

Production based on  
**AMORPHOUS &  
NANOCRYSTALLINE**  
materials



RUSSIAN MANUFACTURER  
OF ELECTROMAGNETIC COMPONENTS

**PC "MSTATOR"**

**2022**

## 55 OF PRODUCTION

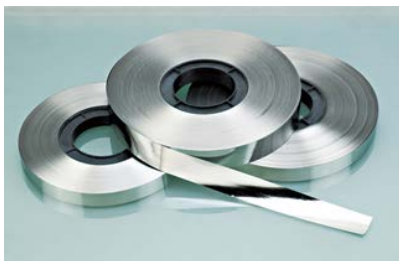
PC "MSTATOR" in the days of the USSR was known as the radio plant "HORIZONT"

Founded as a manufacturer of high-tech electromagnetic components for the aerospace and shipbuilding industries of the USSR Ministry of Defense



## 1980s

A new advanced technology has been introduced: the transition to the use of high-tech extremely thin ribbons with improved electromagnetic characteristics made of **amorphous** and **nanocrystalline alloys** instead of permalloy

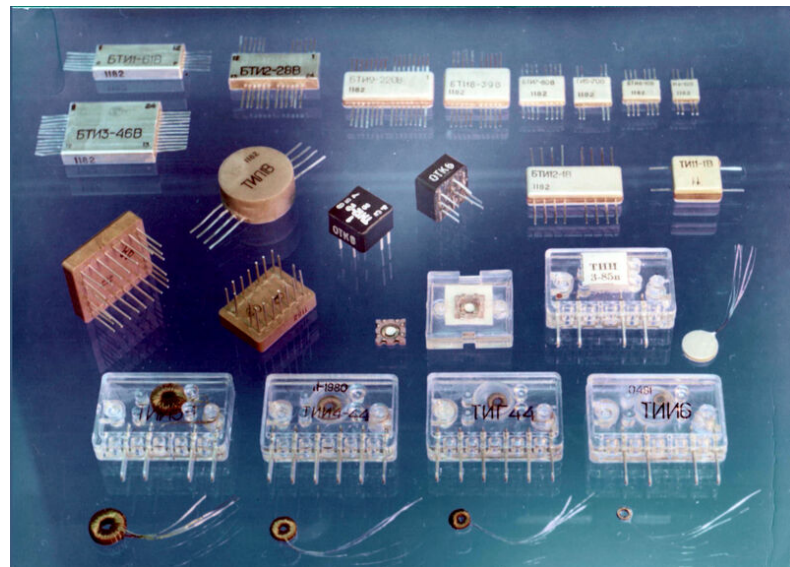


## 1975

### The course to dimensions reduction

Mastered production:

- miniature pulse transformers;
- transformer modules (up to 4 transformers in one case);
- transformers for multiplex information exchange channel (MKIO) **MIL-STD-1553B (ГОСТ 26765.52-87)**



The first enterprise in the USSR that mastered the mass production of electromagnetic components based on amorphous soft magnetic alloys



# 1993

The management of PC "MSTATOR" has established business contacts with South Korea, which allowed:

- adopt and improve foreign technologies;
- attract a significant amount of investment;
- expand the range of products offered;
- reach the World level of quality.



At present, close business and friendly relations are maintained with South Korean partners (Amogreentech Co., Ltd.) – mutually beneficial cooperation with the attraction of new orders for the markets of Asia and Europe.



# 1994

## Significantly expanded range of MAGNETIC CORES

Mastered production according to application for:

