3. Marketing research, Mass Media coverage, promotion to Government orders and contracts, promotion of participants’ products in foreign markets.
4. Expert advice on the organization and operation of investment projects.
5. Training, retraining and training of specialists.

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MOSCOW 2016
# INDEX

## ORGANIZATIONS AND ENTERPRISES

### NANO- AND MICROELECTRONICS 6-13
- National Research University of Electronic Technology 6
- Group of companies MIKRON 7
- Zelenograd Nanotechnology Center JSC 8
- Zelenograd Innovation and Technology Centre JSC 9
- Institute for Design Problems in Microelectronics of the Russian Academy of Sciences (IPPM RAS) 10
- Design Center KM211 11
- AlphaCHIP LLC 12
- Open Joint-Stock Company Research and Development Center ELVEES 13

### EQUIPMENT AND MATERIALS FOR INDUSTRIAL APPLICATION 14-27
- Scientific Research Institute “Submicron”, JSC 14
- NEUROBOTICS 15
- Lasers & apparatus group 16
- Zelax 16
- Adel Instrument LTD 17
- Group of companies NT-MDT SPECTRUM INSTRUMENTS 18
- Open joint stock company Practic-NC 19
- Closed Joint-Stock Company Ecological sensors and systems (CJSC ES&S) 20
- MELZ FEU Ltd 21
- LLC Sovtest Micro 22
- SKTO PROMPROEKT Ltd 23
- SPC “Technovotum” 24
- ESTO-Vacuum Ltd 24
- OCB BULAT Ltd 25
- Epiel JSC 26
- Angstrem JSC 27

### IT-SYSTEMS 28-32
- Joint Stock Company ELVEES NeoTek 28
- Transaction Systems 29
- MULTIPAS LLC 30
PRODUCTS

NANO- AND MICROELECTRONICS 43-78
- Silicon epitaxial structures 43-44
- Microprocessors and Microcontrollers 45-47
- Power Management ICs 48-53
- Integrated circuits 54-58
- RFID 59-72
- Semiconductor devices 73-75
- Medical equipment 76
- MEMS sensors 77-78

EQUIPMENT AND MATERIALS FOR INDUSTRIAL APPLICATION 79-116
- Industrial equipment 79-105
- Equipment for testing and monitoring 106-116

IT-SYSTEMS 117-118
- Automation and control systems 117-118

MEDICAL EQUIPMENT, PHARMACEUTICALS AND BIOCONTROL 119-126
- Medical equipment 119-123
- Pharmaceutics 124
- Biocontrol 125-126

SERVICE

NANO- AND MICROELECTRONICS 127-134
- Design 127-130
- Production 130-132
- Testing 133
- Assembly 134

EQUIPMENT AND MATERIALS FOR INDUSTRIAL APPLICATION 135-136
- Technological services 135-136

OTHER SERVICES 137
- Recruitment 137

IT-SYSTEMS 138
- Automation and control systems 138
GENERAL INFORMATION
National Research University MIET (MIET) is a city-forming, scientific and educational institution. It is a leading Russian university training specialists in the field of electronics, nano- and microelectronics. In recent years, the university has consistently ranked in the top ten technical universities in the country according to the official rating of the Ministry of Education and Science of the Russian Federation.

In the area of research and development MIET takes the forefront implementing new technologies in production. The priority areas for research and educational activities are electronics, nano- and microelectronics, information technology.

EDUCATIONAL ACTIVITIES
The university has developed and implemented a model of innovative modular system of higher education in the field of electronics, providing solutions to current and strategic tasks for highly qualified personnel training for enterprises of Zelenograd, Moscow, and the electronics industry in Russia.

The University implements the basic educational programs of higher education in 16 directions of bachelor’s and 12 directions of Master’s degrees.

SCIENTIFIC ACTIVITY
MIET is awarded with a category of National Research University. The modern technology platform is formed on MIET base in order to implement the instrument of nanoscale structures that are integrated with the schemes of information processing.

MIET is the largest research center, it is directly involved in formation and development of science and industry in Zelenograd. Currently MIET takes the forefront in breakthrough technologies development. Every year more than 300 research and development activities funding of more than 0.5 billion rubles per year are performed at the University.

The university involving innovative enterprises carries out complex projects, including the development of competitive technologies and design for devices and products in nano- and microsystems. MIET provides an influx of young professionals in the field of research and development, the development of leading scientific schools.

INNOVATION INFRASTRUCTURE
As a part of a project development innovation complex, MIET establishes a modern scientific and industrial infrastructure for development, deployment and testing of small-scale release in the market and finished electronic and microelectronic products.

MIET implements the concept of design and development of an innovative complex of the university, which is aimed at a gradual increase in competences, creation of scientific and industrial infrastructure, involvement in the innovation process of high-tech small and medium sized companies to attract private investment and the formation of business processes based on the scientific results of the university. Creating innovative complex at the University allows making full use of scientific and technical experience and intellectual potential of MIET.

Nowadays, MIET Innovation Complex meets the latest requirements for university innovation infrastructure: a complex of buildings and structures – 27,000 m²; a network of community access to research, design, technology and testing equipment; full modernized scientific, industrial and engineering infrastructure; more than 50 innovative enterprises, including 16 start-up companies; 1,700 highly qualified specialists, including 45% – young people up to 35 years.

The University possesses innovative infrastructure that became the basis for innovative production not only among the residents of the innovative complex MIET, but also in many organizations and companies – “Zelenograd” cluster’s members. Integration of education, research and innovation on the basis of university innovation infrastructure in conjunction with a professional innovation management from Zelenograd ITC provides a high performance and dynamic development of innovation.
FMikron is the largest semiconductor company in Russia and Eastern Europe. Russian technological leader Mikron ranks among the top 5 semiconductor IDM companies in Europe by revenue. Mikron is a part of industrial RTI-holding with financial corporation “Sistema” as the major shareholder.

RESEARCH AND DEVELOPMENT
Mikron greatly contributes to the promotion of microelectronics in Russia, supporting a wide range of educational institutions and graduate programs, as well as providing funds for scientific research in the field of future semiconductor materials and technologies.

More than 60 scientific research institutions are Mikron long-term partners. 15% of revenues are invested yearly in R&D. Mikron supports several discipline-related chairs at the leading Russian universities that prepare high-quality specialists in modern and upcoming nano- and microelectronics. More than 150 students undertake an internship at Mikron every year.

Mikron collaborates with the leading international and Russian companies for technology and experience transfer, as well as product development and promotion. The company is a full member of relevant international alliances and associations.

MANUFACTURE AND TECHNOLOGY
Mikron yearly production volumes are around 400 million RFID-tags, 50 million ICs for banking smart-cards, more than 5 million ICs for Russian national foreign passports and other government ID documents. Mikron is the biggest manufacturer by export volume in Russia: around 500 million power management ICs are exported yearly. Mikron overseas customers’ are mainly electronic component distributors supplying Mikron products to local original equipment manufacturers (OEMs). Mikron is the leading semiconductor developer and manufacturer in Russia by revenue and product portfolio (around 500 ICs in product portfolio), key player of the Russian telecom and smart-card market, as well as the largest RFID-manufacturer in Europe.

Mikron group of companies offers customers large Schottky diodes portfolio with leading technical characteristics, TVS and ESD protection devices and fast recovery diodes.

Discrete semiconductor devices are available as wafer and packaged (minimal order starts from 100,000 ICs).

In 2012 together with RUSNANO Mikron accomplished the project for technology transfer from STMicroelectronics and start of the 90 nm production line. The newly launched line increased Mikron 8” manufacturing capacity up to 36 thousand wafers per year.

CUSTOMERS
The company widely promotes its projects in Russia as well as abroad. The main export directions are Europe and South-East Asia. The company works on the international market through its representative offices in Germany, US, Hong Kong, Taiwan and Shenzhen and owns an assembly facility in China.

Mikron commitment to customer satisfaction and quality through all core business and manufacturing processes is verified by ISO 9001 Quality Management System certification. In 2008 Mikron was certified according to the requirements of the international environmental management system ISO 14001. Mikron was the first Russian company to receive such certification. Mikron commitment to green manufacturing is validated by ISO 50001-2011 Energy Management System certification.

KEY FACTS
• Established: 1964.
• Main products: microprocessors for ID documents and smart-cards, RFID chips, tags and inlays, power management ICs, discrete semiconductor devices.
• Headquarters: Moscow, Russia.
• Regional offices: Hong Kong, Taiwan, China; USA.
• Team: around 1500 people.
Zelenograd Nanotechnology Center is one of the leading innovation companies. Today Zelenograd Nanotechnology Center is both a technology business accelerator and a fab-lite for IC manufacturing. The primary aim of Zelenograd Nanotechnology Center activity is transforming science into industrial applications. To achieve this goal we invest in start-up companies, provide technical and business support and ability to use high-tech equipment for new technology research and production prototyping, attract Russian and foreign partners for industrial cooperation.

TECHNOLOGY RESEARCH AND DEVELOPMENT
Production facility allows to design and develop technologies to create new groups of products according to Customer requirements. Zelenograd Nanotechnology Center offers services on developing basic and applied solutions in the following key areas:

- High-temperature electronics with an operating range of -60 °C to +225 °C.
- High-dielectric constant film formation processes for IC MIM capacitors.
- Schottky infrared photodetector array cells.
- MOSFET transistor production technology.

PRODUCTIONS AND FOUNDRY SERVICES
Zelenograd Nanotechnology Center provides research and development and technological services for manufacturing a wide range of microelectronics special products:

- Microcircuits Design (IC, MEMS, Soc, SIP) and development of new technology solutions for microcircuit and MEMS-sensors manufacturing, 3D assembly (3D TSV).
- Low-volume multifunctional complex of microcircuits manufacturing.
- Funding of innovation companies, attracting of additional investors.
- Support and development of technology projects, technology transfer, attracting strategic partners and experts.

Important activity of Zelenograd Nanotechnology Center is innovation commercialization for company’s RD and startups. We investigate robotechnics, IoT and BioTech, and fund startups in this field of activity. In our investment portfolio there are 30 high-tech startups companies which carry out RD and prototyping of:

Nano- and microelectronics:
- Robotics and additive manufacturing © PICASO 3D.
- 3D IC assembly technology.
- Systems of control and processing of information for position detection based on AMR and GMR-sensors.
- Navigation systems and Intellectual systems control for aviation based on MEMS-gyroscopes and accelerometers.
- Telecom systems based on matrix micro-mirrors.

Green Tech:
- Power saving solutions.
- Nonvolatile systems on the base of a piezoelectric generator.
- R&D of liquids cleaning modules.

BioTech:
- Electronics for medicine.
- Biotechnologies for medicine and vaccinology © NIOBIS.
- Research of cell structures.

PRODUCTS AND SERVICES
The reliability and quality of work is guaranteed by advanced equipment, comprehensive innovation infrastructure and a well-developed network of business contacts with partner organizations.
Open Joint Stock Company Zelenograd Innovation and Technology Centre was founded in 1998 as an organization to support innovation in the field of microelectronics, electronics and information and telecommunication technologies. Creation of the company was the innovative initiative of the National Research University MIET, that is the Moscow State Institute of Electronic Technology Foundation for Assistance to Small Innovative Enterprises in Science and Technology and the Ministry of Education with the support of regional structures. The main activities of the organization are: conducting breakthrough research and development; knowledge-intensive production; support of small innovative companies by providing innovative infrastructure and a range of services, including a technology-based network of centers of excellence. Zelenograd ITC in July 2006 received a status of a special economic zone resident.

Technology development activities are conducted jointly with MIET in cooperation with research institutions, industry, foreign and Russian companies in electronics and nanoelectronics.

RESEARCH AND DEVELOPMENT
• Technology development activities are conducted in the areas: an electronic component base, Microsystem Technology and micromechanical systems, information and telecommunication systems and electronic equipment, the development of innovative infrastructure.
• Zelenograd ITC together with business partners develops an energy-saving complete system for every apartment individual metering and regulation of energy consumption for multi-family buildings with a view to use their own instrument and component base. Prototypes are installed on 18 sites in ten regions of Russia.
• The development and certification of the medical device implantable circulatory support device for the left ventricle of the heart. The unit is supplied to medical institutions in Russia, planned export deliveries.
• Zelenograd ITC provides technological services for design and manufacture of photomasks with design rules up to 180 nm.

INFRASTRUCTURE
Zelenograd ITC together with MIET formed a scientific and industrial infrastructure that implements a full cycle of creation of modern high-tech products in the field of microelectronics, microsystems technology, information and telecommunication systems and electronic equipment – from electronic components design to pilot batches production. The project is implemented on the basis of its own and developed within the framework of technology development activities of the innovation infrastructure including more than 20,000 m² of scientific and industrial areas that host scientific and industrial divisions, business-partners, including subsidiaries and SEZ residents. The project is equipped with modern research, design, technology and testing equipment, which allows to develop basic microelectronic technology to design and manufacture high-tech products.

In order to provide technical and technological innovative activities Zelenograd ITC has formed a network of centers of excellence (Network NBI). Currently, as a part of the Network NBI there are six centers of collective use. For organization of pilot production site the photomasks manufacture is set up. The works on equipping the Scientific and Technological Center of nano- and microsystems technology form the core technologies to fulfill a technological cycle of designing and manufacturing of electronic products including a necessary electronic component base and a microsystems technology. There were established the design centers for the electronic components development, microsystems technology, information and telecommunication systems and electronic equipment. Network infrastructure MSC is the only in Russia that has a full cycle of creation of high technology products in the field of electronics, microelectronics and information and telecommunication technologies.

Together with strategic partners and with the active involvement of state support capabilities, Zelenograd ITC solves the problem of ensuring the development of basic technologies, design and pilot production range of innovative products.
GENERAL INFORMATION
The Institute for Design Problems in Microelectronics of the Russian Academy of Sciences (IPPM RAS) was established in 1986 (until April 1998, the name of the Institute was the Research Institute of VLSI CAD Systems). IPPM RAS is a part of the Department for Nanotechnologies and Information Technologies (ONIT) of the Russian Academy of Sciences.

RESEARCH AND DEVELOPMENT
The main IPPM RAS activities include:
• Development of CAD systems for micro- and nanoelectronics.
• Development of high-efficient microelectronic computing systems.
• Design of advanced devices and integrated circuits in micro- and nanoelectronic ranges.

The main scientific and applied results were achieved in the following areas:
• Methods and algorithms for analysis of RF integrated circuits.
• Development of analog-digital integrated circuits and IP-blocks.
• Development of analog and digital cell libraries.
• Development of models and algorithms for the navigation systems design.
• Methods of modular arithmetic for the design of highly reliable micro-electronic digital computing equipment.
• Development of parallel dataflow computing system.
• Magnetic film elements and sensors.

Along with fundamental research, scientists and researchers of the Institute carry out applied researches for the programs of the Russian Academy of Sciences, Ministries of the Russian Federation, foreign scientific organizations, Russian and foreign commercial firms.
IPPM RAS has Dissertation Council for doctoral and Ph.D. dissertations, full-time and part-time postgraduate courses. Since 2005 IPPM RAS organizes and holds regular scientific conference titled “Problems of Advanced Micro- and Nanoelectronic Systems Development” (MES conferences). Since 1992 IPPM RAS is the co-founder of the largest European conference and exhibition DATE (Design Automation and Test in Europe), which brings together academic researchers, developers of the microelectronic systems and devices; vendors, customers and users of VLSI & SoC design automation systems.
GENERAL INFORMATION
Design Center KM211 is one of the leading IC design teams in Russia. In 2014 KM211 has been appointed as TSMC Value Chain Aggregator for Russia. While developing in-house proprietary IP, we dedicated most of our efforts to providing Design Services for companies across the world. To be efficient in the present-day microelectronics business you have to cooperate. Our major goal is to make our clients successful and wealthy.

With our tremendous experience in digital design, we can provide exclusive solutions on the system level, power consumption optimization, efficient crypto-algorithms solutions and floating-point calculations. We have accumulated a lot of experience in protection of on-chip data integrity as a team that successfully developed Russian biometrical passport chip.

RESEARCH AND DEVELOPMENT
We develop our own IP in three directions:
- Multimedia platform HYDRA.
- Microcontroller platform KROLIK.
- KVARC RISC core.

With a number of peripheral blocks, crypto and video hardware acceleration blocks in stack, we are capable of providing fast, power-efficient and yet inexpensive solutions.

TECHNOLOGY
KM211 provides comprehensive access to TSMC technologies for prototyping and volume production of ASIC products. MPW service is introduced for prototyping purposes (Multi-Project Wafer manufacturing): 0.5 µm up to 28 nm processes available.

PRODUCTS AND SERVICES
KM211 services are based on the clients’ requirements and may include:
- consulting on process selection;
- access to PDK and libraries;
- access to IP blocks, including customization and development of new IP cores;
- project development from scratch or project finalization based on client’s developments;
- proprietary KM211 processor cores licensing;
- project layout final verification;
- IC fabrication in all formats, including MPW/MLM/Full Mask Set;
- testing, sawing, packaging;
- logistics to Russia and Customs;
- full preparation and conducting of the volume production.
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General Director | Alexander L. Stempkovsky

GENERAL INFORMATION
AlphaCHIP LLC was founded in March 2006. The team was actually formed in 1993rd in the framework of the former company-predecessor. From that time, the team has carried out more than 100 different projects on the development of complex digital, analog, mixed-signal IP-blocks, integrated circuits, and systems on chip, test chips based on submicron and nanometer technologies for the leading semiconductor companies such as Motorola, Freescale Semiconductor, AMI Semiconductor and ON Semiconductor. The team has also developed a number of highly efficient tools for integrated circuits design. The leading semiconductor enterprises and design centers of Moscow and Zelenograd (JSC Mikron, JSC ICC Milanrd, Research & Development Center “ELVEES” and others) are among Russian partners of the company.

RESEARCH AND DEVELOPMENT
The main AlphaCHIP activities include:
- research, development and verification of library elements;
- research and development of complex functional blocks (IP-blocks);
- development of memory compilers and custom embedded memory modules for VLSI/SoC;
- development of unique specialized CAD tools surpassing the world analogues.

More than 20-year experience of VLSI components design includes:
- more than 270 standard cell/IO library releases (including radiation hardened);
- more than 70 releases of analog libraries;
- more than 250 releases of SRAM, ROM, PROM, EEPROM (including radiation hardened);
- specialized IP-blocks for memory parameters measurement;
- more than 30 test chips for memory verification;
- 57 IP-blocks (15 ADC&DAC, 8 analog BiCMOS IP-blocks, MAC and others);
- Vector Communications Processor (VECOMP), DDR2, USB 2.0.

One of the most promising areas from the mentioned above is the development of memory compilers (design tools) providing high-performance design of memory modules (single and dual-port RAM and ROM) with random configurations for systems on chip. The set of AlphaCHIP memory compilers gives an opportunity to provide operative (1-2 weeks) design services of memory modules for VLSI and SoC for semiconductor companies.

TECHNOLOGY
The projects carried out by AlphaCHIP LLC are based on the most advanced semiconductor technologies with design rules from deep submicron to nanometer ranges (350-32 nm).
ELVEES is a leading Russian ASIC design house – the largest in Russia SpaceWire based chipset developer.

ELVEES was founded in 1990 on the ELAS Space Corporation base and in 1960–1980 with RSC Energia was a developer of the Salyut on-board computers for the MIR orbital Space station.

ELVEES has its own innovative MULTICORE IC design platform (Standard Cells & IO & IP-cores Radiation Tolerant/temperature stability library), which includes great CMOS 250–90 nm silicon proven analog, RF and digital IP-cores.

ELVEES implements partnership programs with 29 Russian universities, in strategic partnership with the SUAI and Submicron creates a Russian SpaceWire technology direction working with many Russian space industry companies.

ELVEES was responsible for the SpaceWire-RT ASIC IP-core Implementation Feasibility part in the FP 7 Russian-European SpaceWire-RT project.

ELVEES design team has the skills and experience on complex Analog/RF/Digital SoC developments projects under Customer requirements and for the all ASIC Design Flow.

### RESEARCH AND DEVELOPMENT

- Radiation Tolerant (RHBD) 180 nm CMOS Standard Cells and IP-cores Library, including SpaceWire and GigaSpaceWire (SpaceWire-RUS standart) ASIC IP-cores (digital and PHY).
- SpaceWire based chipset Multiboard for space applications, including Multicore microprocessors, memories, routers, adapters, Controllers for the Mass-storage;
- Tools and Software for chipsets: computer vision, image compression, adaptive signal processing software; OS – Linux, Real Time uOS;
- FPGA-to-ASIC conversions for the Radiation Tolerant applications; ASIC can be offered as analog/RF/digital “systems on a chip (SOC)” with SpaceWire Standard family links: SpaceWire, GigaSpaceWire (SpaceWire-RUS standart) and SpaceFibre;
- Space quality level; tests and measurements can be performed on the customer request.
Scientific Research Institute «SUBMICRON», JSC was founded on August 24 in 1989. The staff of the company includes 547 employees.

RESEARCH AND DEVELOPMENT
The main activity of Scientific Research Institute «SUBMICRON» is design and small series production of modules for highly reliable, fault-tolerant hardware computing systems for space and onboard management systems, satellite communications and navigation; systems for receiving and processing of sonar information. The company is a developer and provider of identification aircraft system devices, digital control systems for different types of aircraft, and spacecraft data processing systems. SUBMICRON has the departments for Research and Development, test and measurement equipment, onboard and test software. The Research Institute is equipped with all the necessary complex of assembly, test and adjustment equipment, has a normative-technical documentation, including specifications for hardware products. The main customers of the Research Institute are the Ministry Of Defense, ROSCOSMOS and the air force.

TECHNOLOGY
SUBMICRON has mastered all the processes that are necessary for the manufacture and testing of modern electronic equipment.

INFRASTRUCTURE
The company includes: Research and Development department, Pilot production, Department of quality assurance and reliability, Engineering and Technical service, Administrative and Finance Department.

PRODUCTS AND SERVICES
Types of products: fault-tolerant equipment onboard computer systems for space and aviation, satellite communication, identification and navigation systems; signal processing equipment; test equipment; and onboard software.
GENERAL INFORMATION
For more than 10 years Neurobotics develops and delivers systems for scientific research in the field of robotics, neuroscience, physiology and artificial intelligence.

RESEARCH AND DEVELOPMENT
The list of the company’s most remarkable developments includes brain-computer interface based on augmented reality glasses. Such BCI allows patients and bionic athletes to control devices like exoskeletons and other assistive devices. Anthropomorphic robotics (robots with portrait similarity) and classic robotics are another remarkable company’s directions of activity. Neurobotics cooperates with Russian scientific institutions and has done plenty of R&D projects for governmental organizations such as Russian Federal Space Agency (Roscosmos), the FSS and the Investigative Committee of the Russian Federation.

PRODUCTS AND SERVICES
The range of products includes the equipment for the research in neurophysiology, physiology, general human physiology, animal physiology and also for the research of isolated organs, tissues and cells. Our products are being used for the registration and analysis of electroencephalograms, medical parameters of a cerebrospinal nervous system, a vegetative nervous system and muscles, also for neuromarketing, estimation of human emotions and researches of animals’ behavior.
Neurobotics develops anthropomorphic robots with a portrait likeness and biofeedback system. It is based on the concept of multiple modules to let our robots be more scaled. The list of the modules consists of the head module, the torso module, the arms module and the mobile platform module that could be used either together or separately. The concept mentioned allows the user to replace an outdated part with the newer, up-to-date one easily. The open API also allows users to improve the robot’s intelligence.
The company is an exclusive distributor of the foreign producers: ADI(Australia), SMI (Germany), BrainProducts (Germany).
Lasers & apparatus group specializes in development, production, modernization, sale and service of laser industrial equipment. More than 20 years of experience on the market, highly qualified specialists, modern research laboratories, design office, own production and service center – all this provides the entire cycle of laser systems manufacturing – from scientific research, technology and design development to serial production, commissioning and service support of laser systems.

It carries large amount of R&D in the area of traditional and new technologies. Serial models include the systems on the base of recently developed components – diode pumped lasers (fiber and solid-state) and kinematic systems with linear motors, all protected by patents. Lasers & apparatus also started to supply specialized multi-axis systems for 3D processing, hybrid welding systems, systems for additive manufacturing etc. “Lasers & apparatus” manufactures equipment for laser micromachining: cutting, milling, scribing, drilling – MLP1 series, laser marking and engraving – MLP2 series, laser cutting – ML3 and MLP3 series, laser welding – laser welding of aluminum, titanium, steel, kovar – LTSK4 series, chip trimming – ML5 series, additive manufacturing – ML6 series.

Zelax is a leading developer and manufacturer of data network solutions. The company earned its reputation of the reliable telecommunication equipment manufacturer as a result of a long-term cooperation with the largest strategically important enterprises of the Russian economy and government institutions.

Zelax production facility and research center located in Zelenograd allows accomplishment of the full production cycle: from design to manufacturing of modern equipment with custom parameters.

The unique design and the achievements of the world leading companies in the field of microelectronics, reliability, optimal price-quality ratio, full adaptation to Russian transport networks enable customers to effectively implement Zelax solutions for data transmission systems via fiber-optic and copper lines.

Zelax has a team of highly qualified professionals. The company employs about 120 people. Employees’ average period of operation in Zelax is more than seven years. 31% of the staff work for more than 10 years.

The company manufactures wavelength-division multiplexing systems, routers, switches, multiplexers, modems, TDM over IP gateways, converters, surge protectors and other telecommunications equipment.
GENERAL INFORMATION
Adel Instrument company specializes on production and sales of professional diamond tools for the construction industry. The company offers not only high-quality diamond tools but also modern technologies that raise the tool’s resource and work productivity significantly.
In 2012, Adel Instrument company purchased laser equipment for a laser welding of segments on core bits and saw blade that allowed to expand the diamond tool assortment and to improve the quality of production.
Adel Instrument company provides a full range of services including maintenance and repair of the equipment and tools, original product development for special tasks, solution in non-standard conditions. The specialists of the company hold consultations and trainings on how to use the equipment and diamond tools.

RESEARCH AND DEVELOPMENT
Technical development department carries out work on the following directions:
• Improvement and creation of new designs of the diamond tool and diamond segments, new production technologies.
• Research and development of new modern materials for diamond technologies use.
• Diamond tools and leading producers’ developments, world market conjuncture study.
• Current technical control of raw materials, semi-finished and final products.
The plant production laboratory conducts scientific researches together with the well-known national and foreign companies to develop segments and introduce new materials.
The laboratory is equipped with the modern equipment for research and quality control of materials and testing stand as well.

PRODUCTS AND SERVICES
The Adel Instrument Company offers a wide range of diamond tool and equipment for operation in various areas of construction:
• diamond core bits;
• diamond saw blades;
• grinding diamond tools;
• diamond wire;
• floor cutter;
• diamond core drilling system;
• grinding equipment;
• milling equipment;
• equipment for cleaning joints and enlarging cracks;
• crack cutter;
• wire cutter;
• plate compactors;
• wall saws.
GENERAL INFORMATION
NT-MDT Co. was founded in 1990 in Zelenograd, the center of Russian microelectronics, and aimed at providing researchers with devices capable of performing a wide spectrum of tasks on nanoscale objects on the base of experience and knowledge of its founders. In a relatively short time, the company grew from a small group of enthusiasts to a major concern with a worldwide reputation. Over the years, more than 4,000 devices were successfully installed in the largest scientific and industrial centers of Europe, Asia and North America. Today, NT-MDT is the undisputed leader in the Russian SPM market and is well known worldwide.

The company’s mission is to bring the Russian scientific instrumentation at the leading position in the world market. The company is moving towards this goal, relying on advanced development of the best research teams in Russia, and through continuous improvement of its own competence in the field of development, production, marketing, and modern management techniques.

RESEARCH AND DEVELOPMENT
Our recent developments are among the hundred of the highest world achievements in instrumentation (see the contest results of Research&Development www.rdmag.com).

TECHNOLOGY
The company’s product range today includes devices of unique and most effective characteristics in their class. Integration of the latest technological achievements will continue to be the main vector of our progress. Each of the company’s products is designed to solve the problems of the end-user, ranging from training and retraining of technical and scientific staff to creation of new facilities and devices.

INFRASTRUCTURE
In addition to the Central office in Zelenograd, the company has offices in Apeldoorn (the Netherlands), Limerick (Ireland), Tempe (Arizona, USA), Shanghai (China), as well as a wide network of representatives worldwide.

PRODUCTS AND SERVICES
- Accessories for scanning probe microscopy: probes, calibration gratings, test samples.
- Educational SPM NANOEDUCATOR II for design and research activities in schools and Universities.
- Automated SPM with a very wide range of AFM/STM modes for applications in science and industry.
- Modular NTEGRA SPM for scientific research. Flexible modular design allows the development of configuration that is most appropriate for a particular research just by simple replacement of units.
- AFM-Raman-SNOM measurement systems based on scanning probe and optical methods of microscopy/spectroscopy for scientific research and practical applications. Provides the widest range of measurement techniques, including wide-field and confocal microscopy / spectroscopy (including Raman).
- Autonomous technological facilities ETNA 100 for group plasma and magnetron sputtering process on substrates of up to 100 mm diameter.
- Modular nanotechnology complexes (NTC) NANOFAB, containing process units with capabilities of group and nanolocal methods for processing substrates of up to 100 mm diameter. With NTC NANOFAB, you can create a factory for a small-scale production of fully functional nanostructures and nanodevices as well as nanosystems based on them.
Open joint stock company Practic-NC was founded in 1990 and it is a manufacturer of high-accuracy modern and reliable equipment. The main directions of our activities are the development, manufacture and sale measuring and control devices for regulation parameters of technological processes and microclimate and also the supply of complex measuring systems.

We offer a wide variety of own production measuring equipment: stationary measuring-control of relative humidity and temperature thermohygrometers IVTM-7, hygrometers of dew point IVG-1, gas detectors, devices for gases drying, aerodynamic system AU-2, gases preparation systems SPG. All devices can be combined in a common measurement system using specially developed software.

The specialists of our company constantly carry out research and experimental works for enterprises of the defense complex and the aerospace industry.

We produce products which have been using successfully on the enterprises of chemical, metallurgical, oil and gas processing industry, communication centers, construction and agriculture (greenhouses and storages), in bakeries, meat and poultry farms, power objects and utilities, and many other enterprises in Russia and abroad.

Our company’s specialists regularly participate in international scientific conferences and exhibitions suitable to the company’s activities. All that allows us to be aware of the latest developments and offers, guarantee the high quality of manufactured products and lead to creation of modern type measuring devices.

The company expands products range regularly. Each year we launch manufacture of several product types. Following the Customer request, our specialists carry out installation of automated systems “turn key”, provide calibration and technical service. The devices’ modernization is carried out in accordance with the Customer requirements, for example, power modification or special changes in construction of measuring probes. We develop and manufacture new models of control and measurement devices.
ECOLOGICAL SENSORS
AND SYSTEMS CJSC (CJSC ES&S)

CJSC Ecological sensors and systems (CJSC ES&S) was founded in 2003 on the base of one of the branches of JSC Practic-NC – a well-known manufacturer of professional test and measurement equipment. It has been working successfully and permanently for more than 25 years. The main directions of our activities are development, manufacture and sale of measuring and control devices, which are in the greatest demand among consumers. Besides that, the specialists of our company constantly conduct researching and experimental design works to develop new products and improve existing modifications.

Our company’s researching activities are the development of new sensors for the analysis of gaseous areas, including nanotechnologies, registrations methods optimization and sensors signals stabilization, also the development and optimization of signal processing models, the development of new software for multichannel control of technological processes parameters and customer requirements.

The company develops, manufactures and supplies sensors, portable and stationary devices, also multi-channel systems based on them for control and regulation of technological processes parameters, environment and microclimate. We offer a wide variety of measuring equipment of domestic production: hygrometers IVTM-7, hygrometers dew point IVG-1, gas detectors, devices for gases drying, digital thermometers IT-17, the device for measuring flow rate TTM-2, aerodynamic systems AU-2, measuring-control and regulation device IRT-4, measuring the heat flux density unit IPP-2, gases preparation systems SPG. All devices can be combined into a single measurement network using specially developed software.

In addition to production and sales, we provide after-sales, technical service and government checking.

