

SITRONICS
microelectronics 

**JSC Mikron,
SITRONICS Microelectronics**

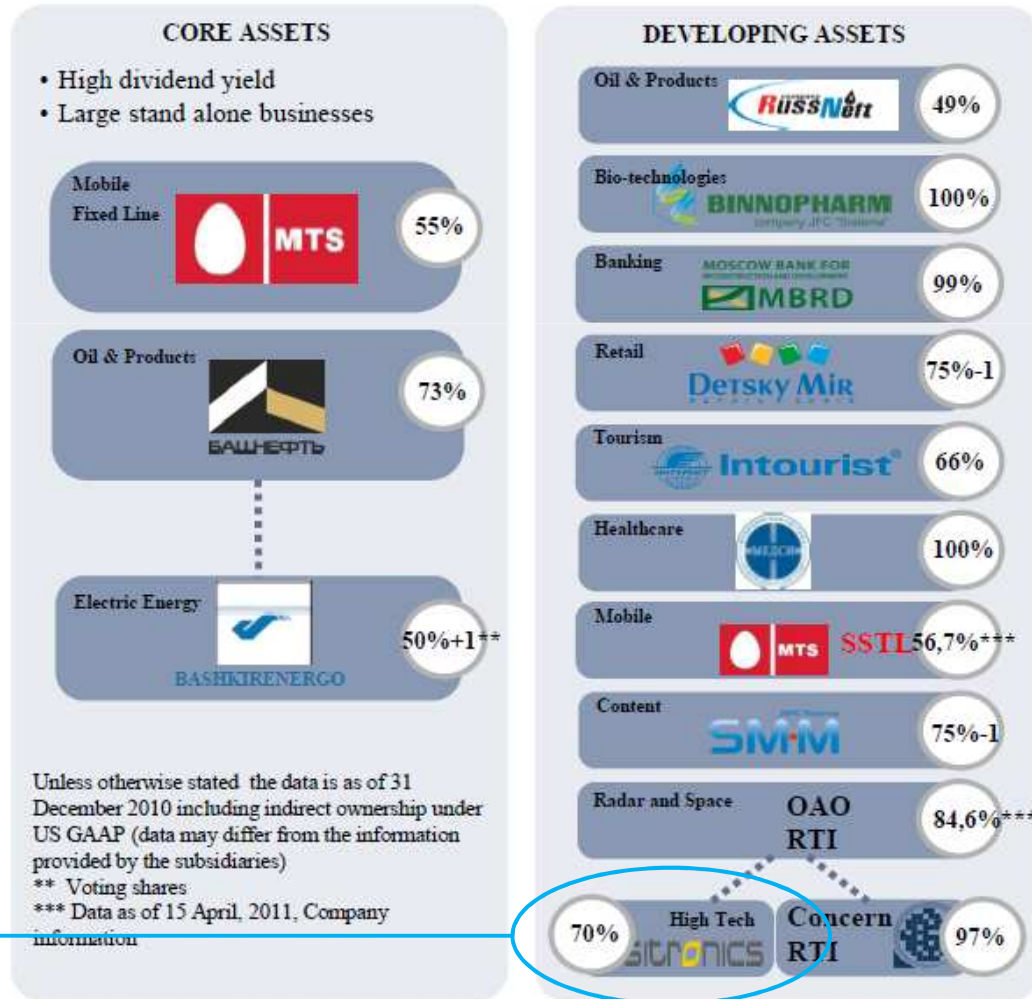
2011



Sistema JSFC Corporate Structure



PRESENT INVESTMENT COMPANY STRUCTURE



▶ SITRONICS is a part of the largest public diversified financial corporation in Russia



Corporate Structure of SITRONICS



Description

- ▶ the largest chip designer, producer and exporter in Russia and the CIS, pre-eminent in the Russian integrated circuits (ICs) of industrial application, smart card, RFID-card and RFID-tag markets. based in Zelenograd (Moscow) and Voronezh