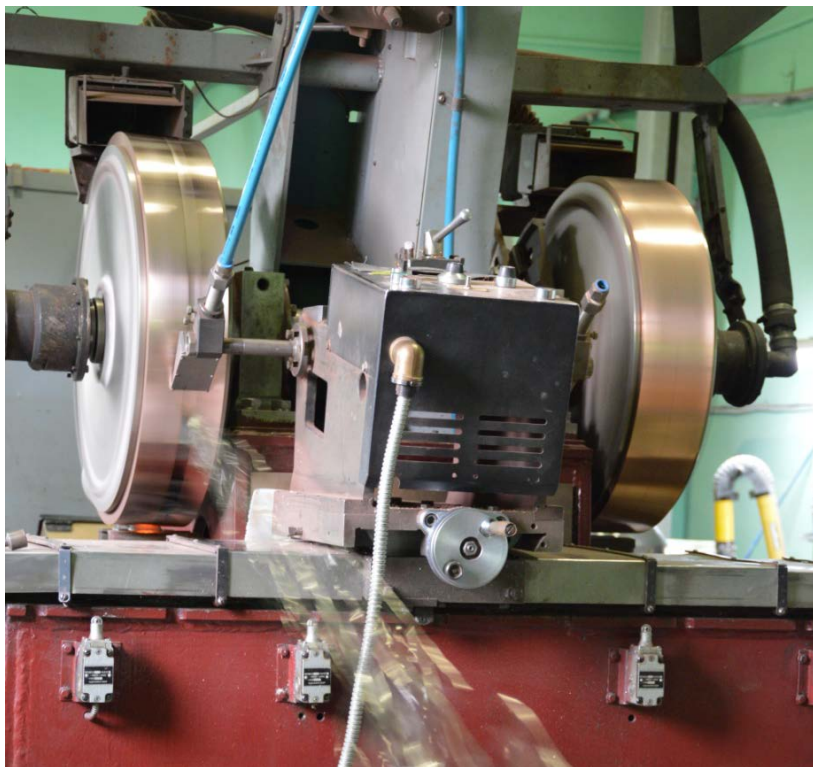
- common mode filters (MSFN, MSF series);
- interference suppression (MSB, MSK series);
- ISDN, DSL networks;
- output chokes;
- differential filter chokes;
- power factor correction chokes PFC (MSCN series);
- precision current transformers;
- high-frequency power transformers (MSTN series);
- switching power supplies (MSC, MSC-NGN series);
- high-quality Hi-Fi audio technology (MSTAN series);
- and etc.



## 2003

Launch of amorphous ribbon spinning machine “SATURN”.

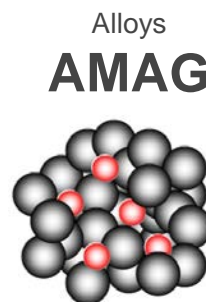
The technology of ultra-fast ( $10^5 - 10^6$  °C/sec.) cooling of a flat melt jet from below to the surface of a rapidly rotating water-cooled copper disk makes it possible to obtain a ribbon of unique thickness **from 16 microns**.



## 2010

**The range of AMORPHOUS and NANOCRYSTALLINE ribbons of the “AMAG” series has been significantly expanded:**

- a number of AMAG alloys were subjected to qualitative analysis and experimentally adjusted in composition in the direction of improving electromagnetic parameters;
- experiments were carried out to obtain new alloys, thanks to which the AMAG product range was qualitatively expanded;
- AMAG alloys have similar material properties:  
**Metglas (MG), Finemet (FT),**  
**VITROVAC (VAC), VITROPERM,**  
**Nanoperm.**

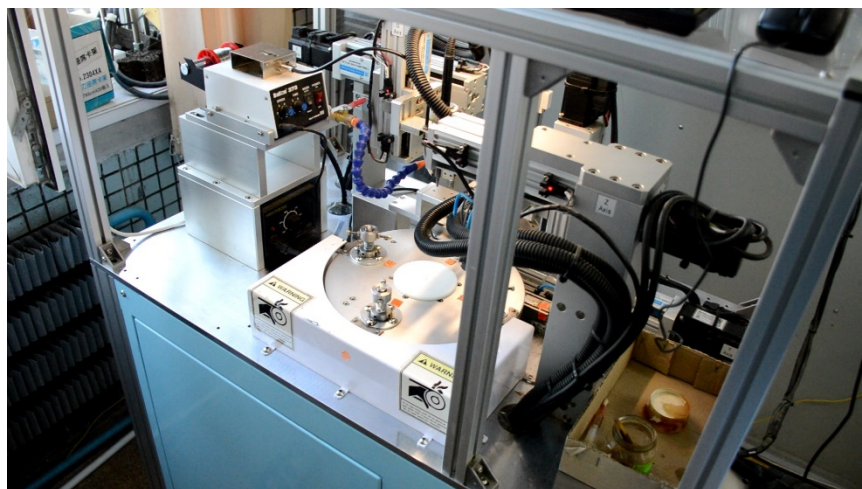
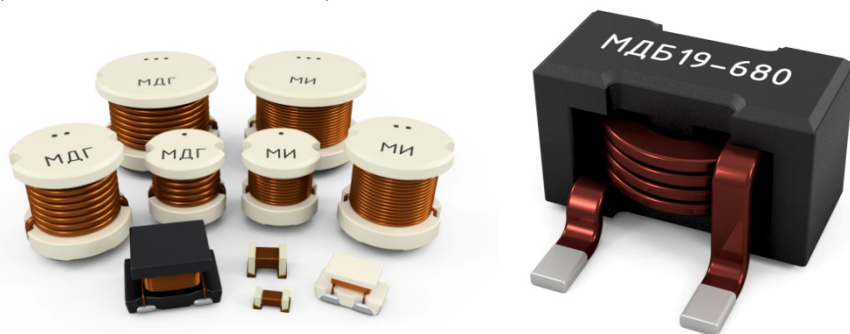