If you are interested in any devices, we are ready to supply them in the shortest possible time and at the lowest prices.
GENERAL INFORMATION
MELZ FEU, Ltd. was founded in 1906. Since 2008 MELZ FEU is located in Zelenograd. Nowadays, it is one of the Russian leading companies and global suppliers of Image Intensification Tubes (IIT), Photomultiplier Tubes (PMT) and Alkali Metal Dispensers (AMD).

RESEARCH AND DEVELOPMENT
Our own manufacture allows continuous and close cooperation with our consumers; as a result, we develop and produce equipment in various variants according to the Customer preferences.

One of the most interesting elaborations was creation of a submersible monocular to keep all technical forces during immersion to the depth of 20 meters.

For the purposes of providing security of special units during the antiterrorist operation MELZ FEU company has developed anti-glaring attachments for optical devices protection from being detected by special systems operating on the basis of laser location.

Within the frames of the import substitution program MELZ FEU has developed a dimensional and specification analogue for PMT, manufactured by Hamamatsu.

TECHNOLOGY
The production flexible structure, highly qualified technical personnel and the use of high-quality components allows us to create competitive, reliable and high-quality equipment with high performance. MELZ FEU has an active program of production modernization, purchasing equipment of world industry leaders and improving processes. Production facilities of the plant are built by severe vacuum requirements of hygiene. Our clean-room possesses the most modern technological equipment among Russian and western productions.

INFRASTRUCTURE
The manufacturing plant is located in technology park ELMA in Zelenograd, the center of Russian electronic and innovative industry.

Our infrastructure includes more than 3,000 m² of areas that host scientific and industrial divisions equipped with modern research, design, technology and testing equipment, which allows us to develop our production.

PRODUCTS AND SERVICES
The principal products of our enterprise are 2 (MX9644 type) and 2+ generation IITs, black&white tubes, UV tubes manufactured on the basis of Photonis-DEP company’s equipment and technology, and according to all their parameters are complete analogs of SuperGEN, SHD-3, XD-4. Our tubes meet the well-known international standards and are used in different types of night vision devices.

Another product of domestic production is Photomultiplier Tubes. PMT can be used in different types of geophysical, photometric, radiometric and spectrometric equipment. Photomultiplier Tubes work in a wide spectral range and have a strengthening factor practically without extraneous noise.

MELZ FEU also produces high temperature ultra-violet PMT, photomultiplier for spectral photon counting, micro-channel PMT, super short PMT with special protection from external magnetic fields.

Specification and quality control are realized in accordance with ISO, MIL-STD and additional requirements of the consumer.
SOVTEST MICRO LLC

GENERAL INFORMATION
The company's area of expertise is semiconductor test technologies, in-house design and production of test equipment for a wide range of semiconductor products (wafer and final package test), entire life-cycle technical and engineering support.

RESEARCH AND DEVELOPMENT
The company takes part in significant national projects:
• Universal identity card.
• Underground travel card.
• E-passport.
• Fiscal crypto protected memory for cash registers.

All the above mentioned smart-card chips are tested exclusively by Sovtest Micro test equipment and technologies amounting to approx. half a billion chips per year.

PRODUCTS AND SERVICES
• Test equipment of the in-house design and production for a wide range of semiconductor products.
• Engineering services for developing test solutions of any complexity.
GENERAL INFORMATION
Construction, Design and Technology Organization SKTO PROMPROEKT was founded in 2001. Core specialists of the company are professionals in design, technology, construction, etc. of Micron (Zelenograd, Moscow).
SKTO PROMPROEKT is one of the leading companies in the field of design, reconstruction and modernization of Hi-Tech industrial enterprises with clean rooms in electronics, precision instrument making, photonics, photovoltaics, scientific research. SKTO PROMPROEKT is a part of the Electronic Engineering Companies Association and the International Consortium of Russian, Czech and Slovak companies – EP GROUP.

RESEARCH AND DEVELOPMENT
The area of expertise is precision engineering industrial plants with clean rooms:

• **Electronics**
  Carrying on the best Russian and foreign traditions, SKTO PROMPROEKT offers its experience and knowledge in creating enterprises for chip production and VLSIs, RFID chips, smart cards, microwave transistors, power thyristors and diodes, IGBT modules, piezo- and acousto-electronic components, IR devices assembly.

• **Precision Instrument Making**
  Using cutting-edge technology and engineering solutions, SKTO PROMPROEKT creates industrial enterprises for image intensifiers, optical-electronic and radioelectronic devices, laser and MEMS gyroscopes, accelerometers, micromirrors, position control and navigation systems production.

• **Photovoltaics**
  Taking into consideration international design and construction experience, SKTO PROMPROEKT creates industrial enterprises in photovoltaics and materials science.

• **Scientific Research**
  Having some leading universities with clean rooms as partners, SKTO PROMPROEKT offers state-of-art solutions for R&D Centres, Nanotechnology Centres, R&D Universities creation.

PRODUCTS AND SERVICES
• Consulting.
• Planning.
• Design.
• Reconstruction.
• Modernization.
• Maintenance and Support.

SKTO PROMPROEKT provides engineering equipment procurement, specific installation works, Fit Up and commissioning works for clean room building elements, HVAC systems, process gases systems, process solutions (chemicals) systems, DIW stations, water treatment stations, etc.
SKTO PROMPROEKT also provides technology equipment procurement, specific installation works and Hook Up works. SKTO PROMPROEKT offers a full range of services for turnkey design, reconstruction and modernization of technology- and knowledge-intensive industrial enterprises with clean rooms. Works are executed by means of Russian highly professional engineers accompanied by specialists of well-known foreign companies, if needed.
GENERAL INFORMATION
SPC “Technovotum” is one of the leading Russian developers and producers of NDT devices, systems and software. Our company products provide non-destructive inspections of critical objects in industries such as: aircraft industry, railway transport, heat-power industry.
A distinctive feature of NDT devices is their universal applicability. One device platform unifies several flaw detection applications: ultrasonic, resonance, eddycurrent and impact flaw detectors, acoustic type strain gauge, coating thickness gauge, etc. A needed application is selected in the software list and run. All software were developed in accordance with existing NDT regulations and are provided with images and pictures in order to ensure the accuracy of the testing results and increase the inspection speed.

RESEARCH AND DEVELOPMENT
The company development is underway. Our newest products are the robotic NDT stations “Roboskop VTM-3000” that provides the complete inspection at all production stages of all sophisticated parts and assemblies. The station is multifunctional and can be adapted to various demands.

COMPETITIVE ADVANTAGES
- strict compliance with technologies;
- reduction of testing time;
- probe positioning accuracy;
- support of various NDT techniques: laser scan, eddycurrent, ultrasonic, impedance, resonance, impact inspection methods.

Our company products are applied in and outside Russia, in CIS, Baltic and other countries. In Russia, our company products are used by such enterprises as: «Russian Railways» JSC, MMZ «Vpered» JSC, Moscow Metropolitan, «Vostokheldorstroy» Ltd., «MVZ Milya» JSC, «GAZ» JSC, etc.

ESTO-VACUUM LTD
ESTO-Vacuum is a Russian developer and manufacturer of vacuum processing equipment and vacuum technologies. The company offers complete solutions for high-tech industries. The accumulated experience of the company allows us to organize all the processes in a single integrated network from the beginning to the end of the product lifecycle: design, equipment, installation and service.

AREAS OF ACTIVITIES
- Design and manufacture of vacuum processing equipment (sputtering, evaporation, etching of thin films).
- Guarantee service of our vacuum technological equipment, as well as equipment from other manufacturers.
- Testing technology and low-volume production in our technology service center.

ESTO-Vacuum has 4 series of vacuum processing equipment: Caroline, Solvac, Irida, Antares. A Technology Services Center was founded by the company for development of new methods of evaporation, etching, thermal processing and lithography.
GENERAL INFORMATION
Located in Zelenograd about 20 km from Moscow near international airport Sheremetyevo OKB Bulat is the innovative leader in the Russian industrial laser market. Our team of development engineers has succeeded in creating a new generation of laser devices by applying the most innovative laser conceptions as well as using the latest technologies in the field of optics, electronics and mechanics. Our customers are large industrial plants and research centers in Russia, Germany, France, Italy and other countries. Owing to our experience, we look to the future with confidence and are ready to meet any challenge. Today OKB BULAT is searching for new applications of our products and business cooperation with new partners around the world.

RESEARCH AND DEVELOPMENT
We have been developing laser technology, manufacturing high-tech solid-state lasers and completing laser systems for welding, cutting, marking, cladding, drilling and other technological applications for more than 20 years. We produce equipment for aviation, automotive, atomic, space, electronics industry, jewelry and stomatology. Flexible production structure, high professional skill and using of high quality components enable OKB Bulat to produce reliable and competitive high-tech laser equipment on the world market.

PRODUCTS AND SERVICES
The main advantage of our equipment is its multifunctionality and easy service. Using our systems allows you to do a full complex of technological operations: laser welding, cladding, cutting, marking and engraving. The majority of our systems is transported easily, so we can do the processing of massive tools or molds in the hard to reach the areas at the customers’ plants. Our service department is always in contact with our consumers and provides all the necessary support during each phase of project development on a 24 hours basis.

Our products:
1. Technological laser systems:
   • LRS series machines are designed to provide technological operations of laser welding, cladding, surface hardening.
   • LRS Automatic series are equipped with automated two-axis tables with a control system and are designed for carrying out various tasks in the sphere of laser welding, cladding, contour cutting and marking.
   • LRS AU series are designed for contour cutting and welding according to a pre-set program.
   • Lasers of HTS series are designed for operations being incorporated into machines that carry out welding and metal cladding, cutting sheet materials and drilling, as well as surface heat treatment.
   • Laser machines of HTS-Mobile series are designed together with OR Lasertechnologie GmbH for repair of moulds and stamps by the process of pulsed laser cladding which employs filler wire. Owing to the possibility of three-axis movement of a laser head and a large radius of an operation space, in which the processed object is positioned and manufacturing process takes place, repair operations can be carried out on large-size objects weighing up to several tons.
   • Laser machines of HTS-Portal series are designed for contour cutting, drilling, engraving, welding, cladding and heat treatment in an automatic mode according to a pre-set program. The laser head together with focusing optics moves over an immobile processed object. This considerably simplifies the work with heavy and large-size objects and work pieces, as well as makes it possible to cut out openings in finished articles.
   • Lasers of HTF series are designed for operations within machines conducting precision metal welding, cladding and heat treatment. They are characterized by high quality radiation, wide range of parameters regulation, simple structure, exploitation convenience and operational reliability.
2. Laser components and accessories.
   Our services include:
   • laser deposit welding with all materials: standard, precious and exotic;
   • manufacturing of pulsed solid-state Nd: YAG lasers;
   • manufacturing of complete laser processing machines for laser deposit welding;
   • technology consulting, service and support;
   • Research & Development of special applications with Standard and Exotic materials using laser welding technology.
EPIEL JSC

GENERAL INFORMATION
Epiel is the most advanced developer and manufacturer of Silicon Epitaxial Wafers and provider of Epitaxial Services to major chip manufacturers and research institutes in Russia. For over 15 years Epiel has been serving the needs of Russian microelectronics industry supplying Epitaxial wafers to more than 50 companies across the country.
Epiel manufactures a wide range of Silicon Epitaxial Wafers covering diverse microelectronics applications including Bipolar ICs, Discrete Power and many more. Having over 30 years’ experience in Silicon Epitaxy, our engineering team has developed a variety of specialized processes enabling Epiel to meet some of the most challenging technology demands of our customers. We focus our greatest efforts on offering our customers well-balanced products and solutions tailored to provide higher yield and best performance. This is achieved through close collaboration with customers and leveraging our engineering and manufacturing capabilities.

PRODUCTS AND SERVICES

<table>
<thead>
<tr>
<th>Silicon Epitaxial wafers</th>
<th>Silicon on Sapphire Epitaxial wafers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wafer size</strong></td>
<td>76, 100, 150, 200 mm</td>
</tr>
<tr>
<td><strong>Epi-layer thickness</strong></td>
<td>3.0–300 µm</td>
</tr>
<tr>
<td><strong>Epi-layer resistivity</strong></td>
<td>0.05–1,500 Ohm.cm n-type</td>
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<tr>
<td></td>
<td>0.05–1,000 Ohm.cm p-type</td>
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<tr>
<td><strong>Applications</strong></td>
<td>Integrated Circuits, Discrete Power, other applications</td>
</tr>
<tr>
<td></td>
<td>Rad Hard ICs, Sensors</td>
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</table>

RESEARCH AND DEVELOPMENT
Apart from manufacturing operation Epiel runs research and development projects in Epitaxial technology. Our engineering team has a long record of R&D projects carried out to support the company’s technological development as well as commercial R&D projects. Our engineering capabilities allow us to provide R&D in order to develop customized processes to customer specification and supply non-standard Epitaxial products such as Ultra-high resistivity (Intrinsic) Epitaxial wafers, Ultra-thick layer Epitaxial wafers, Multilayer Epitaxial wafers and other. The combination of engineering expertise and manufacturing capabilities makes Epiel a versatile partner to meet your specific Silicon Epitaxy needs.

INFRASTRUCTURE
Epiel’s production facility houses over 1,000 square meters of international class clean rooms. The facility is equipped with field-proven high-through Epitaxial deposition tools used by some of the world’s leading semiconductor manufacturers. Our facility has been undergoing steady growth and modernization based on accurate analysis of industry leaders’ experience and consultations with acknowledged industry experts. Today the company is moving further with its development by increasing Epitaxial wafer production capacity and introducing 200 mm Epi products for Power device and Integrated circuit applications.
To ensure extensive customer satisfaction our Quality Management System has been certified to ISO 9001:2008 standard and is regularly audited both by internal analysts and external experts.
GENERAL INFORMATION

Founded in 1963 as a center of Russian semiconductor industry, today Angstrom PJSC holds the status of the largest domestic developer and manufacturer of semiconductor IC’s and semiconductor devices as well as RFID. By developing hi-tech competitive microelectronics products company takes part in strategic State projects and expands its presence on international markets with CMOS VLSI, semicustom VLSI at ULA, Power Electronics, encryption schemes, LCD and LED-drivers, memory, FPGA multiplexers, IC’s for telecommunications and etc. Angstrom PJSC has expertise in developing of electronic components, devices and system solutions for the following spheres and industries: airspace and aviation, nuclear energy plant, gas-and-oil industry, sea wave and wind energy, railways, livestock, jewellery, truck transportation and logistics, LED lighting.

RESEARCH AND DEVELOPMENT

R&D center includes various design houses (a full cycle of analog design, digital design), libraries & PDKs & FDKs design), performs design both for own semiconductor lines and external customers.
- The development of microelectronic components of various products.
- The development of microelectronic components CAD.
- The development of microelectronic technologies: CMOS, BCD, SOS, SOI, SiC, UTf3, MOSFET, IGBT, BiCMOS, TRENCH.

MANUFACTURING FACILITIES AND AVAILABLE TECHNOLOGIES:
Angstrom PJSC consists of 2 semiconductor lines, powerful design-center and an assembly line:
- Assembly to the following packages: QFP, QFN, SOIC, SOT, DIP, SOP, TO, CLCC, PLCC, metal-ceramic packages.
- RFID tag & smart cards assembling equipment.
- Assembly of multichip modules by 2D and 3D technology.

PRODUCTS AND SERVICES
Angstrom PJSC supplies more than 2,000 part numbers of various products:
- standard logic ICs;
- MCU and MPU;
- memory ICs (Flash, ROM, SRAM, EEPROM);
- FPGA ICs;
- interface ICs;
- analog ICs (operation amplifiers, comparators);
- ADC and digital to analog converter;
- radio frequency ICs (mixers, attenuators, synthesis circuits, frequency dividers)
- RFID;
- power MOSFET transistors n- and p-type;
- power IGBT, FRD and IGBT-modules;
- power management ICs (supervisors, PWM-controller, DC-DC, MOSFET-, IGBT-, LED-drivers);
- power multiplexers;
- smart power electronics;
- optoelectronics ICs;
- MEMS.
ELVEES NEOTEK JSC

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Web-site www.elvees.ru
Director Ivan A. Pominov

GENERAL INFORMATION
ELVEES-NEOTEK specializes in design and manufacture of innovative security systems, business monitoring software top-level information and analytical decision support systems in large-scale distributed systems metropolis with infrastructure and traffic. ELVEES-NEOTEK creates innovative security systems and monitoring business for the domestic and world markets. The company is a technology partner of system integrators in Russia and abroad. The expertise of the company is confirmed by numerous implementations in Russia (Sheremetyevo International Airport, the objects of RusHydro, Gazprom, etc.) and abroad (Israel, the U.S., England, etc.).

RESEARCH AND DEVELOPMENT
Systems JSC ELVEES-NEOTEK are based on computer vision and video analytics. Their implementation can reduce the influence of the human factor, reduce the number of operators to build large-scale distributed systems metropolis, at the same time solving the problem of urban security, business monitoring, and management with infrastructure and traffic.

PRODUCTS AND SERVICES
• Orwell 2k video surveillance system with computer vision. A security video surveillance and business monitoring system for 24/7 all-weather guarding of perimeter and territory of objects as well as their approaches by means of automatic target (humans, vehicles) and alarm situation (ignition, fumigation, abandoned object, etc.) detection and classification with automatic transmission of video information to the operator in a real-time mode.

• Orwell-R object perimeter and territory guarding radar system. A radar system for guarding objects with extended perimeter, unenclosed territories and water areas including objects of the “water-land” class (hydroelectric power stations, river and seaports) with extended perimeter.

• Senesys-Avto vehicle passage control system with license plate number and vehicle appearance recognition. A system for automation of vehicle passage and presence control on the guarded territory with algorithms of computer vision for recognizing vehicle license plate numbers and their verification by appearance.

• IPCam-Parking video camera for license plate number recognition and lifting barrier control. A video camera with embedded algorithms for license plate number recognition and a vehicle database. IPCam-Parking is used for access automation at the traffic checkpoints.

• Orwell 2k-TraVio traffic situation monitoring and control system. A system for automatic detection and classification of traffic situations, real-time transmission of information thereof, traffic density analysis and providing information for traffic management.

• Statistics customer counting video system. A professional tool for customer counting based on video surveillance and algorithms of computer vision.

• Pass office software complex with on-line application system. An electronic system for application filing and approval, as well as pass preparation and printing for life cycle automation and tracking of employee and visitor passes in the company.

• Orwell 2k-Neptune video surveillance system for river and marine vessels. A system for 24/7 all-weather guarding of the vessel’s close perimeter, advance automatic warning about approaching vessels or people and movement towards the reefs, prevention of illegal intrusion as well as detection and classification of emergencies on board of the vessel.
GENERAL INFORMATION
Transaction Systems (TRSYS) is an international innovative company, a software developer that provides payment infrastructure for cash and cards payments in Europe, Africa, Russia and CIS countries.
In 2013 TRSYS became a part of diversified holding ITG (INLINE Technologies Group), which is placed on the 3rd position in the ranking of IT solution suppliers for banks, according to the CNews Analytics rating 2014.
The company goals:
• Development and implementation of acquiring technologies in retail.
• Development on innovative technologies in banking acquiring.
• Client yield increase by implementation of non-cash payments acceptance.
• Client Costs decrease connected with cash acceptance.

TECHNOLOGY
Scientific and technical expertise and many years of experience in the market of payment technologies allow TRSYS company to offer its customers unique competitive solutions for business development.
All solutions are compliant to the relevant requirements of the acquiring market and satisfy the highest quality standards.
CISBase is a multiplatform software application for POS-terminals, PINpads and vending systems. CISBase is suitable for effective work on Verifone, Hypercom, PAX and Ingenico platforms. COSBase helps banks-acquirers to reduce costs on POS-terminal management.
TRPOS is a PC based software module designed for interaction between POS-terminal or PINpad and ECR software located on PC. TRPOS is installed on ECR PC for automation of banking card acceptance and for fast customer service at the checkout point.

PRODUCTS AND SERVICES
TRSYS offers:
• Multiplatform software application for POS-terminals, PINpads, and vending systems, suitable for effective work on 4 main platforms (VeriFone, Hypercom, PAX, and Ingenico).
• POS terminal hardware for all card types acceptance.
• Glory money handling machines.
• Payment kiosks.
• Plastic cards of all types, including contactless.
• Services for non-cash payment acceptance arrangement in retail — Payment Service Provide (PSP).
• POS terminal hardware service support and Glory machines service and support.
MULTIPAS LLC

GENERAL INFORMATION
Multipas Company was founded by a young at heart but experienced team of people working over two decades in the card payments industry. Over those years our team was involved in a complete cycle of product development including design, prototyping, testing, certification, manufacturing, and distribution of sophisticated payment hardware and software for the card payments business. Solutions developed by our team have been highly acknowledged by top vendors of POS payment terminals.

Multipas Company develops hardware and software for devices accepting bank cards (POS-terminals). The company’s solutions involve a convenient means for cashless payments in different types of business:

- Stores: supermarkets, hypermarkets and small shops.
- Online shops with express delivery. There are different online stores that use POS-terminal Yarus C2100 to accept bank cards when delivering orders.
- Vending (trade by self-service machines). POS-terminal Yarus Vendotek T2100 can be built into vending machines and allows buyers to pay by bank card or NFC smartphones.
- Public transport. POS-terminals Yarus are used in ticket machines, turnstiles, validators.
- Bike rental stations. In Moscow you can rent bikes at Velobike rental stations, using the device of Multipas Company to pay by a credit card.
- Paid parking. Automated parking systems in Moscow, Sochi, and Ekaterinburg are equipped by POS-terminals Yarus.

WHAT IS OUR PHILOSOPHY?
We believe in cashless payments. That is our philosophy that we combine with our extensive business and technical knowledge within innovative cashless products we proud to deliver.

We also believe cashless payments have a much broader potential. With convenience of contactless technology we see that potential is even higher. Cashless payment has now become available in those places where traditionally Mr. Cash was always “the king”.

Public transit fare collection, vending, a self-service kiosk, and car parking businesses were long time ignored by cashless technology providers. But not anymore.

Customers demand a convenient, cashless, fast and secure method of payments. Business demands additional revenue streams through new payment channels.

Multipas Company is happy to bring innovative cashless payment solutions to business and its customers.

PRODUCTS AND SERVICES
Systems for trade automation:
- Solutions for outlets – Yarus P2100, Yarus C2100;
- Solutions for self-service (paid parking, gas station, bike rental, etc.) – Yarus K2100, Yarus T2100, Yarus T2100Lite;
- Solutions for online stores with express delivery – Yarus C2100 with the application “Orders Manager”;
- Solutions for vending – Yarus Vendotek T2100, Yarus T2100Lite.

The Multipas Company provides software modification services according to customer requirements.
GENERAL INFORMATION
TS-Market Ltd. was established by Telesystems Ltd. on October 23, 2001 as its export agent for the trade activity overseas. Later, TS-Market became an independent export-trading company, promoting security devices of Russian origin worldwide. Within 15 years, we greatly expanded the supplied product range and the geography of distributors. We cooperate with dealers from countries such as: the United States, Canada, Great Britain, Czech Republic, Romania, France, Germany, Italy, Spain, Israel, China, Australia and many others.

PRODUCTS AND SERVICES
We offer 5 major groups of professional security products:

• Ten series of the Edic-mini miniature professional Digital Voice Recorders
The recorders we supply are unique due to its miniature sizes and technical characteristics. We have already registered several of our models in the Guinness Book of Records as the smallest digital voice recorders in the world.

• Series Non-Linear Junction Detectors
Lornet devices fulfill a wide range of tasks in information security and its characteristics are highly competitive to the best examples of the world’s leading manufacturers. These detectors are used while conducting strategic and search work afield, in rooms and transport, and are designed to find special equipment containing semiconductor components.

• Series Metal Detectors
We promote full sized professional, computerized, highly sensitive selective metal detectors for searching and identifying metal objects in the dielectric and low conducting media (soil, brick walls, dry sand, wood, etc.) and handheld inspection metal detectors.

• Series Selective Detectors
The models of the series are designed to detect and locate radio transmitters that are used for unauthorized recording of audio and video, as well as to measure their power output.

• Series Technical Surveillance Countermeasures Devices
This series includes devices for location of portable systems of secret observation, cellular phone jammers, night vision devices, thermal images and other.

Vigorous demand for our high-end devices shows that they do appeal to professionals due to their technical features and convenient design.
We strive in everything we do to meet all the interests and requirements, as well as high standards to develop cost-effective solutions of high-end and versatile audio and video recording techniques. We make sure your orders are manufactured in accordance with all international safety regulations.
ELTOCHPRIBOR

GENERAL INFORMATION
ELTOCHPRIBOR is a Russian engineering and scientific-production company that carries out a complex of works on creation of technological gas supply systems of industrial facilities and research centers.
The company ELTOCHPRIBOR develops the following activities:
• design, installation and examination of technological gas supply systems of high-tech industries;
• development and production of gas supply systems and gas distribution systems components;
• R & D and production of gas systems components: mass flow controllers (MFC), gas pressure regulators, valves and fittings.

RUCAP LLC

GENERAL INFORMATION
RUCAP conducts applied research and development in the area of local positioning of objects since year 2005.
RUCAP specializes in set-up and implementation of solutions for real-time precision tracking on the base of ultrasonic, optical, inertial, radio, electromagnetic technologies – own patented developments are applied. Our company also develops radio technical and electronic systems for consumer and professional markets: metrical, portable devices, automatic controls, device bridging.
RUCAP performs a full cycle of electronics development, including model and industrial design, serial production. Company’s solutions are installed on different objects of city infrastructure, professional training facilities and International Space Station.
RUCAP has Federal Space Agency license and ISO 9001 Quality Management System certificate.

PRODUCTS AND SERVICES
• UM-16 tracking system for professional simulators and virtual reality equipment – real-time tracking of objects and people within preset operating zone with 0.5 mm/0.5° accuracy.
• RUPARK navigation system for indoor parking – indication of free parking lots and driver guidance.
• Development of tracking systems and portable radio technical and electronic systems.
NPF BIOSS

GENERAL INFORMATION
NPF BIOSS was founded in 1992 by the scientists from radio electronics department at Moscow Institute of Electronic Technology (MIET). At present, NPF BIOSS is one of the leading Russian medical equipment manufacturers. Medical ultrasound diagnostic equipment production is the main company’s activity. NPF BIOSS develops new devices and upgrades existing models in close collaboration with plenty medical institutions.

PRODUCTS AND SERVICES
A wide range of BIOSS medical diagnostic devices includes the following products already launched in the market:
- ultrasound scanners;
- doppler spectral devices for cerebral peripheral blood flow evaluation;
- one-dimensional ultrasound scanners (echoes, sinus cans);
- fetal monitors;
- system for the treatment of hemorrhoids under the Doppler control.

The aim of the company is to equip the state and private medical institutions in every region of Russia. The company sees its mission in equipping of medical institutions by high-tech domestic medical devices. The main tendency is the perfection of ergonomics, reliability, interactivity and functionality of developing devices.

In the nearest future BIOSS is going to implement new developments in accordance with medical industry demands and technological advances. It is the basis for BIOSS leadership at Russian market and improvement at the world market. To enter the world market BIOSS carried out the ISO 9001-13485 certification of the manufacture and CE-marking of the products.
INNOVATION CENTER FOR BIO TECHNOLOGY

Pharmaceutical company “Innovation Center for Bio Technology” was established for organization of serial production and sales of original and combined immune biological drugs, and other pharmaceuticals (generics), scheduled to launch in the near future. The level, area and production capacity possessed by our company allow drugs manufacturing in conditions that meet the requirements of GMP, in amount sufficient to fill the market of import substitution.

RESEARCH AND DEVELOPMENT
• The development and production of original combined preparations on the basis of a combined complex of immunoglobulins:
  - with naphazoline or phenylephrine (nasal variant);
  - with ofloxacin (eye version).
• The development and preproduction preparation of generic and combination drugs in other dosage forms (ointment, suppositories, etc.).

PRODUCTS AND SERVICES
• Immunoglobulin complex preparation Triglobin containing serum immunoglobulin of classes IgG, IgA and IgM with high specific activity against herpes viruses, rotaviruses, adenoviruses, influenza, chlamydia, staphylococci, enter bacteria (Shigella, Salmonella, Escherichia) and other pathogenic microorganisms. The drug is effective in treatment of acute intestinal infections of various etiologies.
• Generic drugs (generic drugs):
  - in the form of nasal drops and spray on the basis of naphazoline (similar Senorina) or phenylephrine (an analogue of Vibrocila), used as a decongestant in the treatment of rhinitis, sinusitis, pollinosis;
  - in the form of eye drops on the basis of ofloxacin (similar Floxal), used as an antibacterial agent in the treatment of conjunctivitis, blepharitis, etc.
NEOBIS LLC

Address: 5-23 Proyezd 4806, Zelenograd, Moscow, 124498, Russian Federation
Phone: +7 (903) 533 32 60
E-mail: info@bio-nano.ru
Web-site: www.bio-nano.ru
CEO: Yury V. Grishin

GENERAL INFORMATION
NEOBIS company was established by a development team of REC Probe microscopy and nanotechnology MIET with participation of Zelenograd nanotechnology center in 2011. The equipment and specialists we have allow us rendering a wide range of service in bio- and nanotechnologies for our customers. Our main business area is the development of laboratory equipment for cell biology and regenerative medicine.

RESEARCH AND DEVELOPMENT
At the moment in cooperation with the partners we observe and analyze the influence of electric field and electric current on cells. The recent research has already proved the efficiency of similar technology for cell proliferation index increase, targeted stem cell differentiation, abiotic polymerization increase and viral transfection. The operating principle of our technology is based on cellular voltage potential shift. The voltage potential influences metabolic activity and the activity of transport links in cellular membrane.

PRODUCTS AND SERVICES
NEOBIS service includes contract R&D and multiple investigations of nanoparticles and nanomaterials by means of scanning probe microscopy, electron microscopy and Raman spectroscopy.

ESDIAR LLC

Address: bld. 8 Solnechnaya alleya, Zelenograd, Moscow, 124527, Russian Federation
Phone: +7 (499) 322 81 81
E-mail: info@esdiar.com
Web-site: www.esdiar.com
Chief Executive Officer (CEO): Kirill V. Pozar

GENERAL INFORMATION
Company ESDIAR was founded in 2013 by the graduates of National Research University of Moscow Institute of Electronic Technology (MIET). ESDIAR team includes practicing students and postgraduates, young scientists, researchers and developers. ESDIAR is located in special economic zone of Zelenograd.

RESEARCH & DEVELOPMENT (R&D)
The main trend of the company is design development of innovative medical devices. The research of scientific and practical value is also performed alongside with applied projects. The results of scientific work are published in leading Russian scientific magazines. ESDIAR team includes Doctors and PhDs in the fields of chemistry, technical and mathematical sciences. A unique laboratory set up for electrochemical research of materials properties is also under development.

PRODUCTS AND SERVICE
ESDIAR team works on the following projects: a non-invasive glucose meter; an automatic system for subcutaneous insulin delivery; blood separation; a wearable coagulation analyzer; an apparatus for biological fluid purification and development of electronic units for complex diagnostic systems for human organism parameters monitoring.
GENERAL INFORMATION
The company Medical Computer Systems (MCS) is specialized in design and manufacture of high-tech medical devices since 1993. Projects include a wide spectrum of diagnostic and therapeutic equipment such as EEG, ECG, automatic external defibrillators, biomedical amplifiers for clinics and researches.

RESEARCH AND DEVELOPMENT
Innovation is the key to successful devices, and MCS is committed to remaining on the cutting-edge of technology. As soon as a new technology is developed, it is integrated into our solutions to benefit our clients. For instance, we were among the first to use sigma-delta AD converters for biomedical devices. DSP-technologies, state-of-the-art algorithms and embedded real-time OS are extensively used by our engineers.

During the initial phases of a project, a lot of time is spent with clients to analyze their requirements and specifications, crystalize the concept and select the best solution. Several specialists – industrial designer, mechanical, electrical or software engineers, or specialty consultants – are involved in this feasibility phase to ensure that the client’s objectives in terms of clinical performance, costs, manufacturability and patentability are met or exceeded in order to maximize the investment. Simple concept drawings or complete presentation-quality 3D models can be presented depending upon the client’s needs. This step eliminates a bulk of development risk early on, and can serve as an important milestone for the client and potentially for its investors.