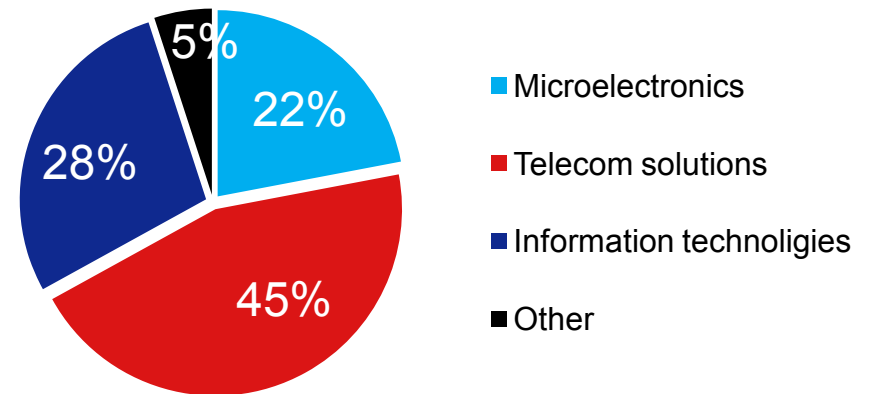
Key products

- ▶ ICs
- ▶ Smart cards
- ▶ RFID cards and tags
- ▶ R&D

Revenue

- ▶ \$ 255 mln in 2010
- ▶ 23% growth per year
- ▶ 22% of total SITRONICS sales *

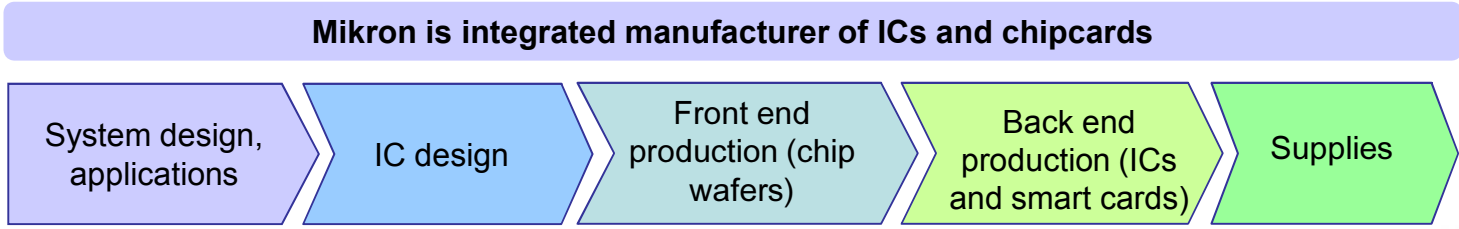
Revenue breakdown, 2010



* 2010 data



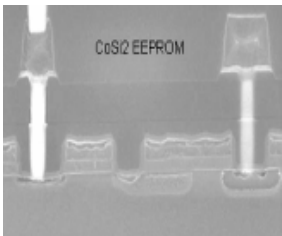
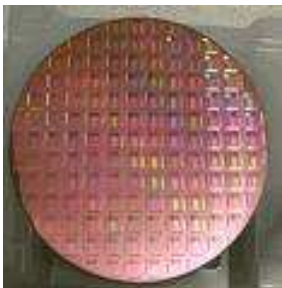
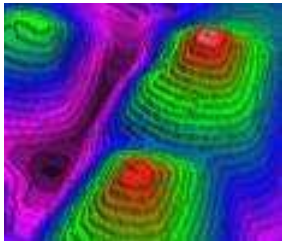
SITRONICS Microelectronics corporate structure



▶ In 2011 Fast Company included Mikron in top ten leading innovative companies of Russia, having appropriated 8th place in the rating



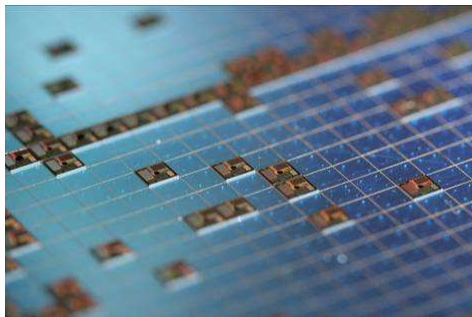
Mikron's R&D directions



Mikron has a powerful scientific and engineering school. About 15-20% of the company's annual revenue is spent on research and developments, about 400 persons are involved in this activity. Scientific research is carried out in close integration with global and Russian research organizations – JSC Mikron cooperates on a permanent basis with over 60 branch and academic R&D institutes and design centers.