## 2010

Serial production of micro inductances, micro chokes, inductors in the chip design (MI, MDG, KIV series) for the needs of the Ministry of Defense of the Russian Federation was mastered.



In 2014, the expansion of the product range (MD43F, MDB19 series).



## 2017

### 10/100/1000 Base-T – Ethernet technology

Transformer modules for galvanic isolation MTS1 have been developed for use in interface channels of data and information transmission systems in accordance with the IEEE 802.3 standard with an operating frequency range of up to 100 MHz.

Based on transformers based on nanocrystalline materials.



Matching  
TRANSFORMER

Ethernet

MTS1



# 2017

Launch of additional new equipment for thermal magnetic treatment of magnetic cores



annealing working area  
up to 200 mm

## PASS-THROUGH CONVEYOR ANNEALING FURNACE

for annealing the large-sized magnetic cores in a transverse magnetic field is designed for precision annealing of magnetic cores made of amorphous and nanocrystalline soft magnetic alloys in a transverse magnetic field and without field under serial production conditions.



## EXPANDING THE RANGE OF MAGNETIC CORES



Max. OD

100 mm → **200 mm**





## 2017-2018

New magnetically soft nanocrystalline alloys with great potential have been developed



**AMAG 212N**



**AMAG 178N**



Based on the AMAG 178N nanocrystalline ribbon, a line of toroidal cores of the **MSCN-TH** series

- at a sufficiently high induction (1.05 T) they have uniquely low losses;
- high operating temperature limit, excellent linearity of the hysteresis loop, which makes them indispensable for all devices related to energy storage;
- good permeability stability with changes in temperature, induction amplitude, frequency.

## 2020

### Common mode chokes / filters

Based on the MSFN series of magnetic cores, MSTATOR's specialists developed a line of common-mode chokes (electromagnetic interference suppression chokes) of the DS2 and DS3 series based on nanocrystalline material **AMAG 200C**.



Significant reduction in assembly volume by **up to ↑ 60%** compared to ferrite core chokes



Provide a high level of interference suppression over a wide frequency range and are characterized by small overall dimensions and weight

# 2021 "WE DON'T STAND STILL!"

↓ 5-20%

Reduction of  
magnetic cores



## Price

by production  
optimization



**Continuous  
improvement and  
development**

by training staff and  
introducing world  
experience



**Range expansion**

by purchasing  
equipment

- ❑ Multi-turn toroidal winding machine (current transformers)



Improvement of  
product  
**Quality**

by purchasing  
equipment

- ❑ New CNC machines for the auxiliary workshop of machining



**Acceleration of  
production**

by purchasing and  
upgrading new equipment

- ❑ 6 spindle winding machine



## 250 STAFF MAN

PC "MSTATOR" provides over 250 jobs.

The company regularly participates in various social programs carried out by the government of the Borovichi city and the Borovichi region.



Top view of  
the company buildings

## SPORT

In a series of working days, the company's activists live a stormy sports life.

Regular participation in sports competitions allows you to temper your spirit and conquer new heights.

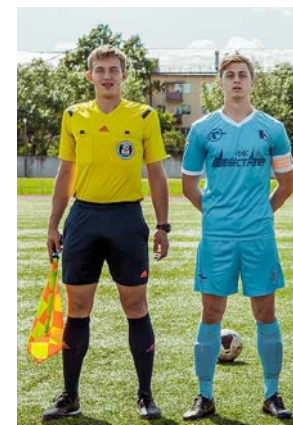


Youth team members

Football team  
"MSTATOR"



Adult team members



# EDUCATION

To improve technical literacy among the younger generation and increase interest in the exact sciences, the management of PC "MSTATOR", together with the administration of the Borovichi city and the Government of the Novgorod Region, developed specialized additional education programs for scholars in grades 5-9.