The medical electronics field is strictly regulated by domestic and international regulations and guidelines. Taking into account these regulations early on saves a lot of time, money and heartache later in the development cycle. MCS has a valuable experience in this process. MCS provides electronic circuit development for analog and digital boards, micro-controller, DSP, and drivers programming, 3D modeling, verification and validation. Using the latest integrated development tools, our team provides product reliability, horsepower, and flexibility. As a part of the most development programs, verification testing is performed throughout the development process to ensure that we stay on course toward a successful endpoint. After completion of the design phase, a series of validation tests is typically orchestrated in order to address any shortcomings relative to the original design goals. We encourage the involvement of outside validation engineers during this process in order to maximize objectivity.

PRODUCTS AND SERVICES
MCS provides a complete engineering solution for firms in the medical device area as outsourcing product development by efficient, innovative and cost-effective team.

Once the design is completed, a full documentation package is handed to production. Alternatively, MCS can organize manufacturing of the product in the ISO certified facility.

Projects cover a wide spectrum of EEG equipment and accessories: clinical electroencephalography, EEG amplifiers for research, including multi-channel amplifiers (more than 160 channels), MR compatible EEG amplifiers, wireless EEG recorders, active EEG electrodes.

Partners of MCS are the leaders of EEG equipment for scientific research world market.

MCS supports the international quality system ISO 9001, ISO 13485 and manufactures many products with CE marking for the demanding European market.
GENERAL INFORMATION
A researching company Plasma-FTC was created in 2009 to carry out activities in development, production and sales of a safe hemostat with no domestic counterpart – a surgical fibrin-thrombin glue Kriofit. In recent years LLC Plasma-FTC has developed the necessary materials, and in 2012 the mass production of glue Kriofit was organized with capacity of 48,000 ml per year, with a 2-shift operation. The patent for a utility model number 110991 “the complex for production of packaged component fibrin-thrombin medical adhesive from plasma of donated blood”, and the trademark Kriofit (certificate number 443714) are owned by LLC PLASMA-FTC.

RESEARCH AND DEVELOPMENT
With the support of the Foundation for Assistance to Small Innovative Enterprises in Science and Technology under the “Start” program in the period from 2010 to 2013, Zelenograd company PLASMA-FTC has developed a manufacturing technology for a fibrin-thrombin surgical glue Kriofit of a plasma donor, and made prototypes of glue Kriofit, performed its preclinical and clinical trials in the leading medical centers in Moscow. Glue Kriofit was registered by Russian health supervision agency.

TECHNOLOGY
The production technology FTC Kriofit is the first domestic technology for a fibrin-thrombin glue production. Necessary materials and components used in medical products manufacture are available. Basic material – plasma – is supplied by blood centers, and because of the technology used for virus deactivation there is no need to test results during the quarantine period, and it is guaranteed to be devoid of viral pathogens of plasma that allows you to purchase it at a reasonable price.

INFRASTRUCTURE
LLC Plasma-FTC is the center of planning and management of medical products development with individual productive stages, ranging from R&D and ending with organization of production and sales. The project team comprises specialists with a sound experience in the biopharmaceutical sector and production of medicines from blood plasma. It created a production facility capable of providing health facilities and products that have no competitors locally and feature the best performance and a lower cost if compared with imported analogues. The company works on development of a mobile complex for production of glue from plasma of the operated.

PRODUCTS AND SERVICES
The surgical fibrin-thrombin glue Kriofit (FTC Kriofit) is a medical substance capable of hemostasis, tissue joining, and having disinfectant properties. It is used for wound edges fixation, instead of stitches. Glue Kriofit is widely used in surgery: in oncology, respiratory organs, heart, and neurosurgery, abdominal, vascular, female genital mutilation, aesthetic surgery and during a postoperative period.
Scientific Research Institute of Microdevices named after G. Guskov JSC (SRIM) occupies a strong position in the field of space microelectronic devices, special radio communication HF, VHF, UHF, Microwave bands and radio radar equipment for ground and airborne equipment.

Currently the institute possesses four developing departments with a total amount of about 200 persons, including graduate students – 4 persons, PhDs – 8 persons, Doctors – 2 persons:

- Department of devices and radio communication systems.
- Department of transceivers and modules.
- Department of radiolocation systems.
- Department of space equipment.

We carry out the design and manufacture of a complete production cycle of microelectronic products for civilian and military purposes.

RESEARCH AND DEVELOPMENT
The main directions of SRIM are:

- design and manufacture of microelectronic equipment for ground, airborne and space systems;
- development of small-scale production;
- commissioning, repair and maintenance.

The main directions in radio electronic devices development are:

- development and manufacturing of AESA transceiver modules for stationary airborne and space radars in the L, S, X, Ku and Ka band;
- development and production of radio microelectronic devices in the frequency band from 1 MHz to 40,000 MHz;
- development and manufacturing of solid-state microwave frequency synthesizers and power amplifiers up to 500 watts in a frequency band from 1 MHz to 40,000 MHz;
- development and manufacturing of on-board transceivers;
- development and manufacturing of components and devices for satellite systems (control and signal processing units and a radio link to an operating frequency range from 0.8 to 40 GHz);
- development and manufacturing of automated control systems and communication systems HF, VHF, UHF and Microwave bands;
- development of new technologies and electronic components.

PRODUCTS AND SERVICES
Scientific Research Institute of Micro devices named after G. Guskov produces not only standard devices and equipment, but also products according to specific customer requirements to meet various needs.

LICENSES AND CERTIFICATES
All work carried out by the Scientific Research Institute of Microdevices named after G. Guskov are carried out in the framework of the necessary licenses and certificates.
## GENERAL INFORMATION
TRIZA-Sputnik Ltd. has been into staff recruitment of overqualified specialists for microelectronics plants and related industries since 1992.

Recruitment agency TRIZA-Sputnik deals with recruiting of staff as well as temporary employees, outstaffing, it also monitors the demand for staff in companies and conducts the marketing research of wages and working conditions level. The recruitment for companies is carried out in tight deadlines with a guarantee period from 3 to 6 months.
The agency deals with staff recruitment in Moscow, Zelenograd, Khimki, Lobnya, Solnechnogorsk, Sheremetevo, Istra, Istrinsky and Solnechnogorsky districts.

Our key customers are large international and russian enterprises, branches of foreign companies in Russia, etc.

## RESEARCH AND DEVELOPMENT
- Labor market research in Zelenograd including systematic monitoring of specialists.
- Identification of demand for staff in companies.
- Development of Know How recruitment technology – “Technological stages of recruiting”.
- Cooperation with a number of higher education institutions to interview and promote the most talented students in the labor market.
- Development of internal recruitment system integrated into the database of specialists in the field of microelectronics at ASP .NET.

## TECHNOLOGY
- Recruitment system integrated into the specialists database.
- Know How Recruitment technology – “Technological stages of recruiting”.

## INFRASTRUCTURE
- Department for recruiting staff for companies.
- Department for recruiting temporary staff.
- Department for recruiting staff for families.
- Department of IT-development.

## PRODUCTS AND SERVICES
- Recruitment.
- Temporary staff recruitment.
- Staff assessment.
- HR records management.
- Outstaffing.
- Psychological consulting.
- CV writing.
- Consulting for specialists promotion.

Researching and reporting on wages, working conditions and specialists’ demands on the labor market.

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<table>
<thead>
<tr>
<th>Address</th>
<th>617, entrance 2, floor 1, Zelenograd, Moscow, 124489, Russian Federation</th>
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</thead>
<tbody>
<tr>
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<td>+7 (499) 736 69 87, +7 (499) 735 85 46, multiline ph. +7 (495) 739 07 82</td>
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<tr>
<td>E-mail</td>
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</tr>
<tr>
<td>Web-site</td>
<td>jobcv.ru</td>
</tr>
<tr>
<td>Director</td>
<td>Yury K. Poletaev</td>
</tr>
</tbody>
</table>
REDWIN GROUP is a marketing consulting agency that goes beyond standard algorithms and proposes complex solutions for business tasks on the base of intellectual property, analytics, creative input and wide production capabilities. We are aimed at the growth and consolidation of our clients and their brands at various market conditions.

RESEARCH AND DEVELOPMENT
The development project of the company is a software solution for testing visual materials going alongside with the product launch at the market – the software application suite “P-Survey”. This software product allows testing any package design, point of sale design and visual concept of an advertising campaign – from the initial development stage till the material introduction to the market as such. It is intended to predict the effect of the developed material on the targeted audience. The preliminary tests carried out with the help of the software can give analytical data not only to big companies. Startups and small businesses can afford them too. Moreover, the well-timed online tests help to save money on trial and new materials production, in case the concept did not have the expected effect predicted by the experts.

PRODUCTS AND SERVICES
- Marketing analysis.
- Brand and TM development.
- Complex solutions for brand consolidation at the market.
- Marketing consulting regarding the brand name/tradename creation and evolution.
- Strategic planning.
- Creative concepts development.
- Graphic commercial design: logotypes, corporate style, brand books, packages, POS materials.
- DTP, catalogues and etc.

MAICOM SYSTEMS CJSC is a subsidiary of German company Maicom Quarz GmbH. The company has two business areas:
1. Providing a full range of logistics services for the delivery of cargo from the foreign supplier to the production facilities of the Russian Customer (door-to-door). Here Maicom Systems acts as an importer of record, i.e. imports the goods, pays all necessary taxes and duties, and delivers goods to Russian Customer under a ruble contract.
2. Providing the selection, delivery, installation, guarantee and on-site assistance service of equipment for semiconductor industry. Maicom Systems provides the Customer with spare parts, consumables and raw materials. The company also provides R&D according to the Customer’s needs.
PRODUCTS
SILICON EPITAXIAL WAFERS

APPLICATIONS
Basic substrate material used in microelectronics for fabrication of integrated circuits and other semiconductor devices.

SHORT DESCRIPTION
Silicon Epitaxial Wafer is an ultrapure semiconductor monocrystalline silicon wafer with a thin layer of monocrystalline silicon deposited on top of it by Chemical Vapor Deposition (CVD). The aim is to have a silicon layer of uniform thickness and accurately controlled electrical properties and so to provide a perfect material basis for the subsequent formation of device element in it. Epiel manufactures a wide range of Silicon Epitaxial Wafers and provides Epitaxial deposition services to microelectronic device manufacturers in Russia and Worldwide. Our versatile product range is comprised of Silicon Epitaxial Wafers for numerous applications including standard Epi-based devices as well as customer-specific applications.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Wafer size</td>
<td>76, 100, 150 and 200 mm</td>
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<tr>
<td>Substrate dopant</td>
<td>Antimony, Boron, Arsenic</td>
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<tr>
<td>Crystal orientation</td>
<td>(111), (100)</td>
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<tr>
<td>Epitaxial layer thickness</td>
<td>3.0–300 µm</td>
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<tr>
<td>Epitaxial layer dopant</td>
<td>Phosphorous, Boron, Arsenic</td>
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<tr>
<td>Epitaxial layer resistivity</td>
<td>N-type 0.05–1,500 Ohm.cm</td>
</tr>
<tr>
<td></td>
<td>P-type 0.05–1,000 Ohm.cm</td>
</tr>
<tr>
<td>Multi-layer structures</td>
<td>Up to 4 layers according to customer specs</td>
</tr>
<tr>
<td>Buried layer epitaxy</td>
<td>Up to 3 buried layers (p+, n+)</td>
</tr>
<tr>
<td>Applications</td>
<td>Integrated circuits, Discrete power, IGBT, DMOS, other</td>
</tr>
</tbody>
</table>

COMPETITIVE ADVANTAGES
- Ultra-high purification of process components for outstanding crystalline perfection of epitaxial layers.
- Unique auto-doping prevention know-how for thick and ultra-high resistivity (intrinsic) epitaxial layers.
- Perfect cost-performance balance due to batch type processing.
- Small batch shipments available.

MANUFACTURER: EPIEL JSC

<table>
<thead>
<tr>
<th>Contact Information</th>
<th>Details</th>
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<tbody>
<tr>
<td>Phone</td>
<td>+7 (495) 229 73 03</td>
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<tr>
<td>E-mail</td>
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<tr>
<td>Web-site</td>
<td><a href="http://www.epiel.ru">www.epiel.ru</a></td>
</tr>
<tr>
<td>Commercial Director</td>
<td>Nikolay Tyurnev</td>
</tr>
</tbody>
</table>
SILICON ON SAPPHIRE EPITAXIAL WAFERS

APPLICATIONS
Basic substrate material used in microelectronics for the fabrication of radiation resistant integrated circuits, sensors and other semiconductor devices.

SHORT DESCRIPTION
Silicon on Sapphire Epitaxial wafer is an ultrapure monocrystalline sapphire (Al2O3) wafer with a thin layer of monocrystalline silicon deposited on top of it by Chemical Vapor Deposition (CVD). The aim is to have a silicon layer of uniform thickness and accurately controlled electrical properties and so to provide a perfect substrate for the subsequent device processing. The advantage of sapphire is that it is an excellent electrical insulator, preventing stray currents caused by radiation from spreading to nearby circuit elements. Silicon on Sapphire is part of the Silicon on Insulator (SOI) family of CMOS technologies. Epiel manufactures 76, 100 and 150 mm Silicon on Sapphire Epitaxial wafers. These wafers are mainly used as substrates for manufacturing electronic devices used in sensors, telecommunications, optoelectronics, space and military applications.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS

<table>
<thead>
<tr>
<th>Parameter</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Wafer size</td>
<td>76, 100 and 150 mm</td>
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<tr>
<td>Crystal orientation of Epitaxial layer</td>
<td>(100)</td>
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<tr>
<td>Epitaxial layer thickness</td>
<td>0.3–2.0 µm</td>
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<tr>
<td>Epitaxial layer dopant</td>
<td>Phosphorous, Boron</td>
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<tr>
<td>N-type Epitaxial layer resistivity</td>
<td>2.5–10; 5–30; &gt;30 Ohm.cm</td>
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<tr>
<td>P-type Epitaxial layer resistivity</td>
<td>0.01–1.0 Ohm.cm</td>
</tr>
<tr>
<td>Applications</td>
<td>Radiation resistant integrated circuits, sensors and other</td>
</tr>
</tbody>
</table>

COMPETITIVE ADVANTAGES
- Enables unique device characteristics due to an insulator substrate.
- Deposition know-how for low dislocations, twinning and stacking faults from crystal lattice disparities.
- Ultra-high purification of process components for outstanding crystalline perfection of epitaxial layers.
- Perfect cost-performance balance due to the batch type processing.
- Small batch shipments are available.

MANUFACTURER: EPIEL JSC

Phone           +7 (495) 229 73 03
E-mail          info@epiel.ru
Web-site        www.epiel.ru
Commercial Director Nikolay Tyurnev
MICROCONTROLLERS FOR SMART-CARDS AND ID DOCUMENTS

Mikron develops and manufactures a range of microcontrollers for applications with high-security requirements, such as electronic ID documents, bank cards and other types of smart cards. Mikron security microcontrollers are based on own or partner chips, support both international and Russian crypto standards and feature contact or dual interface. Most products have already successfully passed certification by authorized government agencies and industry associations. Mikron smart-card ICs are used by the leading banks, telecom operators, transport companies, governmental bodies and agencies, as well as by system integrators for a variety of projects.

MANUFACTURER: GROUP OF COMPANIES “MIKRON”

Phone +7 (495) 229 71 23
E-mail globalsales@mikron.ru
Web-site www.mikron.ru
Group manager, Sales department Andrey Shelegeda

POWER MANAGEMENT ICS

Mikron develops and manufactures more than 100 types of power management ICs for various applications, ranging from home appliances and computing devices to portable devices. Mikron PMICs are available both as wafer and packaged (minimal order starts from 100,000 ICs) and feature:

• Green mode to support the “Blue Angel” norm.
• Low standby current.
• 100% thermal limit burn-in.
• Current limit cycle by cycle.
• LEB (Leading edge blanking).
• Soft start & high efficiency.

MANUFACTURER: GROUP OF COMPANIES “MIKRON”

Phone +7 (495) 229 71 23
E-mail globalsales@mikron.ru
Web-site www.mikron.ru
Group manager, Sales department Andrey Shelegeda
RFID-CHIPS, TAGS AND CARDS

Mikron is the leading RFID tag manufacturer in Russia with a monthly production volume of around 50 million tags and inlays in HF and UHF standards. Mikron RFID tags and inlays base both on in-house developed and partner chips and are used for various applications, including transport, retail, SCM, logistics, healthcare, manufacturing, etc. Mikron product portfolio includes more than 150 in-house developed RFID tags.

TECHNICAL SPECIFICATION

- Supported standards: EPC Class1 Gen2; ISO 14443, 15693; 14443A, B
- Frequencies: HF 13,56 MHz; UHF 860-960 MHz; NFC 13,56 MHz
- Packaging: dry/wet inlays, PET and paper cards and tags, adhesive tags, tamper proof labels

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<td>Group manager, Sales department</td>
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DISCRETE SEMICONDUCTOR DEVICES

Mikron group of companies offers a wide range of Schottky diodes with the leading technical characteristics, TVS and ESD protection devices and fast recovery diodes.

Discrete semiconductor devices are available as wafer and packaged (minimal order starts from 100.000 ICs).

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</table>
MICROCONTROLLER 1913VA015

FUNCTIONS
- Industrial automation: automatic control systems and intelligent units of quantity sensor.

BRIEF DESCRIPTION
VLSI processes signals from bridge sensors.

SPECIFICATIONS AND FUNCTIONAL PARAMETERS
- Built-in two-channel 18-bit ADC and a preamplifier with ratios 1, 2, 4, 8, 16, 32 provides precise measurements.
- Built-in 12-bit DAC.
- Built-in 32 Kbyte flash memory with programming via single-wire interface OWI (default), two-wire interface TWI or UART.
- 16-bit microprocessor with a math coprocessor performs addition, subtraction, multiplication, division of fractional normalized single-precision numbers, format conversion from integer to fractional representation.
- Enhanced system clock — the internal RC-oscillator, two quartz oscillators, ability to connect an external clock frequency.
- Operating temperature range: -60 ... + 150 °C.
- Integrated software development and debugging environment provides all the tools for the rapid development of devices.

COMPETITIVE ADVANTAGES
- Ability to use different types of sensors due to the integrated 16-bit ADC.
- Debugging interface and software debugging and development environment.
- Low power consumption is provided by two power saving modes and clock management system.

MANUFACTURER: ZELENOGRAD NANOTECHNOLOGY CENTER JSC
Phone +7 (499) 720 69 44
E-mail market@zntc.ru
Web-site www.zntc.ru
Chief Marketing Officer Oksana Shaimardanova

AN9910 GENERAL-PURPOSE CONTROLLER FOR SUPER-BRIGHT LED INDICATORS

PURPOSE
- DC/DC or AC/DC LED drivers;
- LED driver for color backlight;
- flat-screen backlight;
- universal direct-current source;
- indicator and decorative LED lighting;
- automotive industry;
- chargers.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- efficiency factor – over 90%;
- input voltage range – from 8 V to 450 V;
- direct current for LED driver;
- output current – from a few mA to more than 1 A;
- LED network – from one to hundreds of diodes. It receives weak low-frequency PWM signal through resolution output;
- operating temperature: -40 °C ÷ +85 °C.

COMPETITIVE ADVANTAGES
- High efficiency.
- Management of LED networks and light panels as well as of all types of converters (buck, boost, SEPIC).
- Workability with 220 V mains supply without any converters.

PRODUCER: ANGSTREM JSC
Phone +7 (499) 720 83 83
E-mail export@angstrem.ru
Web-site www.angstrem.ru
Head of sales department Kanunnikov Vladimir
AN9910B GENERAL-PURPOSE CONTROLLER FOR SUPER-BRIGHT LED INDICATORS

PURPOSE
• DC/DC or AC/DC LED drivers;
• LED driver for RGB auxiliary illumination;
• flat-screen image highlighting;
• universal direct-current source;
• signal and decorative LED lighting;
• automotive industry.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• improved test structure of new An9910 controller;
• open feedback loop for peak current checkout;
• internal linear regulator operating at voltage from 8 V to 450 V;
• operation at constant frequency or with constant turn-off time;
• linear or PWM brightness control feature;
• few external elements required for operation;
• operating temperature -40 °C ÷ +85 °C.

COMPETITIVE ADVANTAGES
• Angstrem brand guarantees the quality and reliability of our output products.
• Scheduled times of shipment.
• Competitive price ensured by our in-house development.
• Versatility.
• High efficiency.
• Management of LED networks and light panels as well as of all types of converters (buck, boost, SEPIC).
• Workability with 220 V mains supply without any converters.

PRODUCER: ANGSTREM JSC

<table>
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<tr>
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<tbody>
<tr>
<td>E-mail</td>
<td><a href="mailto:export@angstrem.ru">export@angstrem.ru</a></td>
</tr>
<tr>
<td>Web-site</td>
<td><a href="http://www.angstrem.ru">www.angstrem.ru</a></td>
</tr>
<tr>
<td>Head of sales department</td>
<td>Kanunnikov Vladimir</td>
</tr>
</tbody>
</table>
AN9911 LED DRIVER WITH PULSE CONVERSION AND HIGH-ACCURACY STABILIZATION

PURPOSE
- RGB backlight.
- Application as LED in automotive systems.
- LED battery-powered lamps.
- Other DC/DC LED drivers.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- pulse converter:
  - buck;
  - boost;
  - buck-boost;
  - SEPIC;
- operation with current-sensing device in power line;
- output current control in power line;
- 250 V internal voltage regulator;
- reference-voltage source with 2% accuracy (within the range from 0 °C to +85 °C);
- two modes: with constant frequency or with fixed on-time; constant-frequency conversion with programmable compensation curve shutdown or PWM dimming mode; +0.2 A/-0.4 A power-transistor driver;
- output short-circuit protection;
- output overvoltage protection;
- multiple channel phasing capability;
- programmable current limiter for power transistor;
- closed-cycle output-current control;
- wide range for PWM dimming.

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times of shipment.
- Competitive price ensured by our in-house development.
- Versatility, high efficiency.
- Management of LED networks and light panels as well as of all types of converters (buck, boost, SEPIC).
- Workability with 220 V mains supply without any converters.

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AN9931 LED DRIVER (CURRENT STABILIZER) WITH PULSE CONVERSION AND POWER CORRECTOR

PURPOSE
- Independent LED lighting
- Street lighting
- Traffic signs
- Decorative lighting

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- Low EMG radiation
- Operation with fixed conversion frequency or at fixed time of low operating frequency
- Built in analog IC power controller with a range to 550 V
- Input and output current sensitivity
- Input current limiting
- Shutdown and PWM and phase dimming capabilities

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times.
- Competitive price ensured by our in-house development.
- Versatility.
- High efficiency.
- Management of LED networks and light panels as well as of all types of converters (buck, boost, SEPIC).
- Workability with 220 V mains supply without any converters.

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Head of sales department Kanunnikov Vladimir

AN9961 LED DRIVER WITH AVERAGE-CURRENT CONTROL MODE

PURPOSE
- LED current control in DC/DC or AC/AC mode; LCD LED backlight, universal direct-current source.
- LED panels and displays; architectural, decorative and LED lighting; and LED street lighting.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- average-current split-cycle control;
- programmable fixed frequency-conversion off-time;
- linear dimming input;
- PWM control input;
- input short-circuit protection with reset mode;
- operating temperature – -40 °C ÷ +125 °C;
- pin compatibility with An9910B driver.

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times.
- Competitive price ensured by our in-house development.
- Versatility.
- High efficiency.
- Management of LED networks and light panels as well as of all types of converters (buck, boost, SEPIC).
- Workability with 220 V mains supply without any converters.

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3-TERMINAL LED DRIVERS: AN9921 (20MA), AN9922 (50MA), AN9923 (30MA)

PURPOSE
- Decorative auxiliary illumination.
- Low-power illuminators.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- stabilized output current: 20 mA (An9921), 50 mA (An9922), 30 mA (An9923);
- universal power input;
- 85–264 V AC;
- buck converter with fixed off-time (10.5 ms);
- integrated 476 V MOSFET transistor.

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times.
- Competitive price ensured by our in-house development.
- Versatility/High efficiency.
- Management of LED networks and light panels as well as of all types of converters (buck, boost, SEPIC).
- Workability with 220 V mains supply without any converters.

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ANR8 HV LINEAR VOLTAGE CONTROL WITH OUTPUT CURRENT TO 10MA

PURPOSE
- Pulse-converter trigger circuits (SMPS).
- Controllable HV DC sources.
- Motor control.
- Battery chargers.
- Power supplies.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- input voltage range – from 12 V to 450 V;
- output voltage control range – from 1.2 V to 440 V;
- output voltage accuracy – 5%;
- output current limiting;
- control output current – 10 mA;
- internal limitation of thermal transition.

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times.
- Competitive price ensured by our in-house development.

HV 3-SEGMENT LED DRIVER WITH BUILT-IN MOSFET AN6923

PURPOSE
Special current control for HV LEDs. Application fields – LED lamps and LED illuminators; ensures a compact size of LED illumination.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- input voltages – from 20 V to 400 V;
- maximum output current – 60 mA;
- low nonlinear-distortions coefficient;
- high power factor;
- low solution cost caused by small quantity of external components;
- breakdown voltage – 600 V;
- high efficiency;
- without any magnetic components, without any EMP problems;
- without electrolytic condensers, genuine planar construction;
- output current can be set by external resistor;
- output current accuracy: ± 5%;
- intellectual temperature control, thermal protection, without flickering;
- LED protection against open and short circuits, high reliability.

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times.
- Competitive price ensured by our in-house development.
- Intellectual temperature control.
- Thermal protection, without flickering.
- LED protection against open and short circuits, high reliability.

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CAPACITANCE TO VOLTAGE CONVERTER IC
1382HX025

FUNCTIONS
Capacitance to voltage converter was designed for MEMS pressure, gas and humidity sensors. It converts capacitance values of sensors’ sensitive elements into the output voltage. A wide range of functional types of microcircuits could be created on the base of different sensors.

BRIEF DESCRIPTION
The capacitance-voltage converter has a built-in analog output and programmable conversion path. Digital SPI interface allows to program the main parameters of the converter. Built-in temperature sensor can be used to compensate temperature drift of sensor characteristics.

SPECIFICATIONS AND FUNCTIONAL PARAMETERS
• Power supply voltage is 5 V. Current consumption does not exceed 6 mA.
• Output is +/-2.0 V relative to Uref.
• Built-in temperature sensor.
• Digital SPI interface for adjusting the reference potential, gain and compensating input parasitic capacitance.
• Operating temperature range – -60 ... +125 °C.
• Maximum total input capacitance – 220 pF.
• Maximum input capacitance difference – 100 pF. Minimum input capacitance difference – 0.1 pF.

COMPETITIVE ADVANTAGES
• Wide temperature range of operating.
• Ability to use different types of sensors due to the large number of conversion path settings.

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<td>Chief Marketing Officer: Oksana Shaimardanova</td>
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INTEGRATED CIRCUITS (IC) FOR COMPUTING DEVICES

PURPOSE
Special-purpose computer facilities, telephony, cash dispensers.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS

- 1806VM2 IC – 16-bit microprocessor, package 4138.42-10.01, 5 V ±10%, 5 MHz
- N1806VM2 IC – 16-bit microprocessor, package N18.64-1 V, 5 V ±10%, 5 MHz
- 1806VM3U IC – 16-bit microprocessor, package N18.64-1 V, 5 V ±10%, 8 MHz
- 1806VM4U IC – 32/64-bit co-processor, package N18.64-1 V, 5 V ±10%, 8 MHz
- 1806VM5U IC – 16-bit processor, package N18.64-1 V, 5 V ±10%, 16 MHz
- 1830VE51N4 IC – 8-bit microcomputer with masked ROM
- 1839VM1F IC – bus adapter, package 6111.132-1, 5 V ±10%, 10 MHz
- 1839VM2 IC – 32/64-bit co-processor, package 6111.132-1, 5 V ±10%, 10 MHz
- 1839VT2F IC – static memory controller, package 6111.132-1, 5 V ±10%, 10 MHz
- 1839VV1F IC – bus adapter 32-BUS and Q-BUS for 1839VM1F
- N1839VZh2 IC – bilateral majority element with monitoring functions, package N18.64-1 V, 5 V ±10%
- KR1878VE1 IC – 8-bit RISC microcontroller
- L1839VM1 IC – 32-bit microprocessor, package 6111.132-1, 5 V ±10%, 10 MHz
- K5004VE1 IC – 8-bit microcontroller, delivery both as packaged version (package 7102.8-1) and as tape modules to be implanted into smart cards
- 1867VM2N4 IC – one-chip digital signal processor with improved performance
- 1874VE36N4 IC – 16-bit microcontroller with masked ROM, ADC, 20MHz, 5V ±10%
- K1008VZh29R2 – pulse dialer, package 201.14-2
- K1446VGSP – electrically erasable programmable ROM with single-wire serial interface
- K145VG10N5 – signal segment driver for matrix liquid-crystal indicator
- K145VG15N5 – line and column driver for HV liquid-crystal indicator
- K145VG9N5 – 64-channel anodic signal driver for matrix liquid-crystal indicator
- KB1013VG6-5 – LCD controller
- KB1446VG5-5 – EEPROM 4x256
- KB145VG6-5 – 40-channel LCD line and column driver
- KR1008VZh16 – pulse/tone dialer, package 2104.18-V
- KR1008VZh27 – pulse/tone dialer, package 2104.18-V
- KR1878VE1E1 – 8-bit microcontroller, package 2104.18-V

COMPETITIVE ADVANTAGES

- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times.
- Competitive price ensured by our in-house development.

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Head of sales department Kanunnikov Vladimir
1485 ICS FAMILY OF DATA’S RECEIVING AND TRANSMISSION

APPLICATION
ICs family for ARINC 429 interface is:
• 1485XK1Y interface IC of data’s receiving and transmission;
• 1485XK3Y circuit of two line receivers;
• 1485XK2T, 1485XK4 transmitters of line standard ARINC-429.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• direct receiving interface for ARINC-429 bus;
• automatic synchronization of data transmission;
• rate of data transmission 12.5 kbit/second;
• low current consumption.

1485XK1Y
• management of synchronization is more than ten times bigger rate of data;
• choice of data’s clock frequency;
• function of parity control;
• mode of self-control;
• low power consumption, one power supply 5 V.

1485XK3Y
• transformation of levels to digital data;
• input hysteresis is more than 2 V;
• mode of self-control test;
• TTL&CMOS output levels.

1485XK2T
• serial output of data to line;
• external capacities have a possibility of the time change by increasing and decreasing output signal for any rate of data transmission (12.5, 48, 100 kbit/second);
• possibility of amplitude’s change for output impulses.

1485XK4T
• serial output of data to line;
• management and choice of differential output signal inclination (time of increasing and decreasing) are for transmission data rate 12.5 kbit/second or 100 kbit/second by logic signal at the driving point.

COMPETITIVE ADVANTAGES
• Angstrom brand guarantees the quality and reliability of manufactured products.
• Delivery times of shipment.
• Competitive price due to our own R&D.

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SINE-COSINE INTERPOLATION ASIC (ANGLE SENSOR ASIC) K1382HX045

FUNCTIONS
- Industrial automation and automobile industry (position detection).
- Robotics (precision measuring systems of moving objects parameters).

BRIEF DESCRIPTION
K1382HX045 converts an input sine-cosine signal from the position sensor (Hall elements, magnetoresistive bridges, complete sensors with sine-cosine output) into the position signal as a digital code or a linear output signal.

SPECIFICATIONS AND FUNCTIONAL PARAMETERS
- Power supply voltage is 5 V +10%.
- Current consumption does not exceed 15 mA.
- Resolution – 13 bit/2.64 ang.min.
- Conversion time – 16 us (400 rpm). Angular error does not exceed +1.0%.
- Adjustment range of offset voltage (analog path): ± 75 mV.
- Built-in programmable power.
- Digital adjustment of zero position, conversion conductance, upper and lower threshold, rotation direction, gain.
- Output interfaces: analog linear ratiometric, digital SPI/SSI, single-line interface.
- Operating temperature range is -60 ... +125 (150) °C.

COMPETITIVE ADVANTAGES
- High precision.
- Support for various types of sensors.