- ▶ IC Design and testing;
- ▶ Process development: CMOS, EEPROM, HV CMOS, bipolar, SiGe. Development of basic semiconductor structures;
- ▶ CAD tools mastering and development;
- ▶ Processing and extraction of data for photomask manufacturing;
- ▶ Foundry services – libraries development, SPICE extraction, layout optimization.





Front end production

- ▶ 6" fab in Zelenograd: 7, 12, 20 and 45V bipolar for analog power management;
- ▶ 6" fab in Voronezh: Schottky diodes, power semiconductors, foundry;
- ▶ 8" fab in Zelenograd: 0.18um CMOS+EEPROM (end of 2009, licensed by ST), 0.35um BiCMOS and BCD (2010), 90um CMOS (2012);

Back end production

- ▶ Assembling facilities in China for analog power management ICs
- ▶ Assembling and personalization of plastic and paper chip cards



Joint Venture with RUSNANO



РОСНАНО

Российская корпорация нанотехнологий

7

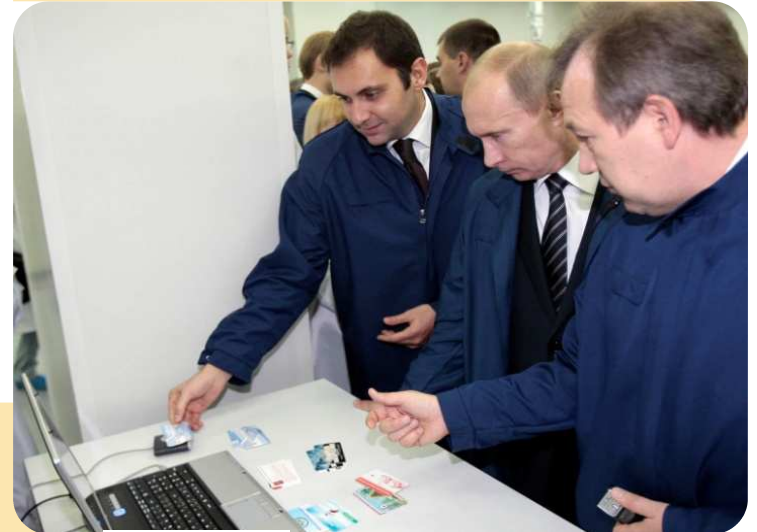
- ▶ October 2009 - investment agreement with RUSNANO to launch 90 nanometre technology microchip production at SITRONICS' existing facility in Zelenograd (Moscow, Russia).
- ▶ The first major Russian project on the establishment of a modern microelectronic production with the government being a co-investor on parity terms
- ▶ The total project funding amount is 16.5 billion rubles. RUSNANO investment into the established joint venture is 6.5 billion rubles. SITRONICS has invested an equal share in the form of high-tech equipment (180 nm microchip production line)
- ▶ 90 nm is the most advanced technology in Russia and one of the most popular in the world: as of today, over 90% of microchips in the world, excluding PC memory segments and microprocessors, have been manufactured in accordance with the 90 nm and higher standards.
- ▶ The start-up of the serial production based on the new technology is scheduled for 2012, planned production capacity makes up 3000 wafers.
- ▶ SITRONICS to become the centre of Russian industrial ecosystem in microelectronics sector

“We are expecting on the synergy effect: the availability of our own nanoelectronic capacity will become a strategic factor boosting the development of a whole range of adjacent segments of the national electronics and other hi-tech industries.”

Dionis Gordin, RUSNANO Managing Director

“The launch of the 90 nanometre microchip production project is of considerable strategic importance for Russia. Nanoelectronic production in Russia plays an invaluable role in the development of the Russian high-tech sector and the country's overall technological security.”

Anatoly Chubais, Chief Executive Officer of RUSNANO



SITRONICS
microelectronics

180 nm and 90 nm technology comparison

Products	Technology
----------	------------



Biometric documents (passport, vehicle certificate, driver license, documentary stamps etc.)