Training takes place on specially equipped areas of Gymnasium and PC "MSTATOR".



## 5-6 grades

"Physics and Mathematics for Young Intellectuals"

## 8-9 grades

"Radio engineering"



”

*Youth is happy  
that it has a  
FUTURE*

*Nikolay Gogol*

# ELECTRONICS CLUB

In the Borovichi city a popular place among young people was AIR CLUB, used to function. Now this is history...



But time does not stand still, and already with new trends, young people themselves are trying to pave a new road to success by organizing

**Center for technical creativity "ArtTech"**

Robotics, Electronics, Arduino,  
Programming, 3D Modeling

In 2021, the management of PC "MSTATOR" decided to establish close relations with "ArtTech". An agreement has been reached to support them.



Awarding of the winners of the LEGO construction festival "Robots in industry"

- Provision of premises for training on the territory of the plant
- Assistance in holding competitions and purchasing awards
- Equipping classrooms with appliances and specialized furniture
- Consultation by technical specialists of the plant
- Assistance in establishing relations with the administration of the Borovichi district
- Campaigning new club members

**"And this is just the beginning..."**

[www.mstator.ru](http://www.mstator.ru)

# PERSONNEL POLICY

PC "MSTATOR" is interested in young, professional staff and is ready to assist applicants, students, specialists in obtaining

- specialized education
- professional development



Individual approach to applicants from Borovichi city and Borovichi district



The National University  
of Science and Technology (MISiS)  
"Materials Science and Nanotechnology"

The Yaroslav-the-Wise  
Novgorod State University  
(NovSU)



**УНИВЕРСИТЕТ ИТМО**

St. Petersburg State University of Information  
Technologies, Mechanics and Optics (ITMO)



**СПбГЭТУ «ЛЭТИ»**

ПЕРВЫЙ ЭЛЕКТРОТЕХНИЧЕСКИЙ

St. Petersburg Electrotechnical University  
(LETI)

**СПб ГТУ)))**

The Bonch Bruevich St. Petersburg State  
University of Telecommunications



**ПОЛИТЕХ**

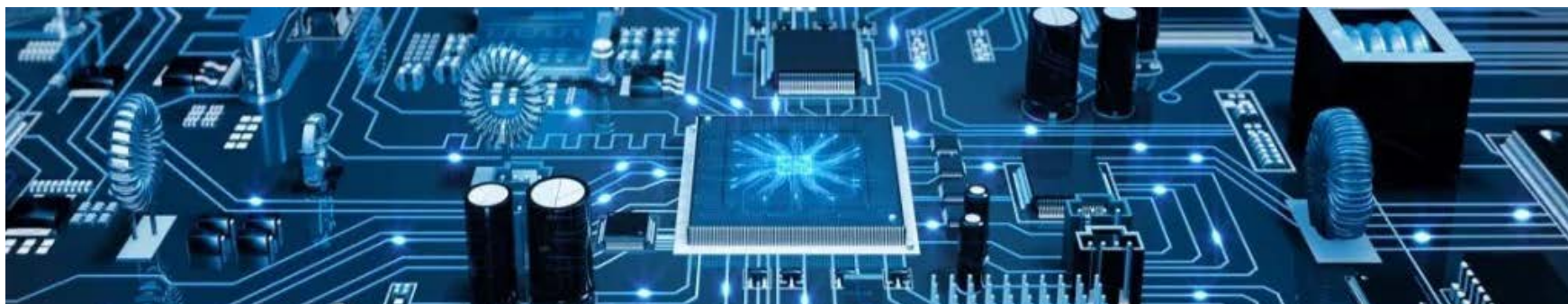
Санкт-Петербургский  
политехнический университет  
Петра Великого

Peter the Great St. Petersburg State  
Polytechnic University



Baltic State Technical University  
"Voenmeh" Named after D.F. Ustinov  
(BGTU)