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Chief Marketing Officer Oksana Shaimardanova
CURRENT SENSOR MICROCIRCUIT (1382HY015)

FUNCTIONS
- Machinery and engine technology.
- Power electronics.
- Control systems.

BRIEF DESCRIPTION
This sensor was designed for current sensors including the automation based on magnetoresistive sensing elements and Hall elements used for:
- measuring the current in power supply sources;
- monitoring the current in vehicles units;
- measuring the current in motor windings for control drives.

SPECIFICATIONS AND FUNCTIONAL PARAMETERS
- Power supply voltage -5 ... +10% V.
- Current consumption does not exceed 25 mA.
- Built-in programmable temperature correction.
- Conversion error +0.8%.
- Band-pass range does not exceed 50 kHz.
- Output interfaces: SPI, PWM, ratiometric line output, logical output of “open collector” type with a programmable switching threshold.

COMPETITIVE ADVANTAGES
- Programmable temperature correction.
- Support for various types of sensors.
- Wide range of interfaces.
- Adjustment factors are stored in the EEPROM.

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POSITION PROCESSOR ASIC (ENC ASIC 3)

FUNCTIONS
- Robotics (precision position detection).
- Engine building (motor rotor position sensors).
- Industrial automation systems.

BRIEF DESCRIPTION
ENC ASIC3 converts input sine-cosine signals from various position sensors, including: Hall elements, magnetoresistive bridges, complete encoders with sine-cosine output, and sine-cosine rotating transformers into position signal as a digital code.
*Under development.

SPECIFICATIONS AND FUNCTIONAL PARAMETERS
- Power supply voltage is 5±10% V. Current consumption does not exceed 40 mA.
- Resolution – up to 16 bits. Conversion time – 10 us (tracking – 500 ns).
- Temperature dependence correction of sensing elements.
- Support of multi-turn mode up to 1024 rpm.
- Built-in temperature sensor.
- Output interfaces: SPI/SSI, A/B/Index, Step/DIR, PWM, UVW, linear.
- Support of RVDT, LVDT type sensors (replacement of AD2S1210 type microcircuit).

COMPETITIVE ADVANTAGES
- High precision.
- Wide adjustment set (phase, gain, offset, temperature correction, etc.).
- Wide range of interfaces.
- Multi-turn mode.
- Support for rotary variable differential transducer type sensors.

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KIBI-001
PROXIMITY RFID CARD

PURPOSE
The identifier is intended for the use as an access device in automated access control systems (AACS).

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- operating frequency – 125 kHz;
- read range – from 0 mm to 150 mm;
- built-in ROM capacity – 64 bit;
- ROM programming method – zapping by producer;
- overall dimensions – 87x55x4 mm;
- weight – less than 18 g.

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times of shipment.
- Competitive price ensured by our in-house development.
- Ruggedized case.
- Built-in power supply is not required.
- Reader interfacing protocol as per EM Marin standard.

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Web-site www.angstrem.ru
Top specialist Semichastnov Oleg

KIBI-001MT
PROXIMITY RFID CARD

PURPOSE
The identifier is intended for the use as an access device in automated access control systems (AACS).

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- operating frequency – 125 kHz;
- read range – from 0mm to 150 mm;
- built-in ROM capacity – 64 bit;
- ROM programming method – zapping by producer;
- overall dimensions – 86x54x0.76 mm;
- weight – less than 9.8 g.

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times of shipment.
- Competitive price ensured by our in-house development.
- Built-in power supply is not required, reader interfacing protocol as per EM Marin standard.
- Basic delivery option – a white card without polygraphic imagery or with such an imagery as per layout original of a customer.

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Top specialist Semichastnov Oleg
KIBI-002
PROXIMITY RFID CARD

PURPOSE
The identifier is intended for the use as an access device in automated access control systems (AACS).

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• operating frequency – 13.56 MHz;
• read range – from 0 mm to 150 mm;
• built-in ROM capacity – 64 bit;
• ROM programming method – zapping by producer;
• overall dimensions – 87x57x4 mm;
• weight – less than 18 g.

COMPETITIVE ADVANTAGES
• Angstrem brand guarantees the quality and reliability of our output products.
• Scheduled times of shipment.
• Competitive price ensured by our in-house development.
• Built-in power supply is not required.
• Reader interfacing protocol as per Check Point standard.
• Ruggedized case.

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Top specialist Semichastnov Oleg

KIBI-002MT
PROXIMITY RFID CARD

PURPOSE
The identifier is intended for the use as an access device in automated access control systems (AACS).

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• operating frequency – 13.56 MHz;
• read range – from 0 mm to 150 mm;
• built-in ROM capacity – 64 bit;
• ROM programming method – zapping by producer;
• overall dimensions 86x56x0.88 mm;
• weight – less than 6 g.

COMPETITIVE ADVANTAGES
• Angstrem brand guarantees the quality and reliability of our output products.
• Scheduled times of shipment.
• Competitive price ensured by our in-house development.
• Built-in power supply is not required.
• Reader interfacing protocol as per Check Point standard.
• Basic delivery option – a white card without polygraphic imagery or with such an imagery as per layout original of a customer.

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Top specialist Semichastnov Oleg
KIBI – 003
PROXIMITY RFID CARD

PURPOSE
KIBI-003 is a proximity radiofrequency identifier designed as a thin plastic card and intended for the use as an access facility in automated access control systems.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- operating frequency – 125 kHz;
- read range (depending on reader radiation power) – from 0 mm to 60 mm;
- built-in ROM capacity – 128 bit;
- ROM programming method – one-off (fusion by producer);
- overall dimensions – 86×54×0.76 mm;
- weight – less than 9.8 g.

COMPETITIVE ADVANTAGES
- Angstrom brand guarantees the quality and reliability of our output products.
- Scheduled times of shipment.
- Competitive price ensured by our in-house development.
- Built-in power supply is not required.
- Structure of coding format – as per the standard open 26-bit format f. HIDGlobal (format No. N10301).
- Basic delivery option – a white card without polygraphic imagery.
- Possible delivery of cards with polygraphic imagery as per layout original of a customer.

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KIBI-D
PROXIMITY RFID CARD

PURPOSE
- This identifier is intended for the use as a unified identification information carrier in different-type access control systems.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- operating frequencies – 125 kHz and 13.56 MHz;
- read range – from 0 mm to 80 mm (125 kHz) or from 0 mm to 150 mm (13.56 MHz);
- built-in ROM capacity – 64 bit;
- ROM programming method – zapping by producer;
- overall dimensions – 86×54×0.76 mm;
- weight – less than 7 g.

COMPETITIVE ADVANTAGES
- Angstrom brand guarantees the quality and reliability of our output products.
- Scheduled times of shipment.
- Competitive price ensured by our in-house development.
- Built-in power supply is not required.
- Reader interfacing protocol as per EMMarine and Check Point standard.
- Basic delivery option – a white card without polygraphic imagery or with such an imagery as per layout original of a customer.

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KIBIK
PROXIMITY RFID CARD

PURPOSE
This identifier is intended for the use as payment or identification means.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• operating frequency – 13.56 MHz;
• read range – from 0 mm to 60 mm;
• capacity of built-in EEPROM – 16x512 bit;
• the number of programming cycles – not less than 100,000;
• overall dimensions – 86x54x0.86 mm;
• weight – less than 6 g.

COMPETITIVE ADVANTAGES
• Angstrem brand guarantees the quality and reliability of our output products.
• Scheduled times of shipment.
• Competitive price ensured by our in-house development.
• Built-in power supply is not required.
• Reader interfacing protocol as per ISO 14443 A (Mifare).
• Basic delivery option – a white card without polygraphic imagery or with such an imagery as per layout original of a customer.

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Top specialist Semichastnov Oleg

MMBIT-002
PROXIMITY RFID KEY

PURPOSE
This identifier is intended for the use in door-phone keys, for counterfeit protection of products, for store accounting, stocktaking record, etc., for commodity flow management at automated warehouses, supermarkets, etc.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• operating frequency – 13.56 MHz;
• read range – from 0mm to 30 mm;
• built-in ROM capacity – 64 bit;
• ROM programming method – zapping by producer;
• overall dimensions: L – 12 mm, thickness – 1.2 mm;
• weight – less than 0.3 g.

COMPETITIVE ADVANTAGES
• Angstrem brand guarantees the quality and reliability of our output products.
• Scheduled times of shipment.
• Competitive price ensured by our in-house development.
• Built-in power supply is not required.
• Minimum overall dimensions.
• Reader interfacing protocol as per Check Point standard.
• Delivery option – MMBIT-002 “D” tags with a TouchMemory data transmission format.

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Top specialist Semichastnov Oleg
BID 002
PROXIMITY RFID TAG

PURPOSE
This identifier is intended for the use as a store-accounting transponder for commodity flow management at automated warehouses, supermarkets, etc., as well as impersonal means of access to territories, rooms, etc., and for controlled access to equipment.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• operating frequency – 13.56 MHz;
• read range – from 0 mm to 30 mm;
• built-in ROM capacity – 64 bit;
• ROM programming method – zapping by producer;
• overall dimensions of BID 002 – Ø 46 mm, thickness – 2.3 mm;
• overall dimensions of BID 002-01 – Ø 28mm, thickness – 1.2 mm;
• weight of BID 002 – less than 12 g;
• weight of BID 002-01 – less than 2 g.

COMPETITIVE ADVANTAGES
• Angstrem brand guarantees the quality and reliability of our output products.
• Scheduled times of shipment.
• Competitive price ensured by our in-house development.
• Built-in power supply is not required.
• Minimum overall dimensions.
• Reader interfacing protocol as per Check Point standard.
• Delivery option – MMBIT- 002 “D” tags with a TouchMemory data transmission format.

PRODUCER: ANGSTREM JSC

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Phone</td>
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<tr>
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<td>Semichastnov Oleg</td>
</tr>
</tbody>
</table>

Top specialist
Semichastnov Oleg
SBR-001B
PROXIMITY RF READER

PURPOSE
This reader is intended for access control systems (ACS) with the following interfaces: Wiegand-33 (Version 1), Wiegand-26 (Version 2), and RS232C (Version 3). A Version-3 reader can be connected to a personal computer through an open 9-pin COM slot.

The reader is intended for installation at turnstiles, doors and equipment. It may be installed on a metal surface.

The reader is designed to be operated with the identifiers KIBI-002 (card), BID-002 (tag), BIZh-002 (token), and MMBIT-002 (tab) and their analogs with a Check Point format.

It generates a high-frequency (13.56MHz) magnetic field with magnetic intensity being safe for a human body (on permanent exposure to it).

The reader is provided with a built-in audible alarm and two-color light-indication LED.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• guaranteed read range when using KIBI-002 – from 0 mm to 150 mm;
• maximum read range when using KIBI-002 – 210 mm;
• power-supply voltage – 8–16 V;
• average useful current at unloaded interface – less than 85 mA;
• overall dimensions (without mounting elements) – 108x77x23 mm;
• cable length – 150 cm;
• cable diameter – 5 mm.

COMPETITIVE ADVANTAGES
• Angstrem brand guarantees the quality and reliability of our output products.
• Scheduled times.
• Competitive price ensured by our in-house development.
• Moisture- and dust-proof.
• Design.
• Mounting in unheated closed rooms (climatic version — “U”, Class 2, as per GOST 15150-69).
• It may be installed on a metal surface.
• Guaranteed operating-temperature range: from minus 20 °C to plus 40 °C.
• Long read distance.
• Low useful current.
• A wide range of power-supply voltage tolerances.

PRODUCER: ANGSTREM JSC

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</tr>
<tr>
<td>Top specialist</td>
<td>Semichastnov Oleg</td>
</tr>
</tbody>
</table>
SBR-005M AND SBR-006M
PROXIMITY RF READERS

PURPOSE
These readers are intended for access control systems (ACS) with a Wiegand-33 interface. They are installed at turnstiles, doors and equipment in unheated closed rooms (climatic version — U, Class 2, as per GOST 15150-69) and at the places with elevated vandalism risk. The readers may be installed on a metal surface. A SBR-005M reader is provided with a built-in keyboard to additionally enter access code. A SBR-006 M reader has no keyboard. The readers has been designed for the use in ACS both with cryptographically secure identifiers (KIBI-M) and insecure ones (KIBI-002, KIBI-002MT [cards], BID-002 [tag], and BIZh-002 [token] and their analogs) with a 13.56MHz carrier frequency. Recognition of an identifier type — automatic.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- guaranteed read range when using KIBI-002 – from 0 mm to 70 mm;
- maximum read range when using KIBI-M – from 0 mm to 40 mm;
- power-supply voltage – 12 V;
- average useful current at unloaded interface – less than 180 mA;
- overall dimensions (without mounting elements) – 133x101x32 mm;
- cable length – 150 cm;
- cable diameter – 5 mm.

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times.
- Competitive price ensured by our in-house development.
- Workable with cards and other.
- Identifiers such as Mifare® Std 1k and Check Point.
- Vandalism-, moisture- and dust-proof design.
- Built-in audible alarm and two-color light-indication LED.
- There is a serial interface for key recording when operating in ACS with cryptographically protected identifiers.
- Additional access protection system with the use of a keyboard (only for SBR-005 M).
- Automatic recognition of an indicator type.

PRODUCER: ANGSTREM JSC

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<td>Semichastnov Oleg</td>
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</tbody>
</table>
**SBR-010 AND SBR-010U – PROXIMITY RF READERS**

**PURPOSE**
These readers are intended for object identification systems, including access control systems, with a data exchange interface – RS232C and USB, respectively. The readers have been designed for the use with the identifiers KIBI-002 (card), KIBI-002MT (thin card), BID-002 (tag), BIZh-002 (token), and MMBIT-002 (tab) and Check Point-format identifiers similar to them. They may be installed in unheated closed rooms with normal humidity (climatic version – UKhL, Class 4.2, as per GOST 15150-69).

**TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS**
- guaranteed read range when using KIBI-002 – from 0 mm to 70 mm;
- power-supply voltage – 5 V;
- average useful current – less than 5 mA;
- overall dimensions (without mounting elements) – 67x4x31 mm;
- cable weight – less than 90 g;
- cable length – 1.5 m;
- RS232C interface connector – DB-9F;
- USB interface connector – USB-A plug;
- storage and operating temperature range – -20 °C ÷ +40 °C.

**COMPETITIVE ADVANTAGES**
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times of shipment.
- Competitive price ensured by our in-house development.
- They can operate with a wide range of various identifiers.
- Minimum weight dimension characteristics.
- Guaranteed operating-temperature range: from minus 20 °C to plus 40 °C.
- They have built-in audible and light indication.

**PRODUCER: ANGSTREM JSC**

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</table>
SBR-003B3 PROXIMITY RF READER

PURPOSE
This reader is intended for distant reading serial numbers of such identification cards as KIBI-001, KIBI-001MT, KIBI-D as well as identification cards and trinkets such as EM-Marine.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- operating frequency – 125 kHz;
- guaranteed read range when using KIBI-001 – from 0 mm to 80 mm;
- RS232C communication interface for personal computer (host);
- useful current – less than 100 mA;
- overall dimensions – 108х77х23 mm;
- weight – less than 150 g;
- operating-temperature range – from -20 °C to +40 °C.

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times of shipment.
- Competitive price ensured by our in-house development.
- Workable with cards and other identifiers such as Mifare® Std 1k and Check Point.
- Vandalism-, moisture- and dust-proof design.
- Built-in audible alarm and two-color light-indication LED.
- There is a serial interface for key recording when operating in ACS with cryptographically protected identifiers.
- Additional access protection system with the use of a keyboard (only for SBR-005 M).
- Automatic recognition of an indicator type.

PRODUCER: ANGSTREM JSC

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| Top specialist  | Semichastnov Oleg   |


SIGNAL PROCESSING
SYSTEM “BSO”

PURPOSE
High performance and reliable signal processing system is designed to receive and process information from multispectral cameras on spacecrafts. Key features: flexible scalability, capacity up to 10 Gflops, based on multi-processor SpaceWire technology clusters. The system has high-speed Fibre-channel with a processing speed of information up to 1.0625 Gbit/s.

TECHNICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage, V</td>
<td>Supply voltage, V</td>
</tr>
<tr>
<td>Power consumption (while two processing channels working), W, max</td>
<td>Power consumption (while two processing channels working), W, max</td>
</tr>
<tr>
<td>Operating frequency, MHz</td>
<td>Operating frequency, MHz</td>
</tr>
<tr>
<td>RAM capacity, Mb</td>
<td>RAM capacity, Mb</td>
</tr>
<tr>
<td>PROM (Flash) capacity, Mb</td>
<td>PROM (Flash) capacity, Mb</td>
</tr>
<tr>
<td>The total number of PROM write cycles</td>
<td>The total number of PROM write cycles</td>
</tr>
<tr>
<td>Number of PROM write cycles under normal operation</td>
<td>Number of PROM write cycles under normal operation</td>
</tr>
<tr>
<td>Overall dimensions, mm</td>
<td>Overall dimensions, mm</td>
</tr>
<tr>
<td>Weight, kg, max</td>
<td>Weight, kg, max</td>
</tr>
</tbody>
</table>

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Web-site www.submicron.ru; www.субмикрон.рф
Sales Director Andrey Zuev
DIGITAL COMPUTER “CVM-101”

PURPOSE
Fault-tolerant digital computer is a part of the onboard complex control system of piloted transport spacecraft “Soyuz-TMA/MS”, “Progress-M/MS.” CVM-101 is designed for on-board systems with the following requirements:

- to provide control of a spacecraft in case of failures;
- to ensure the survivability of a spacecraft and its crew during emergency situations;
- to provide high-speed input-output of information via the redundant channel in accordance with GOST 52070-2003, receiving external interrupts and issuing relay signals;
- to ensure the ability to extend the system by connecting peripheral functional devices.

TECHNICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply voltage, V</td>
<td>27 (–4; +7)</td>
</tr>
<tr>
<td>Power consumption, W, max</td>
<td>46</td>
</tr>
<tr>
<td>Operating frequency, MHz</td>
<td>12</td>
</tr>
<tr>
<td>RAM capacity, Mb</td>
<td>2</td>
</tr>
<tr>
<td>EEPROM capacity, Mb</td>
<td>2</td>
</tr>
<tr>
<td>Overall dimensions, mm</td>
<td>371 x 237 x 147</td>
</tr>
<tr>
<td>Weight, kg, max</td>
<td>6.8 (– 0.3; +0.3)</td>
</tr>
</tbody>
</table>

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Sales Director Andrey Zuev
DIGITAL COMPUTER “CVM-201”

PURPOSE
Fault-tolerant digital computer is a part of the perspective spacecraft “Federation” onboard control system. The computer is designed to receive information from onboard systems via external interfaces, processing the received information in accordance with programs stored in EEPROM and RAM, issue the control and diagnostic information via external interface, and provide high-speed data input-output on standard serial interface (SpaceWire, Ethernet).

TECHNICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of computing modules (depends on design)</td>
<td>4 (2)</td>
</tr>
<tr>
<td>The central processor</td>
<td>1892VM8YA series “Multicore” development OJSC “RDC” Elvees</td>
</tr>
<tr>
<td>Operating frequency, MHz</td>
<td>80</td>
</tr>
<tr>
<td>RAM capacity, MB</td>
<td>16</td>
</tr>
<tr>
<td>EEPROM capacity, MB</td>
<td>8</td>
</tr>
<tr>
<td>Power consumption (depends on the design) max, W</td>
<td>40 (20)</td>
</tr>
<tr>
<td>Overall dimensions, mm</td>
<td>301x230x131</td>
</tr>
<tr>
<td>Weight (depends on the design) kg, max</td>
<td>10 (6)</td>
</tr>
</tbody>
</table>

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Sales Director Andrey Zuev
HARDWARE AND SOFTWARE SIGNAL PROCESSING SYSTEM “BAPOS”

PURPOSE
Hardware and software signal processing system “BAPOS” is designed for signal processing of 2D images on spacecrafts. “BAPOS” structure may vary from 2 to 4 signal processing channels (SPC). SPC is designed for receiving, processing and delivery of information. SPC structure includes a computation module of the primary signal processing, a computation module of the secondary signal processing, a control and input module and a secondary power source and switch module.
“BAPOS” structure allows combining from 2 to 4 systems “BAPOS” into a single computer network.

TECHNICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of channels “BAPOS”</td>
<td>2-4</td>
</tr>
<tr>
<td>Power consumption (each channel), W, max</td>
<td>100</td>
</tr>
<tr>
<td>RAM, Mb</td>
<td>512</td>
</tr>
<tr>
<td>Bandwidth of high speed input/output interface in each direction on a physical level, Gb</td>
<td>10</td>
</tr>
<tr>
<td>Supply voltage, V</td>
<td>27 +2,0; -1,5</td>
</tr>
<tr>
<td>Overall dimensions, mm</td>
<td>419x228x258</td>
</tr>
<tr>
<td>Weight, kg, max</td>
<td>16</td>
</tr>
<tr>
<td>Overall dimensions, mm</td>
<td>Overall dimensions, mm</td>
</tr>
<tr>
<td>Weight, kg, max</td>
<td>Weight, kg, max</td>
</tr>
</tbody>
</table>

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Sales Director Andrey Zuev
RFID FSTORE-ID (UHF)

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS

- Read range: 12–14 m.
- Antenna size: 19x94 mm (U168.1, U368.1).
- Frequency: 860–960 MHz.
- 2 chip options.
- Applications: SCM, manufacturing, brand protection.
- Delivered as: dry/wet inlays, tags / adhesive tags, tamper proof labels.

<table>
<thead>
<tr>
<th>Product ID</th>
<th>Standard / chip</th>
<th>EPC, bit</th>
<th>TID, bit</th>
<th>User, bit</th>
<th>Access password, bit</th>
<th>Kill password, bit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fstore-ID/181</td>
<td>EPC Class1 Gen2/G2iL (NXP)</td>
<td>12</td>
<td>128</td>
<td>64</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>Fstore-ID/186</td>
<td>EPC Class1 Gen2/UCODE7 (NXP)</td>
<td>14</td>
<td>128</td>
<td>96</td>
<td>32</td>
<td>32</td>
</tr>
</tbody>
</table>

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Group manager, Sales department Khuseinov Farkhad

RFID NFC

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS

- Frequency: 14.86–15.20 MHz.
- 1 chip option.
- Applications: NFC tags.
- Delivered as: dry/wet inlays, adhesive labels.

<table>
<thead>
<tr>
<th>Product ID</th>
<th>Standard / chip</th>
<th>Read range, m</th>
<th>Antenna size, mm</th>
<th>Memory, bit</th>
<th>UID, byte</th>
<th>User, byte</th>
<th>Image</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFC-PASS/008</td>
<td>ISO 14443/NXP N TAG203 (NT2H0301G0DUD)</td>
<td>≤ 0.06 m</td>
<td>76x45 mm (A201.1)</td>
<td>1536</td>
<td>7</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>NFC-MINI/038</td>
<td>ISO 14443/NXP N TAG203 (NT2H0301G0DUD)</td>
<td>≤ 0.03 m</td>
<td>34x14.8 mm (A234.1)</td>
<td>1536</td>
<td>7</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>NFC-BOOK/058</td>
<td>ISO 14443/NXP N TAG203 (NT2H0301G0DUD)</td>
<td>≤ 0.06 m</td>
<td>45x45 mm (A243.1)</td>
<td>1536</td>
<td>7</td>
<td>144</td>
<td></td>
</tr>
<tr>
<td>NFC-ROUND/068</td>
<td>ISO 14443/NXP N TAG203 (NT2H0301G0DUD)</td>
<td>≤ 0.10 m</td>
<td>45±0,2 mm (A255.1)</td>
<td>1536</td>
<td>7</td>
<td>144</td>
<td></td>
</tr>
</tbody>
</table>

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Group manager, Sales department Khuseinov Farkhad
TRANSISTOR-P1 DEVELOPMENT AND PILOT LOT PRODUCTION OF A SERIES OF HIGH-POWER MOS TRANSISTORS (LOW CHARGE, TRENCH) IN KT-28 AND KT-90 METAL-PLASTIC PACKAGES

PURPOSE
- Secondary power supplies.
- Synchronous rectifier systems.
- Switching systems.
- Electric actuators.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- Series of MOS transistors with USImax = 30 V ... 650 V.
- Temperature range: -60 °C ÷ +125 °C.

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times of shipment.
- Competitive price ensured by our in-house development.
- Low on-state drain-source resistance.
- 100% monitoring of resistance to avalanche discharge energy.
- Trench technology.
- Low gate charge (LowCharge).

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Web-site www.angstrem.ru
Head of sales department Kanunnikov Vladimir

TRANSISTOR-P2 DEVELOPMENT AND PILOT LOT PRODUCTION OF A SERIES OF HIGH-POWER MOS TRANSISTORS (LOW CHARGE, TRENCH) IN TO-251 AND TO-252 METAL-PLASTIC PACKAGES

PURPOSE
- Secondary power supplies.
- Synchronous rectifier systems.
- Switching systems.
- Electric actuators.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- Series of MOS transistors with USImax = 30 V ... 600 V.
- Temperature range: -60 °C ÷ +125 °C.

COMPETITIVE ADVANTAGES
- Angstrem brand guarantees the quality and reliability of our output products.
- Scheduled times of shipment.
- Competitive price ensured by our in-house development.
- Low on-state drain-source resistance.
- 100% monitoring of resistance to avalanche discharge energy.
- Trench technology.
- Low gate charge (LowCharge).

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Head of sales department Kanunnikov Vladimir
TRANSISTOR-P3 DEVELOPMENT AND PILOT LOT PRODUCTION OF A SERIES OF HIGH-POWER MOS TRANSISTORS (LOW CHARGE, TRENCH) IN TO-247 METAL-PLASTIC PACKAGES

PURPOSE
• Secondary power supplies.
• Synchronous rectifier systems.
• Switching systems.
• Electric actuators.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• Series of MOS transistors with USI_{max} = 30 V ... 1,200 V.
• Temperature range: -60 °C ÷ +125 °C.

COMPETITIVE ADVANTAGES
• Angstrem brand guarantees the quality and reliability of our output products.
• Scheduled times of shipment.
• Competitive price ensured by our in-house development.
• Low on-state drain-source resistance.
• 100% monitoring of resistance to avalanche discharge energy.
• Trench technology.
• Low gate charge (LowCharge).

IGBT INDUSTRIAL MODULES, CLASS 06, 12 AND 17, IN METAL-PLASTIC PACKAGES

PURPOSE
• Electronic keys.
• Welding equipment.
• Electric drives.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• VCE, (V) at Tj=25 °C 1,200, 1,700.
• IC, (A) at Tc=25 °C 60, 70, 75.
• VCES (typ) (В) at Tj=25 °C 2.0 2.1.

COMPETITIVE ADVANTAGES
• Angstrem brand guarantees the quality and reliability of our output products.
• Scheduled times of shipment.
• Competitive price ensured by our in-house development.
• Lowered VCE(sat).
• Trench technology.
• Low Cies, Coes, Cres.
MODULE-P. DOMESTIC SEMICONDUCTOR POWER MODULES FOR THE POWER INDUSTRY

PURPOSE
• DC/DC invertors and convertors.
• Uninterruptible power supply units.
• Power supply units, electric drives.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• series of power modules with UKEmax = 2,500 V, 4,500 V;
• maximum collector current – to 2,000 A;
• power IGBT module.

COMPETITIVE ADVANTAGES
• Angstrem brand guarantees the quality and reliability of our output products.
• Scheduled times of shipment.
• Competitive price ensured by our in-house development.
• Domestic constituent parts.
• NPT+ design.
• Easy parallel connection.
• Lowered VCE(sat).
• High switching frequency.
• High resistance to short-circuit currents.
• Positive thermal factor VCE(sat).
• 100% check for double current action.
• Isolated base for heat dissipation.
• SC-current self-restriction.

PRODUCER: ANGSTREM JSC

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<tr>
<td>Web-site</td>
<td><a href="http://www.angstrem.ru">www.angstrem.ru</a></td>
</tr>
<tr>
<td>Head of sales department</td>
<td>Kanunnikov Vladimir</td>
</tr>
</tbody>
</table>
CAPSULAR ENDOSCOPIC COMPLEX FOR THE DIAGNOSIS OF GASTROINTESTINAL TRACT DISEASES

PURPOSE
The product is developed to carry out a noninvasive procedure of gastrointestinal endoscopic examination of a human by creating video of internal surfaces of GIT throughout its length, video transmission using wireless data transfer or by using a mobile memory card and the subsequent automated processing.
Noninvasive diagnostics of the following:
• Hidden gastrointestinal bleedings
• Iron deficiency anemia
• Chronic abdominal pain (of unknown etiology), diarrhea
• Suspicion of oncological disease in small intestine
• Crohn’s Disease
• Celiac disease
• Irritable Bowel Syndrome (IBS)
• Peutz-Jeghers syndrome
• Radiation enteritis
• Polyposis
• Hemangioma
• Hypobetalipoproteinemia
• Angiodysplasia
• Peptic ulcer
• Lupus nephritis
• Lymphoid Hyperplasia

Structure of complex: Endocapsule – Optical system, Light-emitting diodes, CMOS matrix, Controller, Battery, Transmitter+antenna, Flash memory.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS

<table>
<thead>
<tr>
<th>Main technical characteristics</th>
<th>Institute of Microdevices</th>
<th>Olympus</th>
<th>Given Imaging PillCam</th>
<th>MicroCam RF System Sayaka</th>
<th>Jinshan OMOM</th>
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<tbody>
<tr>
<td>capsule size</td>
<td>11 x 28</td>
<td>11 x 26</td>
<td>11 x 26</td>
<td>11 x 26</td>
<td>13 x 28</td>
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<td>weight of a capsule, gram</td>
<td>4.3</td>
<td>4</td>
<td>3.4</td>
<td>-</td>
<td>6</td>
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<td>camera type</td>
<td>CMOS color</td>
<td>CCD color</td>
<td>CCD color</td>
<td>CMOS color</td>
<td>CMOS color</td>
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<tr>
<td>frequency of shots (fps)</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>30</td>
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<tr>
<td>viewing angle, degree</td>
<td>140</td>
<td>145</td>
<td>-</td>
<td>7.5</td>
<td>140</td>
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<tr>
<td>image format</td>
<td>640 x 480</td>
<td>320 x 320</td>
<td>250 x 250</td>
<td>800 x 600</td>
<td>320 x 240</td>
</tr>
<tr>
<td>data transmission</td>
<td>RF channel + FLASH</td>
<td>RF channel</td>
<td>RF channel</td>
<td>RF channel</td>
<td>RF channel</td>
</tr>
</tbody>
</table>

PRODUCER: SCIENTIFIC RESEARCH INSTITUTE OF MICRODEVICES NAMED AFTER G.GUSKOV

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Web-site www.niimp.ru
Chief Markiteng Officer Skobeleva Maria
SIGNAL POLARITY SENSOR IC (K1382HX034)

FUNCTIONS
The integrated circuit K1382HX034 converts an input signal from bridge sensors to logic signal.
Applications:
- Industrial automation.
- Automotive industry (position sensors for gas-turbine and stepper motors, internal combustion engines, tachometer sensor, current sensor).
- Robotics.

SPECIFICATIONS AND FUNCTIONAL PARAMETERS
- Pairing with any bridge sensors.
- Supply voltage is 5–20 V, current consumption does not exceed 6 mA.
- Output-open collector, 30 mA.
- Built-in power supply sensor.
- Adjustment of the sensor power supply is within a range of 1 to 10 mA.
- Operating temperature range -60 ... +125 °C.
- Instrument amplifier with a programmable gain and offset voltage ratio.

COMPETITIVE ADVANTAGES
- Wide supply range.
- Minimum weight and size.

SINGLE-CHIP MAGNETIC POSITION ENCODER ASIC ENCASIC2

FUNCTIONS
- Machinery and engine technology (position sensor of valve rotor and other types of engines).
- Industrial automation and robotics (industrial position encoders, various position sensors for motion control systems).
- BLDC motion control systems.

BRIEF DESCRIPTION
ENCASIC2 is SoC position encoder, comprising a sensor system on the Hall elements, analog signal conversion circuit, ADC and digital data processing unit. Calculated position code is displayed as a set of standard interfaces: incremental, step+direction, SPI, SSI, PWM, three-phase UVW, linear analog.
*Under development.