Banking and social security cards

Telecom-cards (SIM)

RFID (transport cards, tickets, public events)

180 nm and 90 nm

90 nm technology allows to:

- ▶ increase information capacity,
- ▶ improve protection algorithm,
- ▶ combine several functions in one device
- ▶ increase data transfer rate



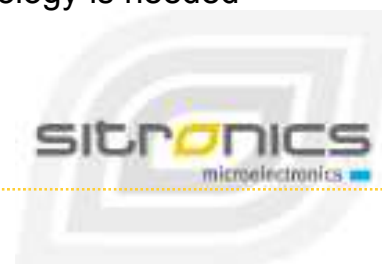
Satellite navigation

Industrial electronics

Avionics

Automotive

90 nm technology is needed



RFID cards and ICs

▶ Transport fare cards

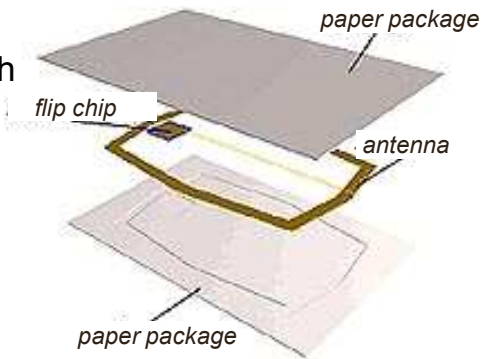
- Completed production chain: back grinding, dicing, bumping, inlay assembling, paper card assembling and personalization.
- Paper package vs traditional plastic package provides advantage in cost and utilization with similar level of reliability
- The largest manufacturer of paper RFID cards in Russia. Total Russian market is ~300 mln. cards/year in 2008=2011
- Key customers:
 - Moscow Subway,
 - Moscow Aeroexpress company
 - Moscow, Kazan, N.Novgorod urban transport systems

▶ Ski-passes, tickets, tags









- SOCHI-2014 Olympic games
- World Student Games in Kazan-2014
- Shows, concerts, sport events
- Transport & Logistics

▶ RFID ICs family MIK64xx

- Contactless ISO 14443A
- 640 bit = 20pages with 4 byte each
- Field programmable read-only locking function for 13 pages
- # of rewrite cycles: >100000
- Data retention time: 5 years
- 32 bit user definable One Time Programmable area
- 128 bit (4 pages) user r/w area
- Typical page programming time = 4.1 ms
- Anti-cloning support by unique 7-byte serial number for each device
- Resistance of the microcircuit to UV and X-ray, to electromagnetic fields and static electricity, mechanical and environmental factors corresponds to ISO 14443-1



NFC tags

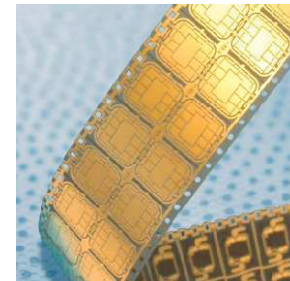
		<u>Quantity, pcs.</u>	<u>\$USD/pcs.</u>			<u>Quantity, pcs.</u>	<u>\$USD/pcs.</u>
	Mifare Ultralight ▶ Diameter 25 mm	5- 99	1,36		Mifare Ultralight ▶ Size 49x81 mm	5- 99	1,43
		100-999	1,04			100-999	1,09
		1000-1999	0,78			1000-1999	0,95
		2000-9999	0,51			2000-9999	0,54
		10000+	0,45			10000+	0,47
	Mifare Ultralight ▶ Diameter 38 mm	5- 99	1,36		Mifare Classic (Standart) 1K ▶ Size 49x81 mm	5- 99	1,84
		100-999	1,04			100-999	1,57
		1000-1999	0,78			1000-1999	1,43
		2000-9999	0,51			2000-9999	1,23
		10000+	0,45			10000+	1,02
	Mifare Ultralight ▶ Diameter 40 mm	5- 99	1,36		Mifare Classic (Standart) 1K ▶ Diameter 38 mm	5- 99	1,84
		100-999	1,04			100-999	1,43
		1000-1999	0,78			1000-1999	1,23
		2000-9999	0,51			2000-9999	0,82
		10000+	0,45			10000+	0,68
	Mifare Ultralight C ▶ Diameter 38 mm	5- 99	1,43				
		100-999	1,09				
		1000-1999	0,82				
		2000-9999	0,54				
		10000+	0,47				
	Mifare Classic (Standart) 1K ▶ Diameter 40 mm	5- 99	1,84				
		100-999	1,57				
		1000-1999	1,43				
		2000-9999	1,23				
		10000+	1,02				