## GOALS AND TASKS

## PRODUCTION OF ELECTROMAGNETIC COMPONENTS



Reduction of  
enterprise costs



Solving electromagnetic  
compatibility (EMC)  
problems



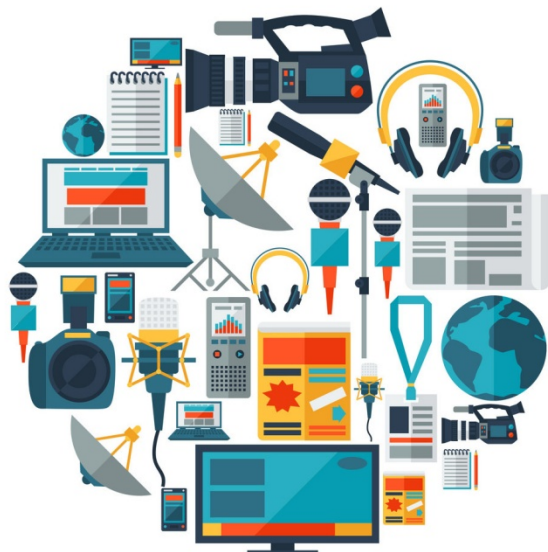
Increasing  
the efficiency  
of components



Ecological  
production

## PRODUCTION PROFILE

### CIVIL



Particular attention is paid to the needs of the Russian electronic industry.

Based on advanced soft magnetic materials, our specialists help to select analogues of foreign products with the best electromagnetic and weight and size characteristics.

### MILITARY



The company's products have all the necessary certificates and meet the modern European and North American standards.

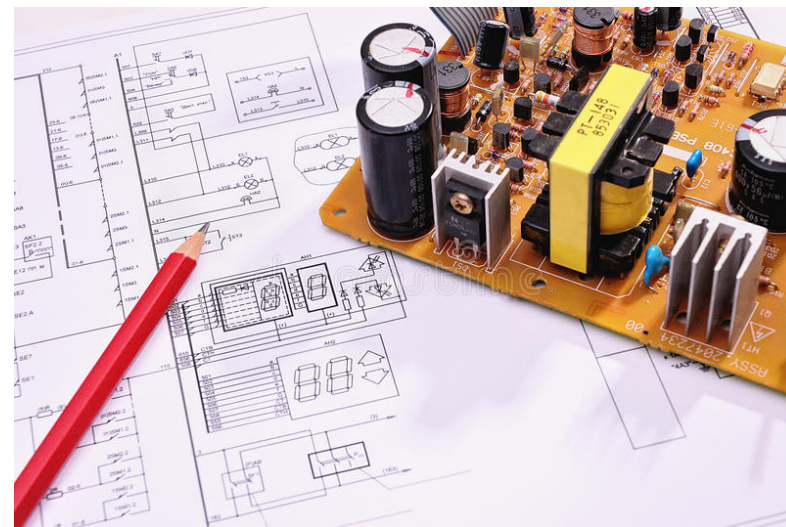
# MAIN CONSUMERS

## INDUSTRIAL ENTERPRISES,

specialized in manufacturing



- transformers;
- chokes;
- power supplies (pulse), inverters, AC/DC and DC/DC converters;
- residual current devices (RCD);
- solar generators;
- electromagnetic screens;
- electrical measuring equipment (current transformers, electronic electricity meters);
- EMI filters (for switched power supplies and inverter drives);
- charging devices;
- sensors for anti-theft devices (EAS);
- industrial ballasts;
- audio and video equipment;
- safeband heaters;



- data and information transmission systems based on standard interfaces of digital networks for multiplex information exchange channel  
(transformers TIL & TIS series -> **MIL-STD-1553B**);
- onboard equipment;
- electric heating systems;
- automotive equipment (in power supplies, flexible magnetic antennas, noise suppression chokes, etc.);
- radio communication and radio transmitting;
- telephone technology;
- mobile phone devices;
- tape media for readers.



## CLIENTS AND PARTNERS IN THE ELECTRONICS INDUSTRY



более 800 контрагентов

# НАМ ДОВЕРЯЮТ



АКЦИОНЕРНОЕ ОБЩЕСТВО  
**АВИААВТОМАТИКА**  
имени В.В. Тарасова



# AWARDS AND CERTIFICATES





## EXHIBITION ACTIVITY

International exhibition of  
electronic components,  
modules and components



EVERY YEAR OUR STAND CAN BE FOUND AT THE EXHIBITION



**ExpoElectronica**  
(RUSSIA, Moscow city)

## CONSTANTLY LOOKING FOR NEW OPPORTUNITIES AND CLIENTS

International  
military-technical forum



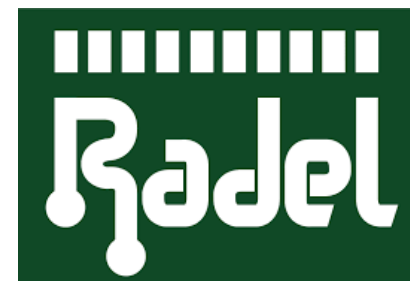
International exhibition of  
components and modules of  
power electronics