SPECIFICATIONS AND FUNCTIONAL PARAMETERS
- Power supply voltage is 5 V ±10%.
- Current consumption does not exceed 30 mA.
- Magnetic configuration – On-AXIS
- Resolution – 4096 counts per revolution (5.3 ang.min). Conversion time – 250 ns (60,000 rpm).
- The converter architecture allows to avoid pulses skips. It provides the smoothness of transfer characteristics.
- Magnetic field induction range – 20–80 mT. Built-in temperature sensor.
- Output interfaces: SPI/SSI, A/B/Index, Step/DIR, PWM, UVW, analog sine-cosine and linear.

COMPETITIVE ADVANTAGES
- High performance.
- Single-chip solution helps to minimize sensor size.
- Various interfaces, multi-turn mode.

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Chief Marketing Officer Oksana Shaimardanova
AMR ANGULAR SENSOR (MRS-20)

APPLICATIONS:
- Industrial automation.
- Rotation control systems.
- In-car electronics.

BRIEF DESCRIPTION
The product could be used in angular throttle sensors for a car engine microprocessor control system developed on the basis of an angular sensor.

SPECIFICATIONS AND FUNCTIONAL PARAMETERS
- Angle of rotation is 0 ... 180° (± 90°).
- Signal amplitude: 15 mV/V.
- Power supply voltage: 5 ... 10 V.
- Resistance from 1 to 3 kΩ.
- Operating temperature range: -60 ... +150 °C.
- Initial offset does not exceed 3 mV/V.
- Package SO-8.

COMPETITIVE ADVANTAGES
- Ability to determine a rotation angle from 0 to 180 degrees.
- High precision.

AMR MAGNETIC FIELD SENSORS (MPC10H... MPC15H)

APPLICATIONS:
- Industrial automation.
- Automotive industry.
- Rotation control systems.
- Precision measuring systems of objects moving parameters.

BRIEF DESCRIPTION
This sensor could be used in distributed automobile units control systems, as well as in the following types of sensors:
- angular and linear movement sensors;
- end position sensors;
- current sensors;
- magnetic field sensors (magnetic compass).

SPECIFICATIONS AND FUNCTIONAL PARAMETERS
- Measured field range: from 0.05 to 10 kA/m.
- Sensitivity: from 3 to 9 mV/V/kA/m.
- Power supply voltage: 5...10 V.
- Bridge resistance – 4 kΩ.
- Initial unbalance does not exceed 3 mV/V.
- Package SO-8.

COMPETITIVE ADVANTAGES
- High precision.
- Ability to determine the rotation angle from 0 to 90 degrees.
- Ability to determine the magnetic field within a wide range from 0.001 to 100 gauss.

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LIFE

DESIGNATION
LIFE is an automated microscope for biomedical research, offering the widest spectrum of inverted optical microscopy methods and techniques of scanning probe microscopy. Routine operations on the instrument are facilitated by comprehensive automation of steps on configuration of the optical detection system, positioning of the sample and the probe, and retraction of the head. Advanced probe techniques allow not only to measure the topography of biological objects, but also to explore their adhesive properties, as well as to measure the local stiffness. The microscope is intended for applications in many areas, including: biomedicine, biotechnology, ecology, nano- and bio-pharmacology, food industry and others.

TECHNICAL SPECIFICATIONS:

| Spatial resolution          | 200 nm for optical inverted microscope  |
|                           | 3 nm for scanning probe microscope     |
| Measurement in liquid      | Flow-through cell                      |
|                           | Heating the liquid in the range from 20 to 60 °C |
|                           | Temperature control accuracy of 0.01 °C |
| Key modes:                 | Dark field microscopy                  |
|                           | Phase contrast microscopy              |
|                           | Microscopy of total internal reflection fluorescence (TIRF) |
|                           | Fluorescence and luminescence confocal microscopy |
|                           | Life-time microscopy                   |
|                           | Atomic-force microscopy                |
|                           | Microscopy of mechanical properties (elasticity, adhesion) |
| Automated positioning      | By sample: 20x20 mm                     |
|                           | By probe: 3x3 mm                       |
|                           | Minimal step: 0.3 μm                   |

COMPETITIVE ADVANTAGES
Automation of both the scanning probe microscope and the inverted optical microscope can greatly simplify routine research in the biomedical field, while maintaining the full functionality of both optical techniques and methods of probe microscopy.

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| Web-site             | www.ntmdt-si.ru    |
| General manager      | Andrey Bykov       |
TITANIUM

DESIGNATION
The atomic-force microscope TITANIUM is an instrument for visualization and property investigation of surfaces with atomic resolution. Its unique system of probe exchange enables continuous operation in an automatic mode. TITANIUM range of applications extends from research tasks on analysis of surface properties to precise control of industrial product parameters.

TECHNICAL SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Resolution</th>
<th>Up to atomic level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Key technologies</td>
<td>Automatic probe exchange with the Revolution Cartridge</td>
</tr>
<tr>
<td></td>
<td>HybriD mode: Investigation of surface mechanical properties</td>
</tr>
<tr>
<td></td>
<td>Multifrequency electrical modes</td>
</tr>
<tr>
<td>Drift</td>
<td>0.2 nm/min</td>
</tr>
<tr>
<td>Noise</td>
<td>25fm/√Hz</td>
</tr>
<tr>
<td>Scan area</td>
<td>100x100 μm</td>
</tr>
<tr>
<td>Control system</td>
<td>Automatic control with motorized basic units</td>
</tr>
<tr>
<td></td>
<td>Expert system for optimization of scanning parameters</td>
</tr>
<tr>
<td></td>
<td>Interactive software with a wide range of tools</td>
</tr>
</tbody>
</table>

COMPETITIVE ADVANTAGES
The multi-probe cartridge (Revolution Cartridge) makes procedures on system setup quick and affordable for an operator of any training level. With its fully automated control, the instrument provides the maximum efficiency and performance of measurements. The HybriD mode uses an innovative approach to accurate representation of AFM data and provides quantitative results of nanomechanical research with the highest resolution.

PRODUCER: GROUP OF COMPANIES NT-MDT SPECTRUM INSTRUMENTS

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<td><a href="http://www.ntmdt-si.ru">www.ntmdt-si.ru</a></td>
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<tr>
<td>General manager</td>
<td>Andrey Bykov</td>
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</table>
NANOEDUCATOR

DESIGNATION
NANOEDUCATOR II is an atomic force microscope (AFM), which combines simplicity, low-cost operation and high spatial resolution for research of the terrain objects and determining their physical and chemical properties. This combination allows the use of NanoEducator both for educational purposes and for routine research.

TECHNICAL SPECIFICATIONS:

<table>
<thead>
<tr>
<th>Scanner</th>
<th>100x100x12 μm with feedback sensors, 3x3x3 μm without feedback sensors</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFM resolution</td>
<td>0.01 nm</td>
</tr>
<tr>
<td>Scan area</td>
<td>High voltage mode: 100x100x12 μm</td>
</tr>
<tr>
<td></td>
<td>Low voltage mode: 3x3x3 μm</td>
</tr>
<tr>
<td>Scanner type</td>
<td>Metrological piezoceramic XYZ scanner with feedback sensors</td>
</tr>
<tr>
<td>Positioning range</td>
<td>12 mm</td>
</tr>
<tr>
<td>Positioning resolution</td>
<td>1.5 μm</td>
</tr>
<tr>
<td>Sample size</td>
<td>up to 35x35x12 mm</td>
</tr>
<tr>
<td>Sample weight</td>
<td>up to 100 g</td>
</tr>
<tr>
<td>AFM head for Si probes</td>
<td>Available in specifications. Any commercial probe can be used</td>
</tr>
<tr>
<td>Detection method</td>
<td>Laser- photodiode</td>
</tr>
<tr>
<td>Probe holder</td>
<td>Holder for measurements in air and holder for measurements in liquids</td>
</tr>
<tr>
<td>STM and AFM heads for wire probes</td>
<td>Available in specifications. Tungsten probes for AFM measurements (low cost of experiments). Pt</td>
</tr>
<tr>
<td>Detection method</td>
<td>Piezo for AFM experiments</td>
</tr>
<tr>
<td>Probe holder</td>
<td>For operation in air and in liquids</td>
</tr>
</tbody>
</table>

COMPETITIVE ADVANTAGES

• Due to the low cost of operation and components that are used in the best professional systems, the instrument can be used both for education of pupils and students and for scientific research.

PRODUCER: GROUP OF COMPANIES NT-MDT SPECTRUM INSTRUMENTS

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| General manager | Andrey Bykov |
SOLVER PIPE

PURPOSE
Solver Pipe is a diagnostic system for structural materials of operating equipment by atomic force microscopy.

Solver Pipe is designed for:
• non-destructive diagnostics of operating industrial equipment including equipment being used under extreme conditions;
• industrial defectoscopy of oversized parts of industrial equipment by means of atomic force microscopy (AFM);
• early stage detection of nanometer-scale structural defects.

The system allows to detect defects of structural materials at early stages, when common techniques (ultrasonic diagnostic, optical diagnostic, etc.) are not able to detect structural changes. As a result, it becomes possible to predict the residual lifetime of industrial equipment and to minimize the risks of emergency failures.

The main application area of Solver Pipe is technical diagnostics and residual lifetime estimation in the fields of oil and chemical industries, energetics, mechanical engineering, aircraft construction, shipbuilding, etc.

<table>
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<td>Web-site</td>
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<tr>
<td>General manager</td>
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</table>
**INTEGRA SPECTRA II**

**PURPOSE**

INTEGRA Spectra II – is an automated AFM-Raman, SNOM and TERS system. The system features:

- High-performance versatile AFM.
- Optical access from top, side and bottom optimized for TERS and SNOM.
- Flexible optical design providing any combination of excitation/collection configurations.
- Automated AFM laser, probe and photodiode alignment.

NT-MDT has been successfully integrating AFM with optical microscopy and spectroscopy techniques since 1998. More than 30 basic and advanced AFM modes including HybriD Mode™ are supported by the company providing extensive information about the sample surface physical properties.

Integration of AFM with confocal Raman/fluorescence microscopy provides the widest range of additional information about the sample.

Simultaneously measured AFM and Raman maps of exactly the same sample area provide complementary information about sample physical properties (AFM) and chemical composition (Raman).

Owing to Tip Enhanced Raman Scattering (TERS) the system allows carrying out spectroscopy/microscopy with nanometer scale resolution.

Scanning near-field optical microscopy (SNOM) is another approach to obtain optical and spectroscopy images of optically active samples with resolution limited by the probe aperture size (~100 nm).

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<td>General manager</td>
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</table>
THERMOANEMOMETER TTM-2-02-2

PURPOSE
The device is designed for measuring the air flow rate in residential and industrial buildings, air conditioning, heating and ventilation systems.

SHORT DESCRIPTION
The device is portable; it features a convenient ergonomic case and sliding telescopic probe antenna.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• measuring range of the air flow rate, m/s: 0.1...30;
• measurement inaccuracy of the air flow rate, m/s: ±(0.05+0.05•V), where V is the flow rate;
• PC connection interface: USB;
• quantity points of the automatic statistics: not less than 10,000;
• supply voltage, V: 2.2...3.

COMPETITIVE ADVANTAGES
• settlement of volume air flow rate and its indication on the display;
• USB interface;
• large two-line display;
• ergonomic case;
• internal memory for 10,000 measurement points;
• the possibility of combining devices in a common measurement system;
• telescopic probe.

DEVICE FOR MEASURING MICRO HUMIDITY OF GASES IVG-1 KP

PURPOSE
The device is intended to measure and record humidity and temperature of the gases areas (non-aggressive gases).

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• measurement range of hygrometers, Tdp.: -80...0 °C,
• temperature of analyzing gas, °C: -20...+40 °C;
• pressure of analyzing gas, ATM, max: 25/160/400;
• recommended flow of analyzing gas, l/h: 20...60;
• quantity points of the automatic statistics: 9,000;
• PC connection interface: RS-232;
• device supply voltage: 3 V.

COMPETITIVE ADVANTAGES
• the Plug & Play principle providing interchangeability of transducers of various design;
• conversion of humidity units depending on the pressure;
• logging of the measurement results and statistics accumulation option (up to 9,000 points);
• humidity measurement is in degrees Celsius on dew-point, recalculation of the measured values of micro humidity in %, RH, ppm, g/m³ is provided.

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Chief Marketing Officer Volkova Galina
PORTABLE MULTICOMPONENT GAS ANALYZER MAG-6PV

PURPOSE
The device is designed to measure and record concentration of up to 4 gases at the same time.

SHORT DESCRIPTION
The device features display indications. The gas analyzer is used to measure concentration of methane, oxygen, carbon dioxide, carbon monoxide, hydrogen sulfide and ammonia depending on the device performance. The modification of the gas analyzer MAG-6 PV refers to explosion-proof equipment group II GOST R 51330.0-99 (IEC 60079-0-98). Application: various technological processes in manufacture, power industry, agriculture and other sectors of economy.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- measuring range of the volume fraction of carbon dioxide, %:
  - option 1: from 0.0 to 1.0;
  - option 2: from 0.0 to 10.0;
- measuring range of the volume fraction of oxygen, %:
  - option 1: from 0.0 to 30.0;
  - option 2: from 0.0 to 100.0;
- measuring range of the volume fraction of methane, %: 0 ... 5;
- measuring range of mass concentration of carbon monoxide, mg/m$^3$: 0...500;
- measuring range of mass concentration of ammonia, mg/m$^3$: 0 ... 70;
- measuring range of mass concentration of hydrogen sulfide, mg/m$^3$: 0 ... 140;
- automatic statistics points quantity: 8,000;
- PC connection interface: RS-232;
- device supply voltage: 4.4 to 5.2;
- device weight, kg, not more than 0.4.

COMPETITIVE ADVANTAGES
- possibility of measuring and recording of the concentration of up to four gases at once;
- explosive-proof construction of the device in a metallic frame;
- LED display;
- presence of a built-in flow booster for pumping of the analyzed gas;
- sound and light indication system on two levels of concentration of each analyzed gas;
- autonomous power supply of the gas-analyzer that guarantees the duration of continuous running up to 8 hours.

**PRODUCER: ECOLOGICAL SENSORS AND SYSTEMS CJSC (ES&S CJSC)**

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PORTABLE HYGROMETER IVM-7M2-D-V

PURPOSE
The device is intended to measure and record relative humidity, temperature and pressure of air or nonaggressive gases in rooms with high humidity.

SHORT DESCRIPTION
Portable hygrometer features a dust and water protected body and an additional pressure channel.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- Measuring range of relative humidity: 0 ... 99%;
- Measuring range of temperature, °C: -20 ... +50 °C;
- Measuring range of pressure, hPa: 840 ... 1,060;
- Conversion of measurement results in different units: °C, Tdp, ppm, g/m³, °C wet thermometer;
- Automatic statistics points quantity: 10,000;
- Device supply voltage: 2.4 V;
- IP65 degree of protection;
- USB interface.

COMPETITIVE ADVANTAGES
- IP65 degree of dust and water protection, metal case;
- Measurement of atmospheric pressure in mm Hg and hPa;
- The possibility of combining the measuring devices in a system;
- Indication of measured values at the same time.

PRODUCER: ECOLOGICAL SENSORS AND SYSTEMS CJSC (ES&S CJSC)

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MINIATURE DIGITAL VOICE RECORDER EDIC-MINI TINY+ A77

Model A77 features the dimensions of only 29x15x12 mm and weight of 7 g, thereby it is very convenient to carry and always keep on hand to record information promptly at the right time. The built-in rechargeable battery allows continuous audio recording within 55 hours. One of attractive features of the device is starting recording by sound. In Voice Activation mode model A77 is able to record within 3 days. Moreover inaudible markers are added to the record allowing it to identify the record’s time and date as well as the recorder’s type and its serial number; and the attempts to modify it.

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<thead>
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<th>PRODUCER: TS-MARKET LTD</th>
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<td>CEO</td>
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MINIATURE DIGITAL VOICE RECORDER EDIC-MINI TINY+ B70

The smallest recorder manufactured in Russia! Its dimensions 37x15x7 mm, and weight is only 7 g. Model B70 registered in Russian Book of Records in 2016 year as the smallest digital voice recorder. Despite the diminutive sizes Edic-mini Tiny+ B70 combined characteristics, providing high record quality ease of use and wide range if functions. Battery of the device conducts continuous recording during 10 hours and with turned on Voice Activation mode — up to 70 hours.

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E-mail market@ts-market.com
Web-site www.ts-market.com
CEO Ushakov Maxim
DIGITAL VOICE RECORDER WITH SOLAR BATTERY EDIC-MINI LED S51

Professional recorder S51 is on the order of wrist watches, and alongside a built-in rechargeable battery, the device is equipped with a solar battery, which increases the autonomy – Edic-mini LED S51 can record up to 50 hours without interruption and recharge. This model is equipped with the most comfortable indication of recorder operation and condition executed in the form of 12 LEDs in different colors. You can playback the records not only using PC but also from the recorder itself via headphones. The Edic-mini LED S51 is protected from forgery by system of markers, which are suitable for use as evidence in court – linguistic and phonoscopic examinations.

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<tr>
<td>CEO</td>
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<tr>
<td>Ushakov Maxim</td>
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SELECTIVE DETECTOR RAKSA IDET

Raksa iDet is used to detect and locate a wide variety of radio transmitters (bugs) in the near field used for secret access to audio and video information. This device is very popular on the world market due to its compact sizes, high scanning and analyzing speed in a range of 1.0–1.5 sec, as well as multilingual interface and ease of use.

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<tr>
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<tr>
<td>Ushakov Maxim</td>
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</table>
NON-LINEAR JUNCTION DETECTOR LORNET STAR

The detector is designed to detect various kinds of electronic devices containing semiconductor elements, such as eavesdropping devices, microphone amplifiers, audio-recording devices, remote control devices, etc., both in a switched-on and switched-off mode. Lornet Star is the world’s only non-linear junction detector featuring an integrated spectrum analyzer of 2nd and 3rd harmonics making it possible to distinguish an organic semiconductor (metal corrosion) from a synthetic one. Three interchangeable transmitter-receiver units of frequency bands 800 MHz, 2400 MHz and 3600 MHz turn the device easily from search to inspection and back.

<table>
<thead>
<tr>
<th>PRODUCER: TS-MARKET LTD</th>
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<tr>
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<tr>
<td>Web-site</td>
</tr>
<tr>
<td>CEO</td>
</tr>
</tbody>
</table>

METAL DETECTOR SIGNUM

The device is a professional, computerized, highly sensitive and selective metal detector with a unique algorithm for flat iron objects (S-algorithm) identification. This model features a multi-frequency technology (MFT) that allows fast and independent replace of the search coil, as well as an unparalleled technology of mediated imaging of the objects of search in the form of spectral hodographic images on the screen of graphic LCD display (128x64 pixels).

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<td>CEO</td>
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</tbody>
</table>
**HUMAN DETECTING RADAR GERAD-5**

Gerad-5 radar is designed to detect people behind obstacles (walls, building construction, debris) during anti-terrorist and rescue operations. The device allows detecting motionless people by breathing with minimum amplitude of moving chest of 0.01m located behind the walls at a distance of 10m. Information on any moving objects in the radar’s operational zone is displayed as red marks in the corresponding sectors angularly and at the predetermined distance, on the radar removable display.

**PRODUCER: TS-MARKET LTD**

<table>
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<tr>
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<tr>
<td>CEO</td>
<td>Ushakov Maxim</td>
</tr>
</tbody>
</table>

**OPTOELECTRONIC DEVICE ANLAS**

Anlas is designed for search and visualization of the place of surreptitious portable observation systems (working or disconnected), camouflaged in interior items, clothing and household goods for personal use, compact cameras under different lighting conditions. The device allows detecting electro-optical surveillance systems through glass including toned glass, organic glass, and semitransparent mirror. Anlas is able to operate both in complete darkness and in the presence of intense backlight.

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</tr>
<tr>
<td>CEO</td>
<td>Ushakov Maxim</td>
</tr>
</tbody>
</table>
GASES HUMIDITY MEASURING IVG-1/X-T-YP-ZA (7)

MAIN PURPOSE
Measuring and recording of humidity nonaggressive gases areas.

SHORT DESCRIPTION
The device is intended to measure and record humidity and temperature of the gases areas (nonaggressive gases) at the same time in 8 points, with the ability to connect pressure sensors.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- measurement range of hygrometers dew point PT.R.: -80 ... 0 °C dew point;
- temperature of the analyzed gas, °C: -20 ... +40 °C;
- pressure of the analyzed gas, ATM, max: 25/160/400;
- recommended flow of the analyzed gas, l/h: 20 ... 60;
- quantity points of the automatic statistics: 30,000;
- connection interface with PC are: USB, RS-232, RS-485, Ethernet;
- length of connecting cable 1,000 m;
- power of device: 3 V.

COMPETITIVE ADVANTAGES
- The Plug & Play principle, providing interchangeability of transducers of the various designs.
- Convert units of humidity depending on the pressure.
- Logging measurement results and the possibility of statistics accumulation (to 30,000).
- Measurement of humidity is in degrees Celsius on dew-point, also provides for the recalculation of the measured values of humidity in % relative humidity., ppm, g/m³.

PRODUCER: PRACTIC-NC JSC

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Web-site www.pnc.ru
Chief Marketing Officer Volkova Galina

AERODYNAMIC SYSTEMS AU-2

MAIN PURPOSE
Reproduction of air flow rate and using for calibration anemometers TTM-2 and similar devices for air flow rate measuring.

SHORT DESCRIPTION
Aerodynamic system AU-2 is installed in a cabinet. Basic set of delivery: a control unit, a mechanical module, a protective box, thermoanemometer model TTM-2-04, software.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- the range of the playable air flow rate: 0,1 ... 30 m/s;
- the limit of permissible absolute error of speed measurement, m/s, where V is air flow rate: ±(0.02+0.02•V);
- type of system: pressure;
- hole diameter, mm: 110 (120*);
- communication interface with PC: RS-232;
- power device: 220 V (50±1) Hz;
- overall dimensions of the mechanic module (without the shielding casing), mm (L×W×H): 1,200×400×400;
- overall dimensions of the control unit, mm (L×W×H) 240×240×100;
- weight of the mechanic module (without shielding casing), not more, kg: 25;
- weight of the control unit, no more than, kg: 4.

COMPETITIVE ADVANTAGES
- A wide range of playable air flow rate from 0.1 to 30 m/s.
- Calibration TTM-2 and similar devices for measuring air flow rate.

PRODUCER: PRACTIC-NC JSC

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Chief Marketing Officer Volkova Galina
STATIONARY ANEMOMETER TTM-2/X-06-XP-YA

MAIN PURPOSE
The product is designed for measuring and controlling of the airflow rate.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- airflow rate measuring range, m/s: 0.1 ... 30;
- measurement error of airflow rate, m/s: ±(0.05+0.05•V), V is the flow rate in m/s;
- the display range of the airflow rate, m3/h: 0 ... 9,999;
- the display range of the airflow temperature, °C: -40 ... +60 °С;
- the number of points of the automatic statistics: 30,000;
- connection interface with PC are: USB, RS-232, RS-485;
- connecting cable: 1,000 m;
- power supply: 220 ± 22 V, 50 ±1 Hz.

COMPETITIVE ADVANTAGES
- Up to 16 measurement channels.
- Integrate relay and analog outputs.

<table>
<thead>
<tr>
<th>PRODUCER: PRACTIC-NC JSC</th>
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</thead>
<tbody>
<tr>
<td>Phone</td>
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<td>E-mail</td>
</tr>
<tr>
<td>Web-site</td>
</tr>
<tr>
<td>Chief Marketing Officer</td>
</tr>
</tbody>
</table>

STATIONARY HYGROMETER IVTM-7/8-T-XP-YA-E (5)

MAIN PURPOSE
The hygrometer is intended for measuring, registration and regulation of humidity and air temperature simultaneously in 16 control parameters points.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
- measuring range of relative humidity, %: 0 ... 99%;
- the time constant of humidity measurement, max: 60;
- temperature measurement range: according to the model of the transducer;
- humidity unit: % relative humidity, °dew point, ppm, g/m³;
- the number of points of the automatic statistics: 715,000;
- connection with PC by USB, RS-232, Ethernet;
- connecting cable: 1,000 m;
- power supply: 220 ± 22 V, 50 ±1 Hz.

COMPETITIVE ADVANTAGES
- Color graphic display (5") with touch control.
- Up to 8 measurement channels.
- Integrate relay and analog outputs.
- WEB interface.
- Protocols Modbus RTU and Modbus TCP.
- Large amount of internal memory.

<table>
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<td>Chief Marketing Officer</td>
</tr>
</tbody>
</table>
INSTALLATION OF DRYING GASES

MAIN PURPOSE
A unit for drying compressed air, nitrogen and other inert gases not worse than up to -70 degrees Celsius on dew-point at relatively low costs (up to 80 l/min at 1 ATM.).

SHORT DESCRIPTION
Adsorption systems for drying gases are produced in a metal cabinet in 2 versions:
- version 1: humidity indication of the output gas;
- version 2: humidity indication of the input and output gases.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• power voltage: 220±22 V, 50±1 Hz;
• power consumption, W, max: 50;
• working area: compressed air/nitrogen:
  - temperature, °C, max: +50;
  - air humidity under the pressure, °C dew point: -70;
• working pressure environment, ATM: 4 ... 16;
• maximum flow rate, ml/h (1 bar, 20 °C): 5;
• loss on regeneration, ml/h, max: 1;
• purity grade of compressed gas (ISO 8573-1), not worse:
  - at the dryer entrance: 3 class;
  - at the dryer exit: 1 class;
• accession, G: 3/8;
• overall dimensions, mm, not more: 450x500x230;
• device weight, kg, not more: 26.

COMPETITIVE ADVANTAGES
• Small dimensions and weight.
• Drying compressed air, nitrogen and other inert gases not worse than to -70 °C; dew point, at relatively low costs (up to 80 l/min at 1 ATM.).
• Recording of measurement results and the possibility statistic accumulation (up to 9,000 pixels).
• Measurement of microplanet is in Celsius degrees dew-point (°PT.R.) also provides for the recalculation of the measured values of humidity in % Rel.VL., ppm, g/m³.

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Chief Marketing Officer Volkova Galina
MAGNETRON SPUTTERING SYSTEM IRIDA D21A

Irida D21A is designed for up to 200 mm substrates thin film deposition applications. Irida D21A allows to apply the coating on the substrate by magnetron sputtering of conductive materials. Dielectric materials could be applied by using RF power supply. Irida D21A has a reactive sputtering mode. Sputter source cluster is mounted on a chamber lid. It consists of 4 magnetrons which can be moved from the chamber wall toward the center via electric drives. In the parked position at the chamber wall magnetrons could be covered with individually controllable shutters. Heated substrate table can lift and rotate. While magnetron moves from the chamber wall to the center and back the substrate table is rotating. By controlling the speeds of the magnetron and the table we control the uniformity (of the layers). 1”, 2” or 3” magnetrons may be used depending on your priority: the price of the target or the rate of sputtering. Irida D21A can be configured as a single machine equipped with the piece-loading substrates load-lock or as a cluster tool with cassette to cassette loading. Irida D21A is equipped with built-in lifts for the upper and lower lids of the chamber for convenient service. On-board electrical equipment of Irida D21A eliminates the need for using separate rack, simplifies mounting/dismantling of the system and increases the reliability and convenience of placing the system in the work-shop.

UTILITY REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>3x380 V ± 5%, 32 A/phase, 50 Hz / 60 Hz, N, G</td>
</tr>
<tr>
<td>Compressed air</td>
<td>6 kg/cm²</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>3-4 kg/cm² 25 liters per run</td>
</tr>
<tr>
<td>Cooling water</td>
<td>4.3 kg/cm², 12 l/min</td>
</tr>
<tr>
<td>Exhaust</td>
<td>DN 40 KF (processed gases)</td>
</tr>
<tr>
<td></td>
<td>Ø 80 mm (gas box)</td>
</tr>
</tbody>
</table>

ORDERING INFORMATION

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irida D21A</td>
<td>magnetron sputtering system with load-lock</td>
</tr>
<tr>
<td>Irida D21AK</td>
<td>magnetron sputtering module for integration into the cluster</td>
</tr>
<tr>
<td>MAXIMA 2600</td>
<td>4 port transfer chamber with 2 cassette stations</td>
</tr>
</tbody>
</table>

PRODUCER: ESTO-VACUUM

<table>
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</tr>
<tr>
<td>Chief Marketing Officer</td>
<td>Mikhail Suvorov</td>
</tr>
</tbody>
</table>
PLASMA ETCHER IRIDA PE21

Irida PE21 is designed for plasma etching of wafers up to 200 mm. Irida PE21 is well suited for etching silicon layers (oxides, nitrides, polysilicon, CND, monocrystalline silicon), quartz substrate, piezoelectric quartz with rate up to 1 µm/min with good quality surface to a depth up to 100 microns.
- Etching of gallium arsenide, gallium nitride, and other compound semiconductors.
- Etching of aluminum, copper, gold, silver, platinum, and many other materials by sputtering.

Highly efficient plasma source provides both high-pressure and low-pressure etching.
Irida PE21 can be configured as a single machine equipped with the piece-loading substrates load-lock or as a cluster tool – with cassette to cassette loading.
Irida PE21 is equipped with built-in lifts for the upper and lower lids of the chamber for convenient service.
On-board electrical equipment of Irida PE21 eliminates the need for using separate rack, simplifies mounting/dismantling of the system and increases the reliability and convenience of placing the system in the work-shop.

OPERATION SYSTEM
- Fully atomized.
- Flexible set of technological programs.
- Four levels of access rights.
- Two types of interface: for operators (simple) and for engineers.
- Mode of parameters editing in the running program.
- An extended data logging records all analog parameters on the monitor and in file.
- Developed system of self-diagnosis.

UTILITY REQUIREMENTS

<table>
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<th>Power</th>
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<td>Compressed air</td>
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<tr>
<td>Nitrogen</td>
<td>2 kg/cm² 25 liters per run</td>
</tr>
<tr>
<td>Cooling water</td>
<td>4.3 Kg/cm², 12 l/min</td>
</tr>
<tr>
<td>Exhaust</td>
<td>DN 40 KF (processed gases) Ø 80 mm (gas box)</td>
</tr>
</tbody>
</table>

ORDERING INFORMATION

| Irida PE21 | plasma chemical system with system gateway download |
| Irida PE21K | plasma chemical etching module for integration into the cluster installation |
| MAXIMA 2600 | 4 port transfer chamber with 2 cassette stations |

PRODUCER: ESTO-VACUUM

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Chief Marketing Officer | Mikhail Suvorov |
# AUTOMATED THERMAL, MAGNETRON AND ION-BEAM DEPOSITION SYSTEM

## CAROLINE D12A

### APPLICATION
ESTO has developed Caroline D12A system for thermal, magnetron and ion-beam deposition on flat silicon, ceramic or glass-ceramic substrates with the thickness of less than 30 mm and less than 100 mm diameter.

The magnetron features horizontally mounted sputtering targets under the horizontal rotary-table with substrates attached face down. Sputtering of the target is performed bottom-up.

The system can be set up for various applications by mounting different equipment to five D12A installation points. D12A equipment includes magnetrons (from 1 to 5 units), ion sources for preliminary surface cleaning and etching, a thermal evaporator.