*prices excluding VAT



▶ Telecom cards: SIM, RUIM

- JV with G&D (65%-Sitronics, 35%-G&D) for smart card production and personalization was launched in 2006
- M5 chip module assembling (Infineon licensed technology) was launched in 2007
- 30% of Russia + CIS market. Total market in 2008 = 120mln. units.
- Supplies to Russia, Ukraine, Belarus, Uzbekistan, Kazakhstan, India in 2009.
- Key customer:
 - MTS group (the biggest mobile service provider in the CIS). long-term agreement for production and customization of SIM-cards for MTS.
 - Supply of proprietary RUIM cards for pan-Indian telecom operator Shyam.



▶ Banking cards

- Eurocard/Mastercard/Visa certification in 2008
- First supplies in 2009. Total market in 2010 = 35 mln cards
- Key customer on the marker: Sberbank of Russia (the biggest card issuer)



▶ Social cards

- R&D contactor of Moscow Government, potential demand is 2.5 mln. cards/year for Moscow.

▶ E-passport

- SoC for Russian travel passport



MIK51XX family

- ▶ 8-bit 30MHz microcontroller
- ▶ Embedded OS with Java Machine
- ▶ Hardware-software Random Number Generator (RNG) ensuring generation of 64 bytes in no more than 20 ms with a unit for controlling the outgoing sequence statistical qualities.
- ▶ Hashing algorithm and Digital Signature like in ICAO recommendations.
- ▶ Dual Key Triple DES (DDES) encryption accelerator.
- ▶ RSA (up to 1024 bits) and GF(p)
- ▶ Elliptic curve (EC2) encryption accelerator.
- ▶ AES encryption acceleration (128, 192 or 256 bits).
- ▶ CRC module ISO 3309 compliant

Applications

- ▶ ID cards and tokens:
 - Passes
 - Access to equipment, internal networks and data
 - Personal info storage, digital signature

Additional security hardware features

- ▶ Sensors of high and low frequency, voltage, temperature, light
- ▶ Hardware protection against breaking in
- ▶ Hardware control of EEPROM integrity
- ▶ Hardware features for counteraction against attacks
- ▶ Resistance to UV and X-ray, electromagnetic field and static electricity, mechanical and environmental factors corresponds to ISO 14443-1 and 7816-1.



Standard Analog ICs

Types

1. Switching regulators (DC-DC): Step-Down, Step-Up, PWM Current Mode, Flyback
2. White LED drivers
3. Voltage regulators (LDO)
4. Analog components: arrays, comparators, amplifiers

Features

- ▶ Green Mode to Support the “Blue Angel” Norm
- ▶ Low Standby current
- ▶ ThermoProtection
- ▶ Current Limit cycle by cycle
- ▶ LEB (Leading Edge Blanking)
- ▶ Soft Start
- ▶ High efficiency

Voltage

- ▶ $V_{in\ min}=4.5V$ for Step-Down; $V_{in\ min}=1.8V$ for Step-Up
- ▶ $V_{in\ max}=20-40V$
- ▶ $V_{out}=1.23V\dots(V_{in\ max}-3V)$; fixed and adjustable output

Current

- ▶ I_{out} up to 5A

Frequency

- ▶ 52kHz - 600kHz



Cost advantages due to in house design and original technology

Applications

- Simple High-efficiency step-down regulator
- Off-line Converter
- DVD/STB Power Supply
- CRT Monitor Power Supply
- Battery Chargers
- Display backlighting and flash light



thank
you

SITRONICS
microelectronics ■