International exhibition for  
electronics, components,  
equipment and technologies

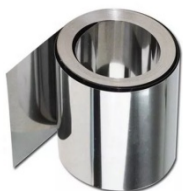


International specialized  
exhibition of radio electronics  
and instrumentation





## PRODUCTS



### RIBBONS

- AMORPHOUS
- NANOCRYSTALLINE

WIDTH from 0.7 to 30 mm

THICKNESS from 16 to 30  $\mu\text{m}$  ( $\pm 2 \mu\text{m}$ )

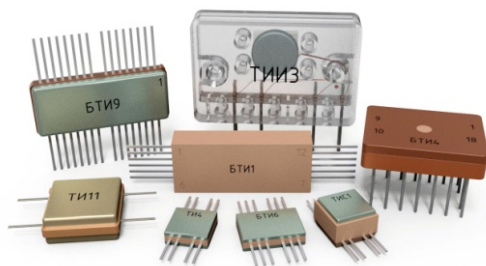


### MAGNETIC CORES

- UNIQUE CLASSIFICATION FOR EVERY APPLICATION
- WIDE RANGE

EXTERNAL DIAMETER from 3 to 200 mm

HEIGHT from 1 to 30 mm



### PULSE TRANSFORMERS & MODULES

- UP TO 4 TRANSFORMERS IN A MODULE
- OPEN OR HERMETICALLY VERSION
- GOCT P 52070-2003 – multiplex information exchange channel
- MIL-STD-1553B



### MICRO CHOCKS

- FOR USE IN RADIO COMMUNICATION AND RADIO TRANSMITTING ELECTRONIC EQUIPMENT
- SMT MOUNTING

### WINDING PRODUCTS

- ACCORDING TO THE CUSTOMER'S REQUEST

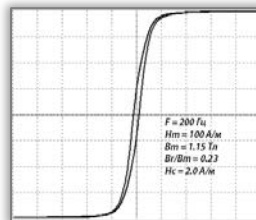
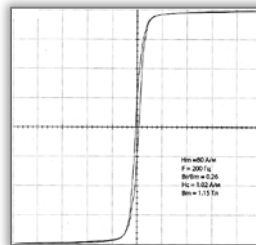
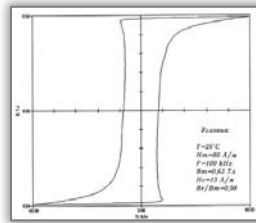


# MAGNETIC CORES

WITH LOW LOSSES



PC "MSTATOR" produces a wide range of wound toroidal cores with an outer diameter of 3 to 200 mm, a height of 0.7 to 30 mm **from amorphous and nanocrystalline AMAG ribbons**, as well as electromagnetic components based on them.



Since the beginning of the eighties, amorphous materials have been widely used in radio and electrical products, which are