### TECHNICAL SPECIFICATION

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of substrates processed for one sputtering cycle, mm</td>
<td>12 pcs. Ø 100</td>
</tr>
<tr>
<td>Visual monitoring of a thermal evaporation process</td>
<td></td>
</tr>
<tr>
<td>Automatic shutter control for deposition on all substrates</td>
<td></td>
</tr>
<tr>
<td>Working gas consumption for each channel, l/hour</td>
<td>0÷9</td>
</tr>
<tr>
<td>The number of working gases (non-aggressive)</td>
<td>up to 3</td>
</tr>
<tr>
<td>Cleaning module</td>
<td>1</td>
</tr>
<tr>
<td>Thermal evaporators</td>
<td>up to 3</td>
</tr>
<tr>
<td>Magnetron units</td>
<td>up to 5</td>
</tr>
<tr>
<td>Magnetron type (for film deposition)</td>
<td>mid-frenquency pulsed</td>
</tr>
<tr>
<td>Magnetron working current, controlled, A</td>
<td>up to 7</td>
</tr>
<tr>
<td>Magnetron voltage, V</td>
<td>up to 650</td>
</tr>
<tr>
<td>Targets dimensions (Indirectly cooled complex targets can be used), mm</td>
<td>Ø 100x4÷12</td>
</tr>
<tr>
<td>Allowed pressure in a sputtering chamber, Pa</td>
<td>0.07÷0.3</td>
</tr>
<tr>
<td>Bias sputtering on a cooled substrate (pulsing frequency 100 kHz, power up to 1 kVA)</td>
<td>optional</td>
</tr>
<tr>
<td>The witness piece of a substrate resistance range, kn</td>
<td>0.2÷20</td>
</tr>
<tr>
<td>Resistivity measurement uncertainty, %</td>
<td>±1</td>
</tr>
<tr>
<td>Quartz thickness gauge installation at any sputtering site</td>
<td>optional</td>
</tr>
<tr>
<td>Recommended temperature of substrates, °C (max 300 °C)</td>
<td>50÷250</td>
</tr>
<tr>
<td>Substrates temperature instability, %</td>
<td>±5</td>
</tr>
<tr>
<td>Limiting residual pressure in a working chamber, Pa</td>
<td>8x10^{-4}</td>
</tr>
<tr>
<td>Total system start-up time including cryopump warm-up, min</td>
<td>&lt;120</td>
</tr>
<tr>
<td>Overall dimensions of the system, with an open chamber cover (width x depth x height) with an open chamber cover, mm</td>
<td>1,315x1, 430x2, 100</td>
</tr>
<tr>
<td>Total weight, including power and control units, kg</td>
<td>&lt;1,850</td>
</tr>
</tbody>
</table>

### PRODUCER: ESTO-VACUUM

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<tr>
<td>Chief Marketing Officer</td>
<td>Mikhail Suvorov</td>
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</tbody>
</table>
AUTOMATED MAGNETRON DEPOSITION
SYSTEM CAROLINE D12B

APPLICATION
Caroline D12B system is designed for magnetron deposition on silicon, ceramic or any flat substrates less than 150 mm diameter (substrate thickness should be less than 30 mm). Maximum surface processing – 150x350 mm.
Substrate holders are located on rotating drum. Magnetron units (up to 4) are placed inside the drum and sputter deposition is performed in vertical direction.
Magnetron units of the system are capable for sputtering any material, including resistive alloys of Cu, Cr, Ni, Al, etc.

TECHNICAL SPECIFICATION

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of substrates processed for one sputtering cycle, mm</td>
<td>48 pcs. Ø 100, 28 pcs. Ø 150, 111 pcs. 60x48</td>
</tr>
<tr>
<td>Automatic shutter control for all targets</td>
<td></td>
</tr>
<tr>
<td>Working gas consumption for each channel, l/hour</td>
<td>0÷9</td>
</tr>
<tr>
<td>The number of working gases (non-aggressive)</td>
<td>up to 3</td>
</tr>
<tr>
<td>Cleaning module</td>
<td>1</td>
</tr>
<tr>
<td>Magnetron units</td>
<td>up to 4</td>
</tr>
<tr>
<td>Magnetron type (for film deposition)</td>
<td>mid-frequency pulsed</td>
</tr>
<tr>
<td>Magnetron working current, controlled, A</td>
<td>0.5÷15 (optional 30)</td>
</tr>
<tr>
<td>Magnetron voltage, V</td>
<td>&lt;650</td>
</tr>
<tr>
<td>Targets dimensions (Indirectly cooled complex targets can be used), mm</td>
<td>440x100x6÷15</td>
</tr>
<tr>
<td>Allowed pressure in a sputtering chamber, Pa</td>
<td>0.07÷0.3</td>
</tr>
<tr>
<td>The witness piece of a substrate resistance range, kΩ</td>
<td>0.2÷20</td>
</tr>
<tr>
<td>Resistivity measurement uncertainty, %</td>
<td>±1</td>
</tr>
<tr>
<td>Recommended temperature of substrates (°C, max 300 °C)</td>
<td>50÷250</td>
</tr>
<tr>
<td>Substrates temperature instability, %</td>
<td>±5</td>
</tr>
<tr>
<td>Limiting residual pressure in a working chamber, Pa</td>
<td>8x10⁻⁴</td>
</tr>
<tr>
<td>Total system start-up time including cryopump warm-up, min</td>
<td>120</td>
</tr>
<tr>
<td>Overall dimensions of the system, with a lifted chamber (width x depth x height, mm)</td>
<td>1,450x1,850x2,550</td>
</tr>
<tr>
<td>Total weight, including power and control units, kg</td>
<td>&lt;1,700</td>
</tr>
</tbody>
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Chief Marketing Officer | Mikhail Suvorov
## AUTOMATED MAGNETRON DEPOSITION SYSTEM CAROLINE D12B1

### APPLICATION

Caroline D12B1 system is designed for magnetron deposition of hardening, decorative and corrosion-resistant coatings on various parts, like blades, shells, tools, etc. The system is equipped with 20 rotary holders. Diameter of processed parts should be less than 80 mm and length should be less than 400 mm.

Caroline D12B1 can be equipped with up to 4 pairs of magnetron units for any materials sputtering from the targets of size not greater than 400x100x6–15 mm. Planetary carousel substrate holders allow sputter deposition on any side of the processed part.

### TECHNICAL SPECIFICATION

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of substrates processed for one sputtering cycle, mm</td>
<td>20 pcs. Ø 80 height up to 400</td>
</tr>
<tr>
<td>Automatic shutter control for all targets</td>
<td></td>
</tr>
<tr>
<td>Working gas consumption for each channel, l/hour</td>
<td>0±9</td>
</tr>
<tr>
<td>The number of working gases (non-aggressive)</td>
<td>up to 3</td>
</tr>
<tr>
<td>Cleaning module</td>
<td>1</td>
</tr>
<tr>
<td>Simultaneous operation of a magnetron and an ion source using gas mixture</td>
<td>optional</td>
</tr>
<tr>
<td>Magnetron units</td>
<td>up to 4 pairs</td>
</tr>
<tr>
<td>Magnetron type (for film deposition)</td>
<td>mid-frequency pulsed</td>
</tr>
<tr>
<td>Magnetron working current, controlled, A</td>
<td>3±30</td>
</tr>
<tr>
<td>Magnetron voltage, V</td>
<td>A0650</td>
</tr>
<tr>
<td>Targets dimensions (indirectly cooled complex targets can be used)</td>
<td>440x100x6±15</td>
</tr>
<tr>
<td>Allowed pressure in a sputtering chamber, Pa</td>
<td>0.07±0.3</td>
</tr>
<tr>
<td>Bias generator power, kVA</td>
<td>4</td>
</tr>
<tr>
<td>Bias sputtering on a cooled substrate (pulsing frequency 100 kHz), V</td>
<td>100±1,000 B</td>
</tr>
<tr>
<td>Recommended temperature of substrates (°C, peak temperature during bias sputtering could reach 700)</td>
<td>50±250 (350 optional)</td>
</tr>
<tr>
<td>Limiting residual pressure in a working chamber, Pa</td>
<td>8x10⁻⁴</td>
</tr>
<tr>
<td>Total system start-up time including cryopump warm-up, min</td>
<td>&lt;120</td>
</tr>
<tr>
<td>Overall dimensions of the system, with a lifted chamber (width x depth x height, mm)</td>
<td>2,350x2,000x2,980</td>
</tr>
<tr>
<td>Total weight, including power and control units, kg</td>
<td>&lt;2,500</td>
</tr>
</tbody>
</table>

### PRODUCER: ESTO-VACUUM

<table>
<thead>
<tr>
<th>Contact Information</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phone</td>
<td>+7 (499) 710 60 00, +7 (499) 710 60 11</td>
</tr>
<tr>
<td>E-mail</td>
<td><a href="mailto:marketing@esto-vacuum.ru">marketing@esto-vacuum.ru</a></td>
</tr>
<tr>
<td>Web-site</td>
<td><a href="http://www.esto-vacuum.ru">www.esto-vacuum.ru</a></td>
</tr>
<tr>
<td>Chief Marketing Officer</td>
<td>Mikhail Suvorov</td>
</tr>
</tbody>
</table>
ATOMATED DOUBLE-SIDED MAGNETRON DEPOSITION SYSTEM CAROLINE D12B2

APPLICATION
The system is designed for double-sided magnetron deposition on silicon, ceramic or any flat substrates smaller than 150 mm diameter (substrate thickness should be less than 30 mm). Maximum surface processing – 150x350 mm. Substrate holders are located on rotating drum. The system is equipped with 7 magnetron units, 4 of which are placed inside the drum and 3 are outside the drum in specific doors. Sputter deposition is performed in vertical direction on both the inner side and the outer side of the substrate. Magnetron units of the system are capable for sputtering any material, including resistive alloys of Cu, Cr, Ni, Al, etc.

TECHNICAL SPECIFICATION

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of substrates processed for one sputtering cycle, double-sided processing, mm</td>
<td>70 pcs. 60x48</td>
</tr>
<tr>
<td></td>
<td>40 pcs. Ø 100, 28 pcs. Ø 150</td>
</tr>
<tr>
<td></td>
<td>111 pcs. 60x48</td>
</tr>
<tr>
<td>Automatic shutter control; at the same time shutters can be open for deposition either at even positions (2 and 4) or at odd positions (1 and 3)</td>
<td></td>
</tr>
<tr>
<td>Working gas consumption for each channel, l/hour</td>
<td>0÷9</td>
</tr>
<tr>
<td>The number of working gases (non-aggressive)</td>
<td>up to 3</td>
</tr>
<tr>
<td>Cleaning modules</td>
<td>1</td>
</tr>
<tr>
<td>Magnetron units</td>
<td>up to 7</td>
</tr>
<tr>
<td>Magnetron type (for film deposition)</td>
<td>mid-frequency pulsed</td>
</tr>
<tr>
<td>Magnetron working current, controlled, A</td>
<td>3÷30</td>
</tr>
<tr>
<td>Magnetron voltage, V</td>
<td>300÷650</td>
</tr>
<tr>
<td>Targets dimensions (indirectly cooled complex targets can be used), mm</td>
<td>440x100x6+15</td>
</tr>
<tr>
<td>Allowed pressure in a sputtering chamber, Pa</td>
<td>0.07÷0.3</td>
</tr>
<tr>
<td>The witness piece of a substrate resistance range, kn</td>
<td>0.2÷20</td>
</tr>
<tr>
<td>Resistivity measurement uncertainty, %</td>
<td>±1</td>
</tr>
<tr>
<td>Substrates temperature instability, %</td>
<td>±5</td>
</tr>
<tr>
<td>Recommended temperature of substrates (°C, max 700)</td>
<td>50÷250 (350 optional)</td>
</tr>
<tr>
<td>Limiting residual pressure in a working chamber, Pa</td>
<td>8x10⁻⁴</td>
</tr>
<tr>
<td>Total system start-up time including cryopump warm-up, min</td>
<td>&lt;120</td>
</tr>
<tr>
<td>Overall dimensions of the system, with a lifted chamber (width x depth x height), mm</td>
<td>1,750x2,000x2,980</td>
</tr>
<tr>
<td>Total weight, including power and control units, kg</td>
<td>&lt;2,300</td>
</tr>
</tbody>
</table>

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Chief Marketing Officer            Mikhail Suvorov
APPLICATION
Caroline D12B3 system is designed for double-sided magnetron deposition on silicon, ceramic or any flat substrates of diameter less than 150 mm (substrate thickness should be less than 30 mm). Maximum surface processing – 150x350 mm.
Substrate holders are located on rotating drum. The system is equipped with 4 pairs of magnetron units, so sputter deposition is performed in vertical direction on the inner side and the outer side of substrates. The system’s vacuum chamber has a specific door equipped with two heaters and an ion source.
Magnetron units of the system are capable for sputtering any material, including resistive alloys of Cu, Cr, Ni, Al, etc.

TECHNICAL SPECIFICATION

| The number of substrates processed for one sputtering cycle, | 70 pcs. 60x48 |
| -double-sided processing, mm | 48 pcs. Ø 100, 28 pcs. Ø 150 |
| -single-sided processing, mm | 111 pcs. 60x48 |
| Automatic shutter control; at the same time shutters can be open for deposition | 0±9 |
| either at even positions (2 and 4) or at odd positions (1 and 3) | |
| Working gas consumption for each channel, l/hour | up to 3 |
| The number of working gases (non-aggressive) | 1 |
| Cleaning modules | up to 7 |
| Magnetron units | mid-frenquency pulsed |
| Magnetron type (for film deposition) | 3±30 |
| Magnetron working current, controlled, A | 300±650 |
| Magnetron voltage, V | 0.07±0.3 |
| Targets dimensions (indirectly cooled complex targets can be used), mm | 440x100x6±15 |
| Allowed pressure in a sputtering chamber, Pa | 0.2±20 |
| The witness piece of a substrate resistance range, kn | ±1 |
| Resistivity measurement uncertainty, % | ±5 |
| Substrates temperature instability, % | 50÷250 (350 optional) |
| Recommended temperature of substrates (°C, max 700) | 8x10-4 |
| Limiting residual pressure in a working chamber, Pa | <120 |
| Total system start-up time including cryopump warm-up, min | 1,750x2,000x2,980 |
| Overall dimensions of the system, with a lifted chamber (width x depth x height), mm | <2,300 |
| Total weight, including power and control units, kg | |

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| Chief Marketing Officer | Mikhail Suvorov |
AUTOMATED MAGNETRON DEPOSITION SYSTEM
CAROLINE D12C

APPLICATION
Caroline D12C is a batch sputtering system. It is designed for magnetron deposition on any flat substrates smaller than 150 mm in diameter (substrate thickness should be less than 30 mm). Maximum surface processing – 150x650 mm. Magnetron units (up to 4) are placed inside the drum and sputter deposition is performed in vertical direction. Magnetron units of the system are capable for sputtering any material, including resistive alloys of Cu, Cr, Ni, Al.

TECHNICAL SPECIFICATION

| The number of substrates processed for one sputtering cycle, double-sided processing, mm | 96 pcs. Ø 100; 176 pcs. 60x48 |
| Automatic shutter control for all targets | |
| Working gas consumption for each channel, l/hour | 0÷9 |
| The number of working gases (non-aggressive) | up to 3 |
| Ion cleaning module | 1 |
| Magnetron units | up to 4 |
| Magnetron type (for film deposition) | mid-frequency pulsed |
| Magnetron working current, controlled, A | 0.5÷15 (30-optional) |
| Magnetron voltage, V | up to 650 |
| Targets dimensions (indirectly cooled complex targets can be used), mm | 749x100x6÷15 |
| Allowed pressure in a sputtering chamber, Pa | 0.07÷0.3 |
| Bias generator power, kVA | 4 |
| Bias sputtering on a cooled substrate (pulsing frequency 100 kHz) | Optional |
| The witness piece of a substrate resistance range, kn | 0.2÷20 |
| Resistivity measurement uncertainty, % | ±1 |
| Substrates temperature instability, % | ±5 |
| Recommended temperature of substrates (°C, max 700) | 50÷250 (350 optional) |
| Limiting residual pressure in a working chamber, Pa | 8x10⁻⁴ |
| Total system start-up time including cryopump warm-up, min | <120 |
| Overall dimensions of the system, with a lifted chamber (width x depth x height), mm | 1,450x1,660x3,130 |
| Total weight, including power and control units, kg | <1,850 |

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AUTOMATED ION-BEAM ETCHING SYSTEM
CAROLINE IE12

APPLICATION
ESTO Caroline IE12 is designed for ion beam etching of metal and dielectric films deposited on any flat substrates of diameter less than 150 mm (substrate thickness should be less than 30 mm). Maximum surface processing – 150x320 mm. The system features two linear ion sources with the beam size of 350 mm. The sources are located vertically and allow etching through photoresistive or metallic mask.

The system provides:
• two-channel gas flow rate stabilization and gas consumption control in each channel;
• vertical ion source placement;
• vertical placement of substrates on the drum;
• full etching automation from loading to unloading of substrates;
• the control of the etching process based on deposition time;
• easy-to-install substrates holders, that speed up loading and unloading operations;
• big rectangular vacuum chamber door permits convenient holders changing;
• stock high vacuum cryopump can be replaced with turbomolecular pump or diffusion pump (optional).

The system can be used for:
• resistive films etching, such as PC-3710, PC-5406 and PC-1004 films;
• titanium and tantalum films etching, and etching of corresponding nitrides and oxides films;
• metal film etching, including gold and copper films;
• silicon dioxide and silicon nitride films etching;
• dielectric films etching;
• argon ion beam etching of any surface.

TECHNICAL SPECIFICATION

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of substrates processed for one etching cycle, mm</td>
<td>42 pcs. Ø 100; 112 pcs. 60x48</td>
</tr>
<tr>
<td>Working gas consumption for each channel, l/hour</td>
<td>0÷9</td>
</tr>
<tr>
<td>The number of working gases (non-aggressive), pcs.</td>
<td>2 (4-optimal)</td>
</tr>
<tr>
<td>Ion beam sources</td>
<td>2</td>
</tr>
<tr>
<td>Ion source working current (controlled by gas consumption), mA</td>
<td>&lt;500</td>
</tr>
<tr>
<td>Power source voltage, kV</td>
<td>1÷3</td>
</tr>
<tr>
<td>Ion source operation using gas mixture is permitted</td>
<td>4</td>
</tr>
<tr>
<td>Allowed working chamber pressure, Pa</td>
<td>&lt;0.3</td>
</tr>
<tr>
<td>Limiting residual pressure in a working chamber, Pa</td>
<td>8×10⁻⁴</td>
</tr>
<tr>
<td>Total system start-up time including cryopump warm-up, min</td>
<td>&lt;120</td>
</tr>
<tr>
<td>Overall dimensions of the system, with a lifted chamber (width x depth x height), mm</td>
<td>1,322x850x1,800</td>
</tr>
<tr>
<td>Total weight, including power and control units, kg</td>
<td>1,100</td>
</tr>
</tbody>
</table>

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Web-site | www.esto-vacuum.ru
Chief Marketing Officer | Mikhail Suvorov
AUTOMATED REACTING-ION ETCHING
AND PLASMA ETCHING SYSTEM CAROLINE PE12

APPLICATION
ESTO Caroline PE12 is designed for reactive ion etching and plasma etching of thin films deposited on any flat substrates of diameter up to 250 mm (substrate thickness should be less than 30 mm).
The system is completely automatic. Substrates processing is performed individually. Caroline PE12 features patented high density plasma generator with dedicated high frequency generator for plasma excitation (13.56 MHz) and a special bench with the HF-bias applied for plasma ions extracting and accelerating.
For better substrate cooling the system can be equipped with optional “helium cooler”, that produce helium flow between the substrate and the bench surface in order to maintain the temperature gradient between the substrate and the electrode.

The system provides:
• three-channel gas flow rate stabilization and gas consumption control in each channel;
• full etching process automation from loading to unloading of substrates;
• big rectangular vacuum chamber door permits convenient.

The system can be used for:
• metal film etching, including gold, silver, platinum and other films;
• silicon-containing layers etching (silicon oxides, silicon nitrides, polysilicon, silicon on sapphire, monocrystalline silicon), quartz substrates and piezo quartz etching with good quality, the etching speed is up to 1μm/min and the depth is up to 100 mm;
• gallium arsenide and gallium nitride etching, as well as other complex semiconductor etching;
• any polymer layers etching;
• highest-grade ceramic surface cleaning;
• hydrogen plasma etching for vacuum tubes is used instead of hydrogen annealing process.

TECHNICAL SPECIFICATION

| The number of substrates processed for one etching cycle, mm | 1 pcs. up to Ø 250 |
| Initial pressure in a working chamber, Pa | 8x10⁻4 |
| Working gas consumption for each channel, l/hour | 0÷9 |
| Pressure in loading/unloading gateway, Pa | 2 |
| The number of working gases (non-aggressive), pcs. | up to 3 |
| Plasma generator HF power | 100÷900 W, 13.56 MHz |
| The number of working gas channels for aggressive gases (Cl₂ SiCl₄), pcs. | 4 |
| Bias voltage frequency, MHz | 13.56 MHz |
| Bias voltage (applied to the bench) power, W | <900 |
| Etching uniformity on 150 mm SiO₂ film, % | ±3 |
| Limiting residual pressure in a working chamber, Pa | 8x10⁻⁴ |
| Total system start-up time including cryopump warm-up, min | 120 |
| Overall dimensions of the system, with a lifted chamber (width x depth x height), mm | 1,450x850x1,980 |
| Total weight, including power and control units, kg | <1,400 |

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Chief Marketing Officer Mikhail Suvorov
AUTOMATED AIRLOCK REACTING-ION ETCHING AND PLASMA ETCHING SYSTEM CAROLINE PE15

APPLICATION
ESTO Caroline PE15 is designed for reactive ion etching and plasma etching of thin films deposited on any flat substrates of diameter up to 200 mm (substrate thickness should be less than 30 mm). The system is completely automatic. Substrates processing is performed individually. Caroline PE15 features patented high density plasma generator with dedicated high frequency generator for plasma excitation (13.56 MHz) and a special bench with the HF-bias applied for plasma ions extracting and accelerating. Due to specific construction of the generator and the bench the current density of the ion beam can reach 50 MA/cm² and more with the energy of 20–300 eV and more. The energy is controlled via bias voltage. For better substrate cooling the system can be equipped with optional “helium cooler”, that produce helium flow between the substrate and the bench surface in order to maintain the temperature gradient between the substrate and the electrode.

The system provides:

- four-channel gas flow rate stabilization and gas consumption control in each channel;
- for etching process automation from loading to unloading of substrates;
- substrate installation foretching and substrate removal from the airlock chamber is performed by an automatic manipulator.

The system is equipped with:

- automatic matching unit;
- multi-channel gas feed path;
- chemically resistant turbomolecular pump;
- barotron (for vacuum monitoring in the working point);
- optional laser thickness gauge for the etching layer monitoring;
- bench heating up to 300 °C.

The system can be used for:

- submicron high-speed dielectrics (SiO₂, Si₃N₄, piezo quartz) etching with speed about 1 μm/min, the etching depth is 100 μm and more;
- metal films etching through metal and resistive mask, including gold, copper and other metals, that don’t produce volatile compounds, the etching speed is up to 0.2 μm/min for gold film;
- monocrystalline silicon etching for a variety of processes, the system can use “cryo-table” technique, the etching rate is limited only by gas cynetics and can reach 5 μm/min and more;
- gallium arsenide and gallium nitride etching (for semiconductor laser manufacturing), including ohmic contacts formation;
- high-speed polyimide etching, photoresistive layer removal;
- etching or annealing process in hydrogen plasma or in atomic hydrogen.

TECHNICAL SPECIFICATION

| The number of substrates processed for one etching cycle, mm | 1 pcs. to Ø 200, 6 pcs. 60x48 |
| Limiting residual pressure in a working chamber, Pa | 8x10⁻⁴ |
| Pressure in loading/unloading gateway, Pa | 2 |
| Loading/unloading time between a gateway and a working chamber, min | 2 |
| The number of working gas channels | 4 |
| The number of working gas channels for aggressive gases (Cl₂SiCl₄), pcs | 4 |
| Working gas consumption for each channel, l/hour | 0÷18 |
| Plasma generator HF power | 100÷900 W, 13.56 MHz |
| Bias voltage frequency, MHz | 13.56 MHz |
| Bias voltage (applied to the bench) power, W | to 900 |
| Etching uniformity on 150 mm SiO₂. film, % | ±3 |
| Working pressure, Pa | 9x10⁻¹÷19 |

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Chief Marketing Officer Mikhail Suvorov
**AUTOMATED AIRLOCK PLASMA ENHANCED CHEMICAL VAPOR DEPOSITION SYSTEM CAROLINE PECVD15**

**APPLICATION**

ESTO Caroline PECVD15 is designed for individual processing of flat substrates less than 200 mm in diameter. The system features patented high density plasma generator with dedicated high frequency generator for plasma excitation (13.56 MHz) and a special bench with the HF-bias applied for plasma ions extracting and accelerating. Depending on client’s needs PECVD15 can be equipped with cooled or heated bench.

The system provides:
- four-channel gas flow rate stabilization and gas consumption control in each channel;
- full etching process automation from loading to unloading of substrates;
- substrate installation for etching and substrate removal from the airlock chamber is performed by an automatic manipulator.

The system is equipped with:
- automatic matching unit;
- multi-channel gas feed path;
- chemically resistant turbomolecular pump;
- barotron (for vacuum monitoring in the working point);
- optional laser thickness gauge for the etching layer monitoring;
- bench heating up to 300 °C.

The system can be used for:
- ion assisted thin films deposition on dielectric substrate;
- dielectric (silicon nitride and silicon oxide) deposition from monosilane (with oxygen and nitrogen) on a substrate at “room temperature”;
- deposition of films of different types in the same processing cycle;
- metal films deposition by cathode sputtering in inert gas plasma. Metals that don’t produce volatile compounds, like gold and copper, can be used.

**TECHNICAL SPECIFICATION**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>The number of substrates processed for one etching cycle, mm</td>
<td>1 pcs. to Ø 150, 6 pcs. 60x48</td>
</tr>
<tr>
<td>Limiting residual pressure in working chamber, Pa</td>
<td>8x10⁻⁴</td>
</tr>
<tr>
<td>Complete degassing time, min</td>
<td>200</td>
</tr>
<tr>
<td>Pressure in loading/unloading gateway, Pa</td>
<td>2</td>
</tr>
<tr>
<td>Loading/unloading time between a gateway and a working chamber, min</td>
<td>2</td>
</tr>
<tr>
<td>The number of working gas channels</td>
<td>4</td>
</tr>
<tr>
<td>The number of working gas channels for aggressive gases (Cl SiCl 111 T.A.), pes.</td>
<td>4</td>
</tr>
<tr>
<td>Working gas consumption for each channel, l/hour</td>
<td>0-18</td>
</tr>
<tr>
<td>Plasma generator HF power</td>
<td>100÷900 W, 13.56 MHz</td>
</tr>
<tr>
<td>Bias voltage frequency, MHz</td>
<td>13.56 MHz</td>
</tr>
<tr>
<td>Bias voltage (applied to the bench) power, W</td>
<td>to 900</td>
</tr>
<tr>
<td>Etching uniformity on 150 mm SiO2. film, %</td>
<td>±3</td>
</tr>
<tr>
<td>Working pressure, Pa</td>
<td>9x10⁻¹⁻⁹</td>
</tr>
<tr>
<td>Overall dimensions of the system, with a lifted chamber (width x depth x height), mm</td>
<td>1,450x1,385x1,830</td>
</tr>
<tr>
<td>Total weight, including power and control units, kg</td>
<td>&lt; 1,600</td>
</tr>
</tbody>
</table>

**PRODUCER: ESTO-VACUUM**

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MAGNETRON SPUTTERING SYSTEM SOLVAC D19

The unit is designed for application of metallic coatings by magnetron sputtering, and dielectric coatings by reactive magnetron sputtering with pre-ionic surface cleaning. Device dimensions allow to apply coatings on large-dimension items or large lots of small-sized products.

UTILITY REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirement</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power</td>
<td>3x380 V ± 5%, 160 A/phase, 50 Hz / 60 Hz, N, G</td>
</tr>
<tr>
<td>Compressed air</td>
<td>6 kg/cm²</td>
</tr>
<tr>
<td>Cooling water</td>
<td>3-4 kg/cm², 40 l/min</td>
</tr>
<tr>
<td>Exhaust</td>
<td>DN 40 KF (operating gases)</td>
</tr>
<tr>
<td>Nitrogen</td>
<td>1±1.5</td>
</tr>
<tr>
<td>Oxygen</td>
<td>1±1.5</td>
</tr>
<tr>
<td>Argon</td>
<td>1±1.5</td>
</tr>
</tbody>
</table>

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ROBOSKOP VTM-3000/RT

MAIN PURPOSE
Robotic complex non-destructive testing (NDT) installation for subway cars of a bogie frame.

SHORT DESCRIPTION
It is applied at the entrance/output control of axes and at full survey of a wheel pair.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
Applied NDT techniques:
• ultrasound;
• laser measurement of geometric parameters;
• eddy-current.

COMPETITIVE ADVANTAGES
The big weight and dimensions of bogie frames, and also some obligatory control methods complicate monitoring procedure process. The system allows to synchronize control with a frame rotation to increase the accuracy of converters positioning and to exclude influence of a human factor, having reduced time for carrying out a full cycle of control.

PRODUCER: TECHNOVOTUM

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Chief Marketing Officer Sleadneva Natalya
TEST SYSTEM FT-17MINI (OPERATING AND PARAMETRIC TESTING)

MAIN PURPOSE
Test system FT-17 mini is the optimal solution for product testing with a small and medium scale integration.

SHORT DESCRIPTION
Application area:
• final testing of microelectronics components and systems (in package and on semiconductor wafer) at the place of production or in the laboratory;
• initial testing of microelectronic components and systems at companies buying electronics;
• research and development, boundary testing of microelectronic components and systems, certification tests.

Devices under test:
• digital ICs (FPGA, microprocessors, microcontrollers, and so on);
• memory ICs (RAM, ROM, FLASH, etc.);
• RFID tags, smart-cards.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Architecture</td>
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<tr>
<td>Number of universal I/O channels</td>
<td>64</td>
</tr>
<tr>
<td>Max test vector rate</td>
<td>50 MHz</td>
</tr>
<tr>
<td>Time resolution</td>
<td>0.5 ns</td>
</tr>
<tr>
<td>Vector memory depth</td>
<td>8 Mb</td>
</tr>
<tr>
<td>Vector formats</td>
<td>NRZ, DNRZ, R0, R1, SBC and others</td>
</tr>
</tbody>
</table>

PRODUCER: SOVTEST MICRO LLC

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Chief Marketing Officer Theodore Krekoten
DESKTOP SEMICONDUCTOR TEST SYSTEM FT-17DT

MAIN PURPOSE
Parametric, dynamic and functional testing of digital and mixed-signal circuits at frequencies up to 200 MHz. Test system FT-17DT is a desktop version of FT-17HF tester.

SHORT DESCRIPTION
This solution is the best for companies running certification tests of ICs or initial testing of small quantities of microelectronic components. It has the same functionality as FT-17HF with one difference in maximum number of pin-electronics boards and universal I/O channels (FT-17DT – 4 boards and 256 I/O channels; FT-17HF – 12 boards and 786 I/O channels).

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
Application area:
• final testing of microelectronics components and systems (in package and on semiconductor wafer) at the place of production or in the laboratory;
• initial testing of microelectronic components and systems at companies buying electronics;
• research and development, boundary testing of microelectronic components and systems, certification tests.

Devices under test:
• digital ICs (FPGA, microprocessors, microcontrollers, and so on);
• memory ICs (RAM, ROM, FLASH, etc.);
• RFID tags, smart-cards.

COMPETITIVE ADVANTAGE
• The main advantage of FT-17DT system is that this product is absolutely Russian development: from electronics to body frame.
• The tester software XperTest is the result of Sovtest Group specialists’ work as well and it supports Russian language.

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FUNCTIONAL AND PARAMETRIC SEMICONDUCTOR TESTER FT-17HF

MAIN PURPOSE
Parametric, dynamic and functional testing of digital and mixed-signal circuits at frequencies up to 200 MHz.

SHORT DESCRIPTION
System is based on a set of universal boards made by technology “Tester-on-channel”. This architecture allows you to get the maximum measurement capability with minimal time and cost control for the manufacture of measuring equipment. The complex may include up to 12 universal cards, the total number of pins to 768, as well as specialized boards for testing components of the mixed signal. In addition to the basic capabilities of the system can be implemented given algorithms testing memory structures (gallop march, chess, etc.)

Fields of application:
• Output inspection of integrated circuits (package and wafer) in the production and in the laboratory.
• The input control parameters of integrated circuits on company-consumers.
• Research and development, control of boundary parameters of microelectronic products.
• The educational process, learning principles of microelectronics and test equipment.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• Number of measuring channels: 768 (up to 12 cards for 64 channels).
• The maximum repetition rate of test vectors: 400 Mbps.
• Setpoint time parameters: 39 ps.
• The number of timestamps to channel 4 or 8 (in multiplexed mode).
• The maximum misalignment of channels: ± 250 ps (picoseconds).
• The depth of the memory test vectors per channel: 128 Mbps (256 Mbps extension to).
• Reference Range of voltage: -2 ... 6 B (or B 0 ... 8).
• Maximum power consumption: 4 kW (kilowatts).
• Cooling System: Air.