**used instead of permalloys, ferrites, electrical steels, magnetodielectrics**

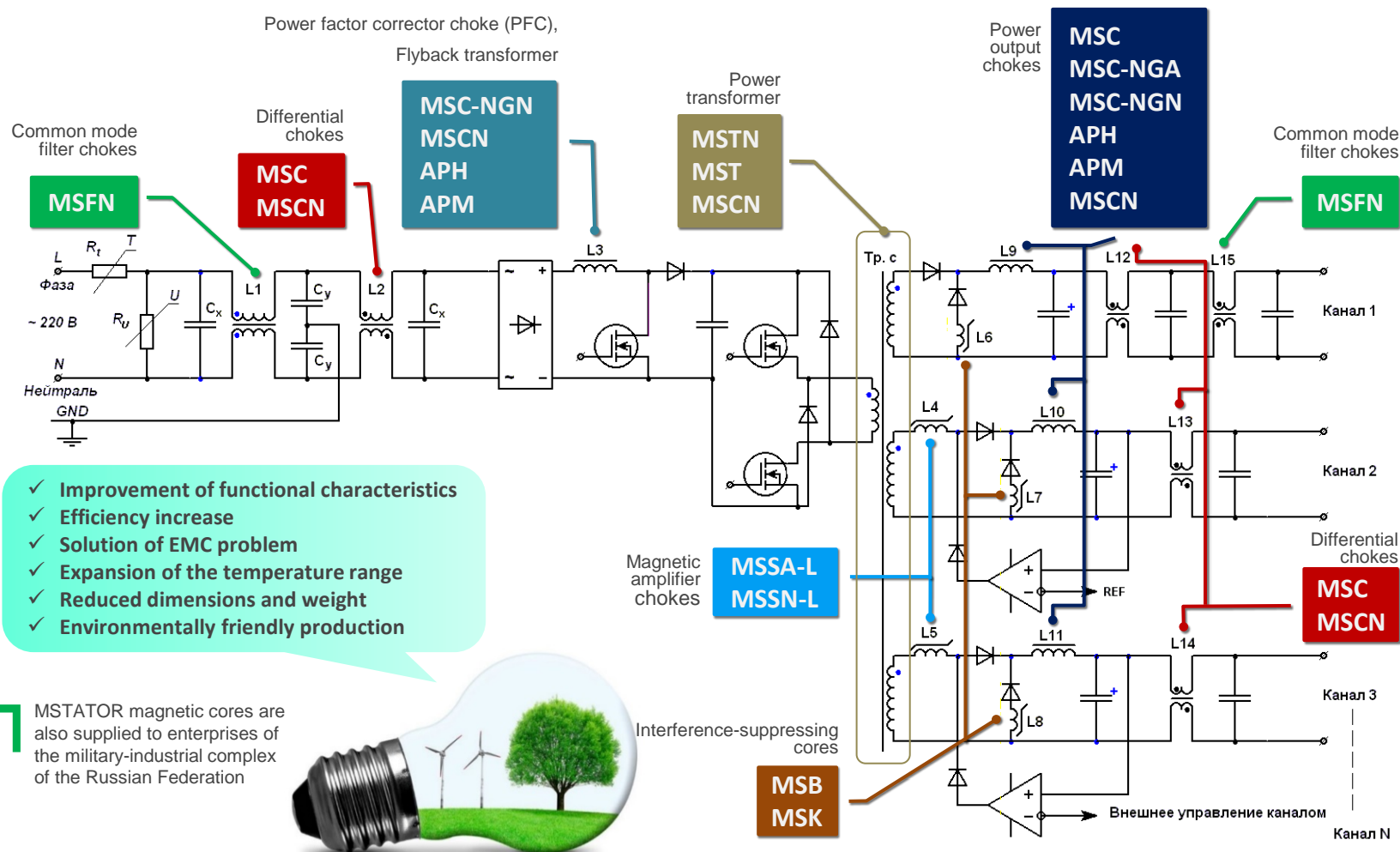
thanks to a combination of unique magnetic, electrical and mechanical properties.



# MAGNETIC CORES

FROM AMORPHOUS AND NANOCRYSTALLINE MATERIALS

## Simplified block diagram of a multi-channel AC / DC switching power supply





# PULSE TRANSFORMERS



# MIL-STD-1553B

**Multiplex Information  
Exchange Channel**

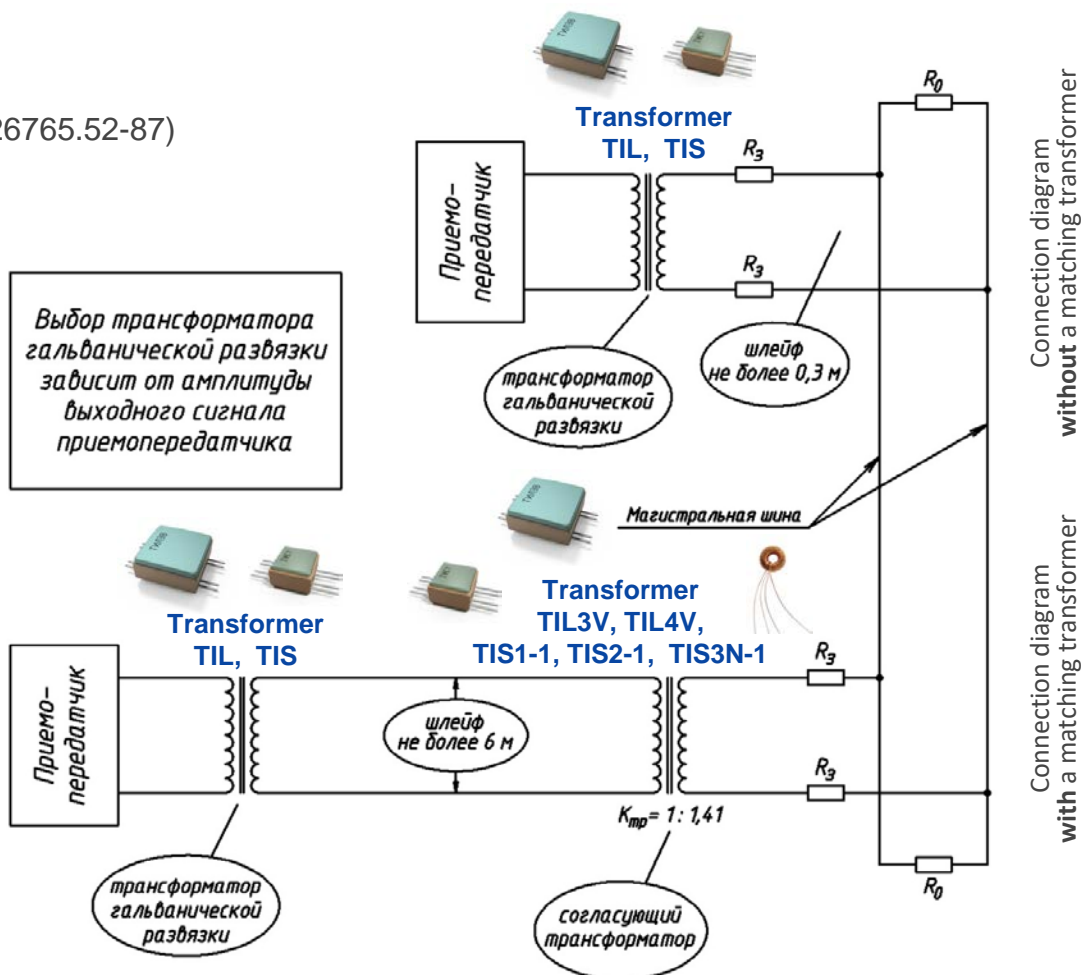
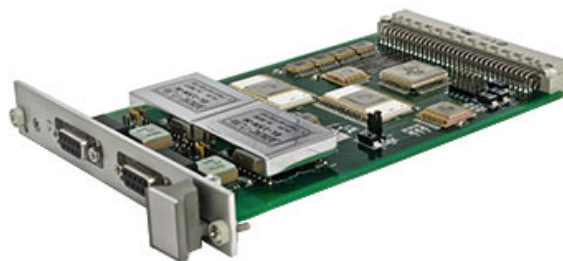
# MKIO

American: **MIL-STD-1553B**

Russian: GOST R 52070-2003 (earlier GOST 26765.52-87)

## For ONBOARD AVIATION EQUIPMENT

Designed for galvanic isolation and coordination of subscribers with a multiplex information exchange channel, for communication and control equipment



## ABOUT PERSPECTIVES



# Sergey Pavlov

General director of PC "MSTATOR"

”

... THE TEAM WILL GROW.

YOUNG SPECIALISTS COME TO US, NEW  
WAYS OF DEVELOPING OUR TECHNOLOGY  
APPEAR AND PREVIOUSLY UNATTAINABLE  
MARKET NICHES OPEN UP BEFORE US.

WE ARE TRYING, WE ARE WORKING.

I THINK THAT WE WILL SUCCEED!

Young professionals are the future of the company



## ELECTROMAGNETIC COMPONENTS

*"Ask questions on the site"*

***[www.mstator.ru](http://www.mstator.ru)***

*Get  
quick  
answers*



Products are based on  
**amorphous &  
nanocrystalline  
materials**

Order according to the specification

Possibility of manufacturing winding  
components for PCB and according to  
customer drawings

A number of products are supplied to  
the defense industry of the Russian Federation



DEVELOPMENT – PRODUCTION – SUPPLY

Public Company "MSTATOR"

174401 Russia, Novgorod region,  
Borovichi city, st. A. Nevsky, 10

**+7 (81664) 4-49-78 – foreign trade department**  
**[amotek-ves@mail.ru](mailto:amotek-ves@mail.ru)**

+7 (81664) 90-226 – marketing department  
[market@mstator.ru](mailto:market@mstator.ru)

+7 (81664) 4-42-84, 44-235 – fax