COMPETITIVE ADVANTAGES
• High performance – at the expense of modern architecture “Tester-on-channel” and opportunities concurrency control.
• Versatility – testing of both digital and mixed signal circuits.
• Flexibility – the configuration of the tester can be easily built up and changed if necessary.
• Measurement of the tester is made using the latest technologies in the field of database components.
• Easy creation of test sequences.
• Easy to operate and maintain.
• Ability to direct connections (direct docking) with automatic handlers.

PRODUCER: SOVTEST MICRO LLC

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ROBOSKOP VTM-3000/AD

MAIN PURPOSE
Robotic complex non-destructive testing (NDT) installation for aviation engines.

SHORT DESCRIPTION
Positioning accuracy, automatic control, preservation and the analysis of the results of control allow to apply "Roboskop VTM-3000/AD" to control the details with high precision of results and reduction of time for carrying out the non-destructive testing. The practice of introduction and use of robotic system was very effective for control of elements of aviation engines, shovels of various types, a gear wheel and other elements at their production and in use. The mode of application of several installations at the same time where one system acts as a loader/discharger of a unit, and another – is directly focused on monitoring procedure.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
Applied NDT techniques:
• ultrasound;
• laser measurement of geometric parameters;
• eddy-current.

COMPETITIVE ADVANTAGES
• strict compliance with the technology;
• minimum testing time;
• accurate positioning of probes;
• combination of different NDT methods.

ROBOSKOP VTM-3000/AD

MAIN PURPOSE
Robotic installation for complex non-destructive testing (NDT) of the composite details used in the aircraft industry.

SHORT DESCRIPTION
The complete control of composite materials includes some control methods for defects detection with the maximum sensitivity in various layers of a unit, with the use of several devices and experts. The opportunity of carrying out a full cycle of control by means of one robotized installation allows to reduce temporary resources and receive a map of the unit’s defects as a result using all the methods put in the program with high precision.

COMPETITIVE ADVANTAGES
• strict compliance with the technology;
• minimum testing time;
• accurate positioning of probes;
• combination of different NDT methods.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
Applied NDT techniques:
• ultrasound;
• laser measurement of geometric parameters;
• eddy-current;
• impedance.

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Chief Marketing Officer Sleadneva Natalya
**ROBOSKOP VTM-3000/AC**

**MAIN PURPOSE**
The robotic non-destructive testing (NDT) equipment for the traction rolling stock parts “Roboskop VTM-3000/AC” is based on the robot arm equipped with measurement and flaw detection instruments – the parts that must be loaded on a special moving platform (carriage). The carriage has seats (supports) for each part in order to keep repeatability of the part location coordinates.

**SHORT DESCRIPTION**
Roboskop VTM-3000/AC provided with the necessary program (procedure) easily detects the needed part coordinates and carries out the measurements or flaw detection. The final report is issued according to the testing results. All NDT techniques are carried out according to the valid norms.

**TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS**
Robotic complex NDT installation for the traction rolling stock parts (coupler case, coupler parts, draw clamp, etc). The provided NDT techniques: eddy current, laser measurement of geometric parameters.

**COMPETITIVE ADVANTAGES**
- strict compliance with the technology;
- minimum testing time;
- accurate positioning of probes;
- combination of different NDT methods.

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**PRODUCER: TECHNOVOTUM**

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**ROBOSKOP VTM-3000/KP**

**MAIN PURPOSE**
Roboskop VTM-3000/KP is a portal-type installation equipped with the servo devices of linear and vertical robot arm movement relative to the testing object. The installation is equipped with a wheel set rotating device (shortly KP) enabling to automatically load and unload the KP during the productions flow.

**SHORT DESCRIPTION**
Testing methods are automatically selected, the probes are automatically replaced in compliance with the testing procedure. While testing, “ROBOSKOP” VTM-3000/KP provides the pre-set movement velocity and trajectory as well as the necessary positioning accuracy and angle of incidence of the probe:
- Eddy current testing technique. It is used for inspection of wheel seat parts in order to detect the surfacial and subsurface defects, including the cracks, corrosion and thermal damages. The Live mode (for rotating sensors) is set up for inspection of through bores and attaching holes (for the motor-rolling stock wheel sets, etc.).
- Laser scanning. This mixed mode is used for measurement of the wheel set geometry parameters (wheel set diameter, wheel profile, the space between rims, axle wear, etc.).
- Ultrasound testing technique (UT). This technique enables to test the wheel sets in compliance with the existing railway norms.

**TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS**
Provided NDT techniques: Eddy current, ultrasound, laser measurement testing techniques.

**COMPETITIVE ADVANTAGES**
- strict compliance with the technology;
- minimum operating time;
- accurate positioning of probes;
- setting of various NDT methods.

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**ROBOSKOP VTM-3000/OR**

**MAIN PURPOSE**  
Robotic installation for complex non-destructive testing (NDT) of a wheelset axle of subway cars.

**SHORT DESCRIPTION**  
The stand of laser scanning and non-destructive testing Roboskop VTM-3000/OR is intended for carrying out nondestructive control of a wheelset axle of subway cars and motor driven rolling stock. It is applied at incoming/outgoing inspection of an axle and a full survey of a wheelset.

**TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS**  
Applied NDT techniques:  
- ultrasound;  
- laser measurement of geometric parameters;  
- eddy-current.

**COMPETITIVE ADVANTAGES**  
Replacement of magnetic powder control by eddy-current allows to provide possibility of automatic recording of results of control and reproducibility of results, and also reduce costs of expendables for magnetic powder control.

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**ROBOSKOP VTM-3000/PV**

**MAIN PURPOSE**  
Robotic installation for complex non-destructive testing (NDT) of a hollow shaft of subway cars of series 81-720/721, 81-740/741.

**SHORT DESCRIPTION**  
It is applied at entrance, incoming/outgoing inspection of a hollow shaft. The following characteristics are subject to control:  
- mutual angular shift of flanges;  
- length of a hollow shaft;  
- welded connections with external and inside.  
The system provides detection of defects like bad welded seam, a crack of 0.5 mm in depth and more, from 7.5 mm long.

**TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS**  
Applied NDT techniques:  
- laser measurement of geometric parameters;  
- eddy-current.

**COMPETITIVE ADVANTAGES**  
- Combination of various methods of nondestructive control on a platform of one device.  
- Lack of “a human factor”.  
- Process automation.

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ROBOSKOP VTM-3000/RD

**MAIN PURPOSE**
Robotic installation for complex non-destructive testing (NDT) of reducers of wheelset of subway cars.

**SHORT DESCRIPTION**
It is applied at incoming/outgoing inspection of an axle and a full survey of a wheelset.

**TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS**
Applied NDT techniques:
- laser measurement of geometric parameters;
- eddy-current.

**COMPETITIVE ADVANTAGES**
The difficult configuration of details of a reducer demands exact positioning eddy-current converters on the object of control taking into account possible deviations of forms from requirements of documentation. Laser scanning, besides determination of the critical sizes, allows to define a profile of a surface with high precision and calculate optimum trajectories of scanning for eddy-current control.

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ROBOSKOP VTM-3000/RSP

**MAIN PURPOSE**
A laser scanning and flaw detection stand – “Roboskop VTM-3000/RSP” is applied in rail welding enterprises for inspection of manufactured products in compliance with valid Russian Railway regulations. The acceptance test of rail welds is done with cross waves by using the echo pulse testing technique. According to the manual, the rail scan area equals to 100 mm + 25 mm for new rails, the rail foot test zone of the used rails is expanded till 300 mm +25 mm.

**SHORT DESCRIPTION**
“Roboskop VTM-3000/RSP” is built into the production facility of the rail welding enterprises as a separate module of the automatic conveyor roll.
“Roboskop” is programmed to carry out the ultrasound testing (UT) of each rail weld across the section and by using the laser measurement of geometric parameters. The total testing time is about 10 minutes, including the measurement of geometric parameters and formation of the “online” testing protocol. Before testing, the user can remove the unnecessary testing zones from the test sequence (re-test option). Probes are automatically calibrated by laser measurements done before testing because of the rail jumping (displacement) on the conveyor roll.

**TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS**
Applied NDT techniques:
- ultrasound;
- laser measurement of geometric parameters.

**COMPETITIVE ADVANTAGES**
- strict compliance with the technology;
- minimum testing time;
- accurate positioning of probes;
- combination of different NDT methods.

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BONDETECTOR DAMI-C09

MAIN PURPOSE
Universal testing instrument for aircraft materials “DAMI-C09” combines the impedance, eddy current and impact testing methods. The device is excellent in detecting and C-imaging of the flaws in metal or non-metal composite parts and honeycomb structure elements and in detecting of nonferromagnetic alloys corrosion in different aviation constructions.

SHORT DESCRIPTION
“DAMI-C09” provides the impedance, eddy current and impact testing methods. The device is intended to detect and C-image the defects in composite materials and honeycomb structures, also detects the corrosion, surface and subsurface defects in various metal constructions and alloys.

MAIN APPLICATIONS
• Aircraft industry.
• Space industry.
• Shipbuilding industry.
• Automotive industry, etc.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
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<tbody>
<tr>
<td>Operating frequency range</td>
<td>1 kHz–1 MHz</td>
</tr>
<tr>
<td>Test productivity</td>
<td>min. 500 measurements/s</td>
</tr>
<tr>
<td>Defect alarm</td>
<td>Audible and light</td>
</tr>
<tr>
<td>“Slider M2” scanner support</td>
<td>All applications of DAMI-C09</td>
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<tr>
<td>Maximal size of C-image (C-scan)</td>
<td>500x500 mm</td>
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<tr>
<td>Probe position determination error</td>
<td>max. 1.5 mm</td>
</tr>
<tr>
<td>Imbedded interface languages</td>
<td>Russian and English</td>
</tr>
<tr>
<td>Built-in interface languages</td>
<td>Color TFT display, 320x240 pixels</td>
</tr>
<tr>
<td>Display type and resolution</td>
<td>Color TFT display, 320x240 pixels</td>
</tr>
<tr>
<td>Graphical Display modes</td>
<td>Time-base scanning (A-scan); complex plain; C-scan given in Cartesian coordinates (X,Y)</td>
</tr>
<tr>
<td>The device archive stores</td>
<td>Settings; testing results; A-scans; complex plain images; C-scans.</td>
</tr>
<tr>
<td>Autonomous operating with a built-in rechargeable battery</td>
<td>no less than 8 hours</td>
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<tr>
<td>Operating temperature range</td>
<td>from -10 to +50 °C at humidity min. 95%</td>
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<tr>
<td>Dust and water protection rating</td>
<td>IP54</td>
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<tr>
<td>Device weight with a built-in battery (without power adaptor, scanner and set of probes)</td>
<td>no more than 1 kg</td>
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<tr>
<td>Overall dimensions</td>
<td>no more than 135 mm x 220x50 mm</td>
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COMPETITIVE ADVANTAGES
The unique features of the device “DAMI-C09” enable to automate the inspection process due to automatic probe adjustment on the testing object with regard to material density and structure. The contact liquid is not required as the dry point contact is used.

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Chief Marketing Officer Sleadneva Natalya
IMPEDANCE EXPRESS TESTER “TERI”

MAIN PURPOSE
TERI is intended for the needs of civil aviation for impedance express detection of disbonds and delaminations in metal and non-metal multilayer soldered and bonded composite materials and honeycomb structures.

SHORT DESCRIPTION
TERI is developed to be applied in civil aviation and is intended for the impedance express testing of multilayer soldered, bonded composite materials and honeycomb constructions in order to detect such defects as discontinuities and disbonds.

TERI relates to indicator devices and is not a measuring tool.

TERI impedance express tester is a simplified modification of device DAMI-C. It is fully compatible with the applied materials and probes.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
TERI provides the impedance, amplitude-phase acoustic testing method in the frequency range from 8 to 12 kHz, using the dry point contact by one-sided access.
TERI enables to determine the relative value of local impedance in the test point. It allows to indirectly estimate the sheet material thickness. There is a complex plain mode displaying the friction noise zone. It provides better opportunities to adjust the device for different roughness of the testing object surface.

GENERAL DESCRIPTION OF THE DEVICE, PRINCIPLE OF ACTION
The device is equipped with the probe PADI-8-02. The probe has small dimensions. It allows its using for inspection of hard-to-reach places.

- Conventional response level per TS-3 standard specimen (imitating the defect, which square is 20x20 mm, occurrence depths – 1 mm, 2 mm and 3 mm in the organic glass block).
- Overall dimensions (87x57x29 mm, weight 300 gr).
- Display resolution (98x64 pixels).
- IP54 protection rating.
- Operating temperature range from -10 to +50 °C.
- Automatic and manual adjustment modes.
- Defect alarm (light and audible).
- Continuous operating time with a built-in battery of 3,6 V – no less than 10 hours.

COMPETITIVE ADVANTAGES
TERI is applied in civil aviation as an up-to-date alternative of obsolete procedures requiring the mechanic knocking of honeycomb constructions with “hammers”. The new technology increases the testing reliability. For the civil aviation, there is a special non-reference adjustment that considerably increases the testing reliability and enables to have much fewer test blocks.

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TOMOGRAPHIC UD4-TM

MAIN PURPOSE
Universal flaw detector “UD4-TM” is a technological know-how, continuing a wide range of tomograph flaw detector series UD4-T and keeping its basic concept and methodical solutions.

SHORT DESCRIPTION
The digital technologies of “Tomographic” UD4-TM provide different flaw detectors in one device, which are set as application software. Needed applications are selected and activated likewise Windows by using the user menu where each setting is a flaw detector (NDT) device: Flaw Detector, Thickness gauge, Tensometer, etc.

“Tomographic” UD4-TM is fully compatible with various special NDT tools, can be equipped with a large set of accessories: Path sensor, Acoustic scanner, Optical probe coordinates fixation system as well as other integration and visualization tools. The UD4-TM scan feature is intended to visualize the testing process in hard-to-reach places. By using the video scanner, the tested area and probe signal can be simultaneously displayed.

Flexible functionality, simple settings and user-friendly operating “Tomographic” UD4-TM to a universal ultrasound and eddy current testing instrument, enabling to stop using special flaw detectors, unify the instrumentation pool, metrological provision and totally increase the testing reliability and productivity.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
“Tomographic” UD4-TM supports and enables to use various testing methods, which are set into the device as separate and independently operated applications:

I group. General-purpose applications:
- “Tomographic 1.1.” – ultrasonic flaw detector;
- “Tomographic 1.2.” – EMAT thickness gauge (0.2 mm ... 1,000 mm);
- “Tomographic 1.3.” – Probe certification (DAC diagrams);

II group. Railway applications:
- “Tomographic 2.1.” – ultrasonic testing of wagon wheel sets according to the Russian Railway norms;
- “Tomographic 2.2.” – ultrasonic testing of railway axles according to the Russian Railway norms;
- “Tomographic 2.3.” – ultrasonic testing of locomotive parts;
- “Tomographic 2.4.” – ultrasonic testing of turnouts and rail welds;
- “Tomographic 2.5.” – eddy current testing of wagon parts according to the Russian Railway norms;
- “Tomographic 2.6.” – eddy current testing of locomotive parts.

III group. Aircraft applications:
- “Tomographic 3.1.” – resonance flaw detector (0.2 ... 1.0 MHz);
- “Tomographic 3.2.” – acoustic tensometer (acoustic test of threaded parts tightening);

IV group. Eddy current applications:
- “Tomographic 4.1.” – eddy current flaw detector;
- “Tomographic 4.2.” – eddy current thickness gauge of coatings;

Service applications group:
- “Tomographic 5.1.” – multimedia player “FlashPlayer”;
- “Tomographic 5.2.” – calculator;
- “Tomographic 5.4.” – battery state.

COMPETITIVE ADVANTAGES
- Wide dynamic range up to 140 dB enables to detect both small and big flaws without switching the sensitivity.
- Programmable oscillator (synthesizer) enables to select the optimal outgoing pulse for various probes, considerably increasing the sensitivity and flaw detectability.
- The digital data processing allows significantly improving the testing quality and ability:
  - reverberation and noise compensation, enabling to detect subsurface flaws at small depths;
  - the Fourier analysis of received signals, enabling to visualize the acoustic path parameters;
  - digital filters, etc.

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CASHLESS POS-TERMINAL VENDOTEK
FOR VENDING MACHINES

MAIN PURPOSE
POS-terminal Vendotek is designed for using in a vending machine. Vendotek allows accepting bank cards, MIFARE cards, NFC smartphones.

SHORT DESCRIPTION
Vending becomes more popular every day. There are plenty of vending machines selling different goods and products – food, drinks, magazines, tickets for public transport and many other things. Vendotek can be built in different types of vending machines thanks to compact housing, availability to use a few types of fixing the device to a vending machine.

Vendotek provides remote collection of sales data. Vending company can receive information about sales and a rest of goods. The information can be collected on a server. Vending companies can optimize their maintenance costs. The front panel of Vendotek can be of different colours, includes images, logos. Vendotek has a display that can be used for promotional materials.

Vendotek is created by Russian company MULTIPAS. Devices for cashless payments developed by MULTIPAS are actively used in Russia and abroad. One of European customers of Vendotek is Coca-Cola Company in Czech Republic that installed Vendotek in drink vending machines.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• CPU: ARM9;
• flash memory 16–128 MB for saving programs and data;
• RAM 16–64 MB to run programs;
• memory for secure storage with battery supply 4 KB;
• supply voltage + 12 ... 40 V;
• display 240x320 mm, 256 colors (optionally);
• interfaces: Ethernet 10Base-T (optionally), GPRS/3G (optionally), RS232 (up to 1 M baud) for configuration, RS232 for external reader (+ supply 5V), MDB (cashless device) with supporting Level 3, RS232 for download of audit data;

COMPETITIVE ADVANTAGES
• Work with a wide range of Russian banks (direct connection and a contract).
• Minimum percentage per transaction (less than 2.5%).
• Easy connection to a vending machine by one standard cable.
• Can be mounted on the surface of a vending machine, even when there is no space behind the panel.
• Built-in modem.
• Possibility to separate antenna from a vending machine to improve connection.
• Color graphic display with an ability to show advertisements.
• Download of an advertising slideshow remotely from a server.
• Support all banking contactless cards, MIFARE cards and tags, NFC smartphones.
• Automatic recognition of a card type.
• Uploading of electronic checks and statistics.
• Support of uploading audit in accordance with standard EVA-DTS 6.1.1 (protocols DEX / UCS, Enhanced DDCMP).
• Certificates EMV L1 Contactless, PayPass, PayWave.

PRODUCER: MULTIPAS LLC
Phone +7 (499) 710 34 30
E-mail inf@termt.com
Web-site www.termt.com
Chief Marketing Officer Irina Oksenchuk
UM-16 TRACKING SYSTEM

UM-16 is a professional solution for object and human positioning in enclosed spaces. The system determines the position of objects in real time, supports 6 degrees of freedom and provides 0.5 mm position and 0.5° orientation accuracy. UM-16 modular positioning system allows to set a working zone of any configuration with maximum 400 square meters area.

TECHNICAL CHARACTERISTICS

<table>
<thead>
<tr>
<th>Coordinate system</th>
<th>absolute</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>100 Hz</td>
</tr>
<tr>
<td>Latency</td>
<td>6 ms</td>
</tr>
<tr>
<td>Working temperature</td>
<td>-30 °C ... +50 °C</td>
</tr>
<tr>
<td>Working distance</td>
<td>0.05–3.0 m</td>
</tr>
<tr>
<td>Number of emitting modules</td>
<td>up to 16</td>
</tr>
<tr>
<td>Computer interfaces</td>
<td>USB, ETHERNET, optionally CAN or RS485</td>
</tr>
</tbody>
</table>

COMPETITIVE ADVANTAGES

- No error accumulation over time.
- Exceptionally reliable, fully protected from any undesirable noise and difficult operating environment conditions.
- Modular principle – the system is configured according to the working zone requirements and can be easily extended any time.

PRODUCER: RUCAP LLC

Phone +7 (499) 720 69 87
E-mail rurina@rucap.ru
Web-site www.rucap.com
Chief Marketing Officer Rurina Irina
**ANGIODIN-SONO/P-ULTRA**

**MAIN PURPOSE**
Multifunctional ultrasound system of high class is designed to carry out a full range of ultrasound examinations required in daily practice of ultrasound diagnostics physician.

**SHORT DESCRIPTION**
All advanced technologies of ultrasound image processing are implemented in the scanner. Along with high quality imaging and highly sensitive Doppler scanner has: advanced package for cardiovascular examinations, cardiology package, and combination of shear wave and compression elastography (in one device), and so on.

**TECHNICAL CHARACTERISTICS**
- probes from 1 up to 15 MHz (up to 192 elements): convex, linear, phased, micro-convex, endocavity, biplane, intraoperative, 3D (option);
- scanning modes: B / 2B / 4B / B+M; CD; PD; PDP; TD; PW; CW; B+PW/CW; B+CD/PD+PW/CW;
- scanning technologies: evaluation of the blood vessels elasticity, shear wave and compression sono-elastography, panoramic scanning, keystone for linear probes, suppression of speckle noise, color mapping, tissue Doppler and other.

**COMPETITIVE ADVANTAGES**
Scanner is able to perform all the functions of a stationary ultrasound device but still being portable. The control panel is easy to understand, it is user-friendly. Large LCD screen 15” with an adjustable angle, the ability to simultaneously connect up to 4 sensors (with extender), a small weight and size, built-in rechargeable power supply allows to use the device in a stationary (on the truck) and a mobile version.

**PRODUCER: NPF BIOSS**

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<thead>
<tr>
<th>Phone</th>
<th>+7 (495) 276 27 90 / 91 / 92 / 93</th>
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<tbody>
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</tr>
<tr>
<td>Head of marketing department</td>
<td>Trapeznikov Sergey N.</td>
</tr>
</tbody>
</table>

**ANGIODIN-PROCTO**

**MAIN PURPOSE**
Medical equipment for treatment of hemorrhoids stages I-IV under control of Doppler ultrasound by dearterization and other low-invasive methods like mucopexy and submucosal laser destruction.

**SHORT DESCRIPTION**
The Medical equipment set includes Doppler electronic unit for arteries localization, a set of unique proctoscopes for manipulations, suture, trolley and footswitch, which allows doctor to operate the device without help of an assistant.

**TECHNICAL CHARACTERISTICS**
- set of specialized modes (CW, PW, M, M+PW) convenient for the coloproctology specialist;
- unique proctoscope LDL-2 has integrated 8 MHz Doppler probe located proximal to ligature window, and integrated light source which provides uniform illumination of the surgical field;
- fixation of the signal and mark on paper;
- control by 4-pos. footswitch.

**COMPETITIVE ADVANTAGES**
The Medical equipment has Doppler unit designed specifically for proctologist, it has all the required features for arteries location, determination of the depth of their occurrence and control of ongoing procedures. The unique Proctoscope combined with a color Doppler mode allows you to accurately locate hemorrhoidal artery, control the process of suture ligation, and accurately carry out various manipulations.

**PRODUCER: NPF BIOSS**

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</table>
ANGIODIN-FM

MAIN PURPOSE
Maternal and fetal monitor is designed for diagnosis of fetus and maternal vital indicators.

SHORT DESCRIPTION
The monitor allows specialist to diagnose the status of the fetus, or 2-fetus during pregnancy and childbirth by advanced ultrasonic method – cardiotocography (CTG) as well as monitor the status of the mother.

TECHNICAL CHARACTERISTICS
• fetus condition monitoring with CTG (including twin pregnancy) in antenatal and intranatal periods;
• monitoring of maternal vital indicators: NIBP, ECG, SpO2, Temperature;
• automatic antenatal and intranatal analysis of CTG to exclude the influence of subjective factors and provide medical staff convenience;
• generation of alarm signals to alert staff with pop-up messages (on screen) and sound signals;
• remote monitoring of the fetus and the mother in real time;
• storage of survey results in electronic form with the possibility to evaluate temporal pregnancy dynamics.

COMPETITIVE ADVANTAGES
The registration of two fetuses is ensured by qualitative division of the twins’ heart rate (HR) that is possible due to the program of co-channel verification. Analysis of the fetus / fetuses is carried out by the user’s choice through the use of one of the three well-known methods. The ability to continuously monitor the status of the fetus / fetuses during childbirth allows us to take a timely decision to change the tactics of delivery in the interests of the fetus and to improve birth outcomes.

PRODUCER: NPF BIOSS

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</table>

ANGIODIN-UNIVERSAL

MAIN PURPOSE
Portable ultrasound Doppler Equipment for bilateral monitoring of cerebral blood flow with detection of emboli. The Equipment could be applied in vascular surgery, neurosurgery, cardic surgery, emergency neurology, intensive care.

SHORT DESCRIPTION
• Unilateral and bilateral monitoring of cerebral circulation.
• Detection of micro embolism with emboli differentiation on gas and solid.
• Microvascular examinations using intra-operating probes (pencil / catheter) 16 MHz.
• Multimodal neuromonitoring with synchronous recording of trends: ECG, EEG, SpO2, CO2, NIBP, ID.
• Functional tests: CO2 / vasomotor response, autoregulation, asymmetry, the critical closing pressure.
• Examination of blood flow in the lower extremities using specialized 4 MHz monitor probes and built-in non-invasive blood pressure module.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
• US-channels: 1 MHz PW, 2 x 2.66 MHz PW / CW, 4 MHz PW / CW, 8 MHz PW / CW, 16 MHz PW;
• multifrequency 2 / 2.66 MHz monitor probe;
• simultaneous recording of several spectrograms from different depths (multigate);
• M-mode – multidepth (up to 400 windows) Doppler scan;
• imaging and evaluation of blood flow velocity profile;
• automatic and manual calculation of the main indicators of dopplerograms;
• continuous monitoring of 14 key indicators of cerebral hemodynamics;
• automatic detection, identification and analysis of emboli characteristics.

PRODUCER: NPF BIOSS

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EEG ACCESSORIES MCSCAP

SHORT DESCRIPTION
MCScap is a textile EEG-recording cap with removable electrodes placed according to schemes 10-20, 10-10 (modified) or 10-10 (full).

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
MCScap cap technology comprises elastic caps with plastic fixing rings for electrodes positioned according to 10–20 or 10–10 systems and a set of individual removable sintered Ag/AgCl electrodes. It combines the advantages of textile EEG cap with easy reconfiguration and replacement of broken electrodes. Elastic cap provides the perfect fit of electrodes to the head without additional adjustment.
Numerous ventilation holes are intended for control of the electrode positions and temperature regulation. Various sizes of caps allow using MCScap everyone. Sizes XL, XL/L and L can be used for the most adult patients. For children and some of adults applied sizes L/M and M. The sizes MS/S, S and XS are used for children during their first years of life. Also there are new cap sizes for infants.
Electrode touchproof connectors can be plug directly to amplifier front panel or connected via a high-density adapter. Fixing of cap is provided with chin strap or chest belt. For earlobe electrodes are designed a special ear adaptor. MCScap-T – is a new flat (D12*4) and lightweight (<1gr) EEG electrodes. Primarily the electrodes are designed for long-term registration, requiring maximum comfort and stability, such as EEG monitoring, somnografiya, biofeedback.
Attaching electrodes to the head is possible with:
• conductive paste,
• EEG cap MCScap-T,
• disposable adhesive rings through a ring-adapter.

PRODUCER: MEDICAL COMPUTER SYSTEMS LTD

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<tr>
<td>Chief Marketing Officer</td>
<td>Dmitriy Prilutskiy</td>
</tr>
</tbody>
</table>

HEARTVUE

SHORT DESCRIPTION
Computer system for non-invasive screening of heart including: USB PC-ECG amplifier, CardioDM-06 software, 4 clamp ECG electrodes.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
A 30 seconds resting ECG is recorded by HEARTVUE of the 6 standard leads (I–aVF), using only 4 electrodes from patient’s wrists and ankles. Then the low-amplitude oscillations of ECG-signal are automatically selected and analyzed. It is so-called analysis of microalternations. That is fundamental difference from a standard ECG contour analysis.
The features of microalternations are showed by the Myocardium index and another 9 indexes, which detail the changes in heart zones, also intervals of de- and re-polarization. The averaged amplitudes of microalternations are mapped as dispersive 3D color portrait of heart.
Microalternations are sensitive indicators of total influence from physiological systems involved in the mechanisms of heart regulation. So, HeartVue reacts to small changes of ionic balance in myocytes, displacement sympa-tho-adrenal activation and other metabolic changes, which don’t show up in the morphology of ECG or ultrasound visualization of heart. Similarly HeartVue reacts to the hidden dynamics of the compensatory reaction of left ventricle, allowing time to identify the state of cardiac overload.
According to the results of testing on the PTB ECG database from National Metrology Institute of Germany, sensitivity 84% with specificity 73% for Myocardium index.

COMPETITIVE ADVANTAGES
The HeartVUE system will prove to be an invaluable heart screening tool for cardiologists, general practitioners, clinics, hospitals and emergency medical facilities.
HeartVUE can be used as a fitness system for independent heart control of visitors in health-improving and a fitness club, also as a sport system for a sports doctor and a coach for quick estimation of the heart state of professional sportsmen during in training.

The HeartVUE system is a Class IIa device according to Dir 93/94/EEC for medical devices and classified for CLASS II TYPE CF EQUIPMENT according to IEC 60601-1. The HeartVue is CE0535 certificated.

PRODUCER: MEDICAL COMPUTER SYSTEMS LTD

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</table>
DC EEG AMPLIFIERS NVX

DESCRIPTION
NVX is the DC amplifier with 24, 32 or 48 monopolar channels for electrodes and 4 auxiliary bipolar channels for sensors NeoSens. The device is used in training systems, clinical and scientific researches as a part of computer-based research system for short-term registration of the electro-physiological signals, primarily EEG. The amount of channels and presence of auxiliary channels depends of models. Basically NVX amplifiers is used with NeoRec application software. NeoRec is the software for EEG and other biomedical signals acquisition during the process of scientific or medical research. The program records the signals in various file formats for further analysis and processing by third-party software.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS

<table>
<thead>
<tr>
<th></th>
<th>NVX 24</th>
<th>NVX 36</th>
<th>NVX 52</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEG DC monopolar channels</td>
<td>24</td>
<td>32</td>
<td>48</td>
</tr>
<tr>
<td>AUX bipolar channels</td>
<td>–</td>
<td>4 galvanic isolated from EEG for probes</td>
<td></td>
</tr>
<tr>
<td>TTL triggers</td>
<td>1 input / 1 output</td>
<td>9 input / 1 output</td>
<td></td>
</tr>
<tr>
<td>Display</td>
<td>–</td>
<td>Graphic OLED</td>
<td></td>
</tr>
<tr>
<td>EEG dynamic range</td>
<td>±400 mV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EEG channel’s input impedance</td>
<td>more 100 MOhm @ DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EEG channel’s noise</td>
<td>less 0.9 uV p-p @ 0.1 ... 30 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EEG test signal</td>
<td>200 µV (±1%), 1 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Electrode impedance measurement range</td>
<td>1 ... 120 KOhm (±10%) @ 30 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUX channel’s dynamic range</td>
<td>0 .. 4 V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUX channel’s input impedance</td>
<td>more 100 MOhm @ DC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUX channel’s noise</td>
<td>less 15 uV p-p @ 0,1..30 Hz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AUX probe powering</td>
<td>+5 V (±5%). Up to 15 mA per probe with electronic protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digitalization</td>
<td>24 bit, 6th order delta-sigma modulator with 64x oversampling, one converter per each channel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-pass response</td>
<td>DC coupled and digital filtration by application software</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sampling rate</td>
<td>125, 250, 500, 1,000, 2,000 Hz @ all channels</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control and powering</td>
<td>from USB +5V, 450 mA max</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety</td>
<td>IEC 60601-1, IEC 60601-2-26, class IIa, type BF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td>200x155x40 mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>less 650 gr</td>
<td></td>
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</tr>
</tbody>
</table>

COMPETITIVE ADVANTAGES
- DC conversion for very low frequency signals from 0 Hz.
- ±400 mV dynamic range and low noise 0.9 uV p-p for electrophysiology signals as EEG, ECG, EMG, EOG etc.
- Up to 50,000 Hz sampling rate.
- Synchronic conversion of all cannels for free calculation montages and free selection of referent electrode.
- Galvanic isolation AUX sensor from EEG/ExG channels allows use a wide range of sensors, provides additional safety of the patient.
- Input/output TTL triggers: 1/1 for NVX24 and 9/1 for NVX36, NVX52 for synchronize with external stimulants.
- Graphical display shows the modes and parameters (NVX36, NVX52 only).
- Application software for settings of experiment and recording to EDF+, BDF+, GDF.
- NVX acquisition driver for OpenViBE. This is free open source software for designing, testing and using BRAIN-COMPUTER INTERFACES.
- Software library for self-design of user’s application.

PRODUCER: MEDICAL COMPUTER SYSTEMS LTD

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E-mail | mks@mks.ru
Web-site | www.mks.ru
Chief Marketing Officer | Dmitriy Prilutskiy
SURGICAL FIBRIN-THROMBIN GLUE “KRIOFIT”

MAIN PURPOSE
The main purpose of the glue “KRIOFIT”:
• adequate hemostasis (bleeding, bleeding from the great vessels);
• primary and secondary liquorhea;
• tightness anatomical cavities (for fixing organic tissues: liver, lungs, spleen, pancreas, kidney, brain);
• overlay cosmetic sutures.

Application of the glue “KRIOFIT”:
• oncology;
• on the respiratory organs, heart, and in neurosurgery;
• abdominal;
• on vessels, female genital mutilation;
• in plastic surgery and in dentistry;
• in burn surgery.

SHORT DESCRIPTION
The product is a tape of 2 syringes with a common plug. One syringe is fibrinogen, the other is thrombin.
Thrombin-fibrin glue “Kriofit” represents a protein solution of yellow color, the solution of pH from 7.0 to 7.4, it contains:
protein from 5.0 to 6.0%, the fibrinogen content of 40%, 40% thrombin, cryoprecipitate 10%. Quantitative determination of fibrinogen is 31mg/ml., quantification of factor is VIII. 28 IU/ml, quantitation of fibronectin is 9mg/ml., quantification of factor XIII. 7.5 IU/ml, quantitation of thrombin (avg.) is 50 IU/ml. The feedstock for fibrin-thrombin glue “Kriofit” uses single donor blood plasma. Application of the glue “Kriofit” reduces blood loss by 1.5 times that reduces plasma transfusion and suspension of packed red cells, the time of operation and the postoperative period, sharply reduces the number of reoperations.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS
Fibrin-thrombin glue “Kriofit” has the following properties:
• biocompatibility with body tissues;
• full reabsorption in a few weeks;
• the ability to accelerate wound healing through the formation of new blood vessels and local tissue growth;
• sheeting when combined fibrinogen and thrombin for 10s;
• sterility provided at all stages of the life cycle from production to transportation.

COMPETITIVE ADVANTAGES
• Operation is possible to manufacture autologous FTC.
• Safe in use: the glue does not contain ingredients of animal origin, that guarantees the absence of adverse reactions to foreign proteins.
• No transmission probability of hematogenic infections undergo surgery virus inactivation.
• Easy preparation and use: the time before it is ready for use – 10 min. (Heating up 37 °C) without requiring dissolution of dry components in terms of maintaining sterility.
• The price is 2-3 times lower than of imported counterparts (basic analogue Tissucol Kit does not come to Russia in 2014).

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<thead>
<tr>
<th>PRODUCER: PLAZMA-FTK</th>
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<td>Chief Marketing Officer</td>
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ANTHROPOMORPHIC ROBOTS

“Neurobotics” develops unique anthropomorphic robots with a portrait similarity and biocontrol systems.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS

Product components:
• Robotic head with silicon skin, mimic actuators and a built-in speaker.
• Eyes with integrated cameras.
• Microphone.
• Pneumatic arms (powered shoulders and forearms).
• Pneumatic wrists.
• Detailed user’s manual.

Control methods:
• Speech interface:
  - Yandex.Speech (Internet connection and Yandex account are required).
  - Stel (local interface, Internet connection is not required, at extra charge).
• Visual interface:
  - Tracking the actions of an interlocutor by robot’s eyes.
  - Emotions tracking and doubling.
• Neuro interface.
• Cyber-glove interface (robotic hand and wrist control).
• Exoskeleton interface (robotic hand control).
• Mio interface (wrist control).

COMPETITIVE ADVANTAGES
• Portrait similarity and human-like facial expressions. Silicone skin, 18 facial actuators.
• HD-vision and automated articulation. Detection of human emotions.
• Anthropomorphic arm based on a flexible pneumatics. Smoothness and high power within small dimensions.
• Autonomous and telemetry operation modes. A set of audio and video processing algorithms enables control from anywhere in the world via Internet.
• Your robot is always up-to-date! The robot is based on the concept of multiple modules that allows you to replace an outdated part with the newer, up-to-date one easily.

PRODUCER: NEUROBOTICS

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<td><a href="http://www.neurobotics.ru">www.neurobotics.ru</a></td>
</tr>
<tr>
<td>General manager</td>
<td>Vladimir A. Konyshev</td>
</tr>
</tbody>
</table>
NEURO CONTROL SYSTEM

The ability to control various devices using the «power of thought» in the XXI century becomes more accessible for a wide range of users. We are pleased to offer a new product – neuro control system – to all amateurs and professionals of robotics.

TECHNICAL CHARACTERISTICS AND FUNCTIONAL PARAMETERS

The special control device – Neurobelt-8 and its software – enables to control the robot by means of operator’s brain activity. The device is aimed to convert the brain signals to the machine commands. In fact, it may also help to control a wide range of solutions, such as a smart house, quadrocopters, robotic mobile platforms, anthropomorphic robots and so on.

<table>
<thead>
<tr>
<th>Number of channels</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Bipolar</td>
</tr>
<tr>
<td>Frequency range</td>
<td>1-50 Hz (-3 dB)</td>
</tr>
<tr>
<td>Samples</td>
<td>121 Hz (8 channels), 139 Hz, 161 Hz, 194 Hz, 242 Hz, 322 Hz, 481 Hz, 946 Hz (1 channel)</td>
</tr>
<tr>
<td>Input voltage range</td>
<td>± 300 mcV</td>
</tr>
<tr>
<td>Output DC voltage range</td>
<td>± 30 mcV</td>
</tr>
<tr>
<td>Transfer protocol</td>
<td>IEEE 802.15.4/Bluetooth 4.0</td>
</tr>
<tr>
<td>Transmission distance</td>
<td>10 meters</td>
</tr>
<tr>
<td>Indication types</td>
<td>“Stand-by”, “Device identified”, “ON”, “Internal error”, “Discharging”</td>
</tr>
<tr>
<td>Power supply</td>
<td>Built-in battery: Li-Ion 500 mAh</td>
</tr>
<tr>
<td>Battery life</td>
<td>10 h (100 days in a stand-by mode)</td>
</tr>
</tbody>
</table>

COMPETITIVE ADVANTAGES

• Portrait similarity and human-like facial expressions. Silicone skin, 18 facial actuators.
• HD-vision and automated articulation. Detection of human emotions.
• Anthropomorphic arm based on a flexible pneumatics. Smoothness and high power within small dimensions.
• Autonomous and telemetry operation modes. A set of audio and video processing algorithms enables control from anywhere in the world via Internet.
• Your robot is always up-to-date! The robot is based on the concept of multiple modules that allows you to replace an outdated part with the newer, up-to-date one easily.

PRODUCER: NEUROBOTICS

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E-mail v.konyshev@neurobotics.ru
Web-site www.neurobotics.ru
General manager Vladimir A. Konyshev
DESIGN SERVICES

DESCRIPTION
- The development of memory compilers and custom embedded memory modules for VLSI/SoC.
- The research, development and application of the standard cell libraries for VLSI, SoC and complex functional blocks (IP-blocks) design.
- The research and development of complex functional blocks (IP-blocks).
- The development of unique specialized CAD tools.
- Standard cell libraries, memory compilers, IP-blocks characterization (including embedded memories).

One of the most promising areas from the mentioned above is the development of memory compilers (automated design tools) providing high-performance design of memory modules with random configurations for systems on chip and VLSI design. The set of AlphaCHIP memory compilers gives an opportunity to provide operative (1-2 weeks) memory modules design services for semiconductor companies.

KEY LIMIT /BOUNDARY/ PROCESS PARAMETERS
Bulk and SOI (silicon on insulator) CMOS processes.
- Minimum feature size: from 350 to 45 nm;
- Architecture of memory modules:
  - single and multi-port synchronous SRAM;
  - mask programmable ROM;
  - electrically Erasable Programmable ROM;
  - electrically Programmable Read-Only Memories (EPROM-OTP).
- Duration of characterization process for a library containing about 600 standard cells is not greater than 48 hours (for one set of process, voltage and temperature variations).

EQUIPMENT
Powerful Linux workstations and servers. Both advanced design tools from the leading CAD vendors and own innovative tools for specific applications.

COMPETITIVE ADVANTAGES
- Memory compilers are developed both for usual and specific applications.
- EEPROM/EPROM-OTP compilations.
- High-speed standard cell libraries characterization (3 ... 10 times higher depending on elements type).
- More than 20-year experience of cooperation with leading world semiconductor companies on memory compilers, libraries and IP-blocks design.

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<tr>
<th>COMPANY: ALPHACHIP LLC</th>
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<td>E-mail</td>
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<td>Web-site</td>
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<td>The employee taking orders for the provision of services</td>
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THE CIRCUIT SIMULATION SYSTEM

DESCRIPTION
The circuit simulation system is intended for simulation analog circuits electric characteristics. The system provides calculation of the electric characteristics set that determines the quality of a designed circuit. The system performs the simulation of circuits with elements defined by models in time or frequency domain.

KEY LIMIT /BOUNDARY/ PROCESS PARAMETERS
The system provides the following types of computations: steady state analysis in time and frequency domain, small-signal frequency domain analysis, distortion analysis, noise analysis, phase noise analysis for oscillators. The system has a limited set of active elements models.

COMPETITIVE ADVANTAGES
The system has a number of special purpose analyses for efficient simulation of radiofrequency and high speed circuits.

COMPANY: INSTITUTE FOR DESIGN PROBLEMS IN MICROELECTRONICS OF RUSSIAN ACADEMY OF SCIENCES
Phone +7 (499) 729 92 08
E-mail ippm@ippm.ru
Web-site www.ippm.ru
The employee taking orders for the provision of services

DEVELOPMENT OF GENERAL PURPOSES DIGITAL IP BLOCKS AND COMPUTATIONAL MODULES

Institute for Design Problems in Microelectronics of Russian Academy of Sciences performs services for development, verification, and synthesis of complex functional blocks in the VLSI and FPGA basis. The following services available:
• Development of computing modules architectures using unconventional arithmetic structures to ensure high throughput.
• Automation of design routes based on programming languages C/C++, Python, TCL/TK, PHP.
• Design of IP generators on hardware description languages Verilog, VHDL.
• Synthesis and Verification of modules in Synopsys Design Compiler, ModelSim, NCsim, Quartus II, Synplify.
• Estimation of area, delay on the critical path, power.
• Evaluation of reliability characteristics on the gate-level and application of methods designed to improve fault tolerance of logic circuits.

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Web-site www.ippm.ru
The employee taking orders for the provision of services Telpukhov D.V.
DESIGN SERVICES

DESCRIPTION
Zelenograd nanotechnology Center provides following services in IC, MEMS and SoC design:
• development of physical and chemical quantities sensors and their VLSI signal converters;
• development of microprocessors, microcontrollers, signal processing systems;
• development of MEMS-magnetic sensors;
• development of MEMS-gyros;
• development of different types of MEMS;
• development of information processing systems for sensors;
• post-production support for VLSI integration on the Customer’s system.

KEY PARAMETERS
• Processor core capacity: 16–32 bit.
• Resolution: 16 bit.
• Gain-transfer characteristics nonlinearity: 0.001%.
• Current consumption: 200 µA/MHz.
• Sensor type: resistive, capacitive, frequency, magnetic.
• Measured characteristics: pressure, temperature, flow rate, acceleration, level, approximation, position, angle, current, speed.
• Operating temperature range: from -60 to +150 °С.
• Output interfaces: analog linear ratiometric, digital SPI/SSI, single-line interface.
• Signal transformation time from 250 ns (60 thousand rpm).

INTELLECTUAL PROPERTY
In-house designs of microelectronic products are protected by patents and certificates, including certificates for the microcircuit chip topology and patents for sensors and analog-to-digital signal converters.

REQUIRED FINANCIAL RESOURCES AND COOPERATION FOR COMPLETING PROJECTS
Zelenograd nanotechnology center has necessary resources and competences for the development and design of competitive microelectronic products.

INTELLECTUAL PROPERTY
• We ensure a full range of activities from preparation of technical specifications to manufacture of serviceable chips and microcircuits.
• Modern library of IP blocks enables us to provide services for the design of microcircuit chips with topological standards up to 180 nm, including built-in flash memory.
• There is a possibility to integrate different types of sensitive elements.

COMPANY: ZELENOGRAD NANOTECHNOLOGY CENTER JSC
Phone +7 (499) 720 69 44
E-mail market@zntc.ru
Web-site www.zntc.ru
Chief Marketing Officer Oksana Shaimardanova
ARCHITECTURAL DESIGN

Feasibility study: analysis of the customer requirements (whether functional or technical), concept development:

- analysis of available architecture and circuit options;
- technology and package evaluation and choice;
- calculation of power, area and potential yield;
- specification development;
- risk analysis, project schedule preparation and cost definition.

Design:

- front-end modelling, synthesis and verification in Design Compiler, Primetime, Powermill, Pathmill, Pro VHDL, Pro Verilog, VSS, Timemill, Formality, NCsim;
- back-end physical design in Silicon Ensemble, OPUS (Virtuoso), Arcadia;
- physical verification in Calibre.

As the result of a design stage the customer receives the IC topology design in GDS2 format.

COMPANY: MIKRON JSC

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<th>Phone</th>
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<tr>
<td>E-mail</td>
<td><a href="mailto:globalsales@mikron.ru">globalsales@mikron.ru</a></td>
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<td>Web-site</td>
<td><a href="http://www.mikron.ru">www.mikron.ru</a></td>
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<tr>
<td>Group manager, Sales department</td>
<td>Khuseinov Farkhad</td>
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CONTRACT MANUFACTURING OF MICROELECTRONIC PRODUCTS

Contract manufacturing services are available at Mikron 8’, 6’ and 4’ production lines with total capacity of 50,000 wafers per month. It offers small and medium scale production of a wide range of ICs and discrete semiconductor devices. Both full-cycle manufacturing from test samples to mass production and standalone technological operations according to customer-requirements can be performed. A foundry-team will guide the customer through all production stages to ensure that IC designs are manufactured with the highest quality and in a timely manner and the customers are satisfied with their collaboration experience with Mikron.

SUPPORTED TECHNOLOGIES

Mikron provides foundry services covering technology solutions from 2.5.0 µm ~ 65 nm process nodes, focusing on differentiated technologies including:

- **CMOS:**
  - CMOSF8_4 M_5 V (0.18 µm, 4 Me);
  - CMOSF8_5 M (0.18 µm, 5 Me);
  - CMOSF8_6 M_5 V + EEPROM (0.18 µm, 6 Me).
- **HCMOS:**
  - HCMOS8D_6 M_5 V (0.18 µm, 6 Me);
  - HCMOS8D_RF SiGe (0.18 µm, 6 Me, RF as an option);
  - HCMOS065_LP (65nm, 7 Me);
  - HCMOS10_LP_7 M_2.5 V (90 nm, 7 Me).
- **Bipolar:** Bipolar (2 µm, 1-2 Me, trench as an option).
- **CMOS:**
  - CMOS (1.6-2 µm, 1 Me, 1 polySi);
  - HV-CMOS (BCD) (1.6-2 µm, 1 Me, 1 polySi).
- **Planar:**
  - Planar: Pt (IF: 1–100 A); Mo (IF: 3–60 A); Cr (IF: 0.5–30 A); Ti (IF: 1 A);
  - Planar HV.

It provides manufacturing services for power management ICs, power discretes, RF, as well as standard logic and mixed-signal ICs.

COMPANY: MIKRON JSC

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FOUNDRY SERVICES

DESCRIPTION
Zelenograd Nanotechnology Center carries out contract manufacturing of microcircuits, including following services:
• experimental and small-scale IC and MEMS manufacturing;
• new technology development, RD of manufacturing routes.
Zelenograd Nanotechnology Center carries out a complete production cycle of technology services in the field of microelectronics and microsystem technology for various purposes and on the implementation of individual technological operations of chip production.
Zelenograd Nanotechnology Center is an innovative company and a low-volume foundry. It provides a wide range of technology support, including:
• VLSI, MEMS and SoC manufacturing;
• prototyping of high-tech production for start-ups and huge companies;
• new technology development;
• technology services and implementation of special options.
Zelenograd Nanotechnology Center provides contract manufacturing services for domestic fabless companies. Quality management system certified according ISO 9001:2001 and required domestic standards.

KEY LIMIT/BOUNDARY/TECHNOLOGICAL PARAMETERS
• Production technology: CMOS, BiCMOS, MEMS.
• Project standard: 0.6–0.35 μm.
• Diameter of a silicon wafer: 150 mm, 200 mm (BEOL).
• Production capacity: 600 wafers per month.

COMPETITIVE ADVANTAGES
• Special technology routes on up-to-date high-tech equipment.
• System-on-chip technology.
• High-temperature and radiation-resistant electronics.
• Flexible pricing policy.
• Prototyping for R&D and series of pilot batches (small amounts of a wide range).

COMPANY: ZELENograd NANOTECHNOLOGY CENTER JSC
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Web-site www.zntc.ru
Chief Marketing Officer Oksana Shaimardanova
## DESIGN AND MANUFACTURE OF PRINTED CIRCUIT BOARDS (PCB)

### KEY PARAMETERS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Standard PCB</th>
<th>PCB HDI</th>
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<tbody>
<tr>
<td>Number of layers</td>
<td>up 12</td>
<td>up 30</td>
</tr>
<tr>
<td>Thickness of board, mm</td>
<td>0.5 ... 3.0</td>
<td>0.2 ... 6.0</td>
</tr>
<tr>
<td>Max. Size of board, mm</td>
<td>355x285</td>
<td>600x600</td>
</tr>
<tr>
<td>Ratio of the diameter of the hole to the thickness of the board</td>
<td>1:5</td>
<td>1:10</td>
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<tr>
<td>The minimum contact area (to foil 18 mkm)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- To plated holes to 2.0 mm – 0.3 mm;</td>
<td></td>
<td></td>
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<tr>
<td>- To plated holes over 2.0 mm – 0.5 mm.</td>
<td></td>
<td></td>
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<tr>
<td>The minimum width of the conductor and clearance, mm</td>
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<tr>
<td>- To foil 18 microns – 0.10-0.10 mm;</td>
<td></td>
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<tr>
<td>- To foil 35 microns – 0.15-0.15 mm;</td>
<td></td>
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<tr>
<td>- To foil 70 microns – 0.20-0.20 mm;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- To foil 105 microns – 0.25-0.25 mm.</td>
<td></td>
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<tr>
<td>Admission to the thickness of the board</td>
<td>± 0.2 mm</td>
<td>± 10%</td>
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### COMPANY: REZONIT LTD

- Phone: +7 (495) 777 80 80
- E-mail: pcb@rezonit.ru
- Web-site: www.rezonit.ru
- Head of Sales Dpt.: Alexey Nikulin

### COMPANY: MICROLITE LLC

- Phone: +7 (495) 221 73 44
- E-mail: smt@microlit.ru
- Web-site: microlit.ru
- Head of Sales: Alexey Nikulin

### MANUFACTURE OF PRINTED CIRCUIT BOARDS (PCB)

### KEY TECHNICAL AND / OR TECHNOLOGICAL PARAMETERS

- The number of layers – up to 18.
- Conductor-gap:
  - To foil 18 microns – 0.10-0.10 mm;
  - To foil 35 microns – 0.15-0.15 mm;
  - To foil 70 microns – 0.20-0.20 mm;
  - To foil 105 microns – 0.25-0.25 mm.
- The minimum contact area (to foil 18 mkm):
  - To plated holes over 2.0 mm – 0.3 mm;
  - To plated holes over 2.0 mm – 0.5 mm.
- The minimum diameter of the metallized holes (for boards of different thicknesses, this parameter is different, the ratio of the height to the bore diameter is 5: 1) – 0.2 mm.
- Resolution marking paint (minimum line width) – 0.15 mm.
- The thickness of the copper foil – 18, 35, 70, 105 microns.
- Machining contour:
  - Stamp – tolerance of +/- 0.2 mm;
  - Milling Contours – tolerance of +/- 0.2 mm;
  - Scribing – tolerance of +/- 0.25 mm.
TEST AND FUNCTIONAL CONTROL SERVICES

DESCRIPTION
Zelenograd Nanotechnology Center provides testing services a wide variety of microcircuits, MEMS-sensors and provides following services:
• qualification testing;
• functional control and testing of electrical parameters;
• failure analysis.

KEY LIMIT/BOUNDARY/TECHNOLOGICAL PARAMETERS
Key parameters for digital microcircuits:
• number of channels – 256;
• maximum testing frequency – 500 MHz.
Key parameters for analog microcircuits:
• generator of number sequences with 2 Gbit memory and 500 Mbit data transmission rate;
• signal generator with 150 MHz maximum frequency and sample number per second 10^9 and memory of 4 million samples.
Key parameters of memory test unit:
• algorithmic sequencer;
• data receiving device;
• data transmission rate – 250 MHz.

COMPETITIVE ADVANTAGES
• Testing and functional control of domestic and foreign production for special applications (VLSI, MEMS and SoC, 3D IC).
• The quality management system certified according to ISO 9001:2001 and required domestic standards to provide certificate testing of electronic components of domestic and foreign VLSI, MEMS, SoC and SiP.

COMPANY: ZELENOGRAD NANOTECHNOLOGY CENTER JSC
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Web-site www.zntc.ru
Chief Marketing Officer Oksana Shaimardanova
ASSEMBLY SERVICES

DESCRIPTION
Zelenograd Nanotechnology Center has an up-to-date Assembly line and provides a wide range of assembly and packaging services:

- assembling of chips for microcircuits, MEMS-sensors into ceramic- and-metal packages (including LLC, BGA packages) and glass-metal packages;
- unpackaged assembly for microcircuits, MEMS-sensors;
- special options:
  - packaged systems, multi-chip modules;
  - flip-chip;
  - 3D IC integration (3D assembly), multi-chip modules;
  - integral component insertion (IC and MEMS);
- carrying out special operations outside the main routes.

KEY PARAMETERS

- Quantity of output terminals is up to 1,500.
- Single-level or multi-level connection:
  - size of connection point: up to 40 μm;
  - chip size: 0.3x0.3 mm to 50x50 mm.
- Measurement: DAC, ADC, digital, analog, analog-to-digital VLSI.
- Capacity: up to 10000 microcircuits per month.

EQUIPMENT
The high-tech assembly line provides an ability to carry out the following operations:

- assembly chips both with a large and small gain (up to 4000 N).
- Cu-Cu insertion of chips (3D assembly).
- Implementation of functional and parametric control of microcircuits on the wafer.

COMPETITIVE ADVANTAGES

- The special technology routes on up-to-date high-tech equipment.
- Assembly for special applications, assembly of multi-chip modules up to 1,500 outputs.
- Flexible pricing and quick fulfillment of orders.
- The quality management system certified according to ISO 9001:2001 and required domestic standards.

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<td>Web-site</td>
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<tr>
<td>Chief Marketing Officer</td>
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DESIGN, RECONSTRUCTION AND MODERNIZATION

DESCRIPTION

• Design
SKTO PROMPROEKT’s services include: Project Concept, Design, Construction, Assembly and As-Built Documentation development; documentation approval, inspection, implementation guidance.

• Reconstruction
SKTO PROMPROEKT’s turnkey overall construction engineering services include: investment planning, design, construction, engineering equipment procurement, installation, commission, maintenance and support.

• Modernization
SKTO PROMPROEKT and NPP ESTO help their customers with selection, procurement, installation, maintenance and support of Russian and foreign technology equipment for any technology- and science-extensive enterprise.

EQUIPMENT
Slovak and Czech engineering equipment and clean room building elements:
• floor, wall and ceiling systems components;
• laminar flow hoods, laminar flow work zones, air locks;
• air handling units, chillers, FFU, FU;
• H₂ and O₂ electrolysis units;
• Ar and N₂ cryogenic evaporators;
• process chemical solutions delivery stations;
• compressed air delivery systems;
• gas cabinets, gas panels, VMB and VMP;
• power and heat generation systems, UPS;
• power transformers.
Technology equipment of the leading European and Russian companies: LPE, AIXTRON, Oxford Instruments, Stroza, NT MDT, NPP ESTO, etc.

COMPETITIVE ADVANTAGES
• Years of experience in design, construction, equipment delivery and commission of High-Tech enterprises.
• Highly qualified personnel, extensive resource, production and service bases.
• Vast partners and customers databases.
• Location in Russian silicon valley – Zelenograd.
• Maintenance and support of any engineering and technology equipment.
• Knowledge of Russian and European regulation standards for overall construction engineering.

COMPANY: SKTO PROMPROEKT

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<td>E-mail</td>
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<td>Web-site</td>
<td><a href="http://www.ckto-promproekt.ru">www.ckto-promproekt.ru</a></td>
</tr>
<tr>
<td>Responsible Executive</td>
<td>Igor A. Trofimenko (phone: +7 (499) 720 69 29, ext.: 243)</td>
</tr>
</tbody>
</table>
TECHNOLOGY SERVICES CENTER

On the production base of the Technology Services Center is equipped with vacuum areas and measuring equipment, the site of photolithography. We offer a transfer of your process to the production areas of the center. Our center specialists consult customers on all questions during the whole production cycle and pick up the optimal solution of problems of the customer in a short time and at reasonable prices.

TECHNOLOGIES
- metallization of different surfaces;
- deposition of thin films of films;
- application of multifunctional coatings;
- etching of various materials;
- photolithography.

MATERIALS
- all metals, including refractory and magnetic;
- nitrides and metal oxides, including silicon;
- dielectric and resistive layers;
- precious metals, etc.

TYPES OF SURFACES
- metal substrate and the plate;
- nonwovens;
- polyamide and polyethylene film;
- web materials, etc.

TYPES OF COATINGS:
- hardening and tool steels;
- anti-corrosion and heat-resistant coating;
- low friction nanocomposite coatings;
- biocompatible and antibacterial coating;
- optical coatings;
- protective and decorative coatings.

The Technology Centre is equipped with modern vacuum and measuring equipment and the laboratory of photolithography. Vacuum equipment:
- 3 units of Caroline family;
- 2 units of Solvac family;
- 6 units for photolithography.

ANALYTICAL INSTRUMENTS:
1. Microscope Nikon HFX II.
2. Analytical balance GR-300.
3. ARS 9000 TESTING SYSTEM.
4. Surface Profil measuring system Dektak 3030 (Dektak 3030 Profilometers).
5. Linnik interference microscope MII-4.

COMPANY: ESTO-VACUUM

Phone +7 (499) 710 60 00, +7 (499) 710 60 11
E-mail marketing@esto-vacuum.ru
Web-site www.esto-vacuum.ru
Chief Marketing Officer Mikhail Suvorov
ORWELL 2K VIDEO SURVEILLANCE SYSTEM WITH COMPUTER VISION

DESCRIPTION
A security video surveillance and business monitoring system for 24/7 all-weather guarding of the objects’ perimeter and territory as well as their approaches by means of automatic target (humans, vehicles) and alarm situation (ignition, fumigation, abandoned object, etc.) detection and classification with automatic transmission of video information to an operator in a real-time mode.

Orwell-R object perimeter and territory guarding radar system
A radar system for guarding objects with extended perimeter, unenclosed territories and water areas including objects of the “water-land” class (hydroelectric power stations, river and sea ports) with extended perimeter.

Senesys-Auto vehicle passage control system with license plate number and vehicle appearance recognition
A system for automation of vehicle passage and presence control on the guarded territory with algorithms of computer vision for recognizing vehicle license plate numbers and their verification by appearance.

IPCam-Parking video camera for license plate number recognition and lifting barrier control
A video camera with embedded algorithms for license plate number recognition and a vehicle database. IPCam-Parking is used for access automation at the traffic checkpoints.

Orwell 2k-TraVio traffic situation monitoring and control system
A system for automatic detection and classification of traffic situations, real-time transmission of information thereof, traffic density analysis and providing information for traffic management.

Statistics customer counting video system
A professional tool for customer counting based on video surveillance and algorithms of computer vision.

Pass office software complex with on-line application system
An electronic system for application filing and approval, as well as pass preparation and printing for life cycle automation and tracking of employee and visitor passes in the company.

Orwell 2k-Neptune video surveillance system for river and marine vessels
A system for 24/7 all-weather guarding of the close perimeter of the vessel, advance automatic warning about approaching vessels and people and movement towards the reefs, prevention of illegal intrusion as well as detection and classification of emergencies on board the vessel.

KEY LIMIT /BOUNDARY/ PROCESS PARAMETERS
• persistent, all-weather protection in all weather conditions;
• integrated safety;
• reduction of human factor influence;
• downsizing operators;
• ensuring high availability and reliability;
• advanced solutions for the processing and transmission of information;
• unique video algorithms;
• user-friendly interface.

COMPETITIVE ADVANTAGES
• innovations in production to reduce cost;
• the uniqueness of the characteristics of the product;
• competitive price;
• availability of qualified personnel;
• accurate execution of orders in time;
• working experience;
• image and reputation;
• high quality product;
• free technical support;
• free demo version;
• training clients;
• optional system.

COMPANY: ELVEES NEOTEK

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<td>E-mail</td>
<td><a href="mailto:main@elvees.com">main@elvees.com</a></td>
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The employee taking orders for the provision of services
STAFF RECRUITMENT
IN THE FIELD OF MICROELECTRONICS

DESCRIPTION
“TRIZA-Sputnik” ltd. has been into staff recruitment of overqualified specialists for microelectronics plants and related industries since 1992. Recruitment agency “TRIZA-Sputnik” deals with recruiting of staff as well as temporary employees, outstaffing, it also monitors the demand for staff in companies and conducts the marketing research of level of wages and working conditions. Recruitment for companies is carried out in tight deadlines with a guarantee period from 3 to 6 months. The agency deals with staff recruitment in Moscow, Zelenograd, Khimki, Lobnya, Solnechnogorsk, Sheremetevo, Istra, Instrincky and Solnechnogorsky districts.
Our key customers are large international and Russian enterprises, branches of foreign companies in Russia, etc.

KEY LIMIT /BOUNDARY/ PROCESS PARAMETERS
To monitor the demand for staff in companies, analyze the working conditions and monitor workforce potential in the field of microelectronics of the region the unique software was worked out and implemented. It not only collects and stores the data about specialists and enterprises where they work, but also allows to trace correlation between specialists in some particular fields (e.g. construction in microelectronics) and those companies where they worked before and work now, their extrapolated presence in the labor market, the balance of demand and supply, their requirements and cooperation with other specialists, carrier growth, its perspectives and etc.
• Unique software for monitoring the labor market and demand for staff.
• Sputnik-Personnel recruitment Know-How – “Technological stages of recruitment”.
• Structured database of specialists in the field of microelectronics and related industries of the region.

EQUIPMENT
A customized approach, monitoring data about specialists in the region and unique structured database (in the fields of activity and economic sectors) underlie the stable work of our company. Our wide experience in headhunting, direct searching, recruiting allows to meet the requirements of the most sophisticated business leaders.

COMPETITIVE ADVANTAGES
• The first in Zelenograd and one of the oldest Recruitment Agencies in Russia.
• More than 23 years of experience in labor market.
• Successful implementation of more than 2,000 projects.
• Monitoring about 40% of qualified specialists in Zelenograd.
• An effective operational system to process orders.
• Excellent knowledge of the labor market in Moscow and North-West of Moscow region.

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