Poland.
Business Forward

PARP
PFR Group

The Professional Electronics, Microelectronics and Photonics Sector in Poland

Report 2024

European Funds
for Smart Economy

European Funds for Smart Economy
Republic of Poland
Co-funded by the European Union
Ministry of Economic Development and Technology
Republic of Poland

Author:
Joint publication of the Łukasiewicz Research Network - Institute of Microelectronics and Photonics scientific team (pages 7-26)

Editing:
Eryk Rutkowski, Polish Agency for Enterprise Development (pages 27-33)

Cooperation:
Monika Wysocka, Polish Agency for Enterprise Development

Published by the Polish Agency for Enterprise Development
Pańska 81/83, 00-834 Warsaw, Poland
www.parp.gov.pl

ISBN 978-83-7633-596-4
Free copy

The catalog of companies and organizations is by no means a complete list of entities in the Polish professional electronics, microelectronics and photonics sector.
Instead, it features entries of those that volunteered to submit. The content was provided by the entities themselves and was not revised by the authors of the publication.

The publication has been financed from the European Regional Development Fund in the framework of the European Funds for Smart Economy 2021-2027 Program.

Design, DTP + proofreading: Content Zone /www.contentzone.pl

Table of contents

Katarzyna Duber-Stachurska

President of the Polish Agency for Enterprise Development

Dear readers,

Electronics has become such an integral element of our lives that we hardly notice it, considering it cheap and available to everyone.

In fact, until very recently, electronic devices were large, expensive and available to very few. Many of us remember perfectly well the excitement when we used our first PC, mobile phone, or started communicating via the Internet.

All these extraordinary inventions would not be possible without the development of electronics. It became clear how much we depend on it during the COVID-19 pandemics. Electronics allowed us to work, talk and it literally saved our lives. The Internet of Things, Industry 4.0, artificial intelligence, electro mobility, renewable energy - all these domains depend on electronics and photonics.

The chip market itself, worth USD 405.7 billion in 2020, is expected to reach the value over USD 773 billion in 2030. One of electronic companies producing graphics processors and other integrated circuits alone has recently been valued at USD 3 trillion! No wonder that Polish companies want to benefit from this favorable economic trend.

It is true that Poland was a latecomer to the global electronics market. In recent years, however, Polish exports of electronics and photonics have shown impressive growth, both in terms of volume and value. It increased from USD 431.69 million in 2012 to USD 510.90 million in 2022. Polish companies successfully develop electronic solutions for medicine, defense, space industry, and the entertainment sector.

The main export markets for Polish electronics and photonics are Germany, Great Britain, France, and the United States, which reflects Poland's strong integration with the global supply chain as well as high level of innovativeness among Polish companies.

With the aim to help Polish companies gain more international recognition, the Ministry of Economic Development and Technology has launched the 'Internationalization of the SME's - Brand Hub' program financed by the European Union. Our Agency was entrusted with the role of the operator of the Polish Electronics and Photonics Promotion Program within the project.

Our publication presenting the professional electronics, microelectronics ad photonics sector in Poland, along with an extensive catalogue of companies operating in the industry, is one of the deliverables of the above-mentioned program.

The Polish Agency for Enterprise Development, which has been supporting Polish firms for almost 25 years, has witnessed the growth of many of the companies presented in the brochure. We know their technical perfection, adaptability and potential for further expansion. We hope that our publication inspires you to start cooperation with those fantastic enterprises.

Poland in figures (2023)

Population

37.6 million

Foreign trade turnover

Import EUR

340.5 bn EUR

(7.0 % decrease, yoy)

Export EUR

351.0 bn EUR

(1.4 % increase, yoy)

Unemployment rate

2.8%

(as of November 2023)

The 3rd lowest in the EU

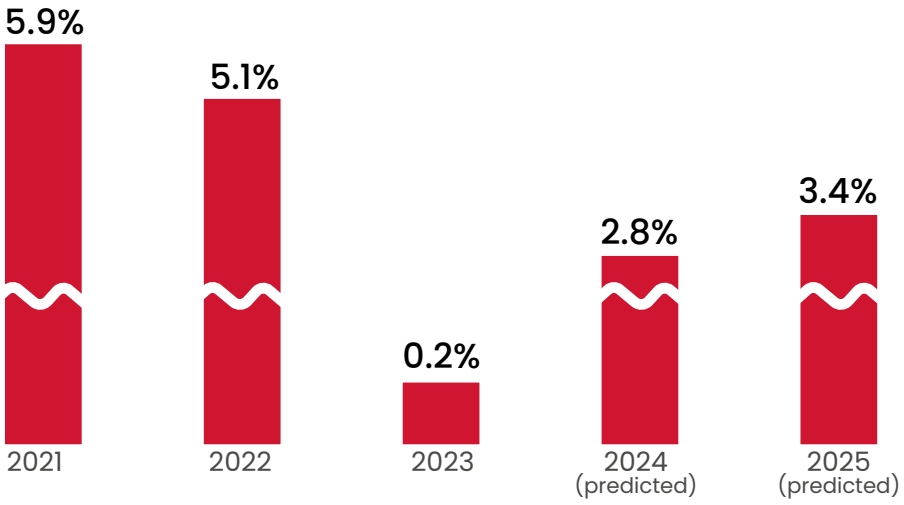
GDP

Total – USD

808.6 bn

per capita USD

20 681



World Economy Rank by GDP 21st (2022)

The 6th largest economy in the EU

Sources: Statistics Poland, World Bank, Eurostat

Professional electronics, microelectronics and photonics as a prospective sector of the Polish economy

Author: Joint publication of the Łukasiewicz Research Network - Institute of Microelectronics and Photonics scientific team

Modern technologies as an opportunity for the development of the Polish economy

The challenge for the 21st-century economy is to achieve high production efficiency, quality, and effectiveness by combining low manufacturing costs and a flexible, customer-tailored range of products and services.

It is possible through the implementation of intelligent manufacturing solutions and widespread digitalization, automation, and decentralization of production, which in turn will bring a series of challenges related to processing and transmitting vast amounts of data, monitoring process states, fast and non-destructive product testing methods, and powering autonomous systems, machines, or vehicles. Another challenge is to ensure comprehensive production safety, supply chain security, and to prevent threats associated with advancing globalization.

The new industrial revolution will encompass not only high-tech industries, the automotive industry, or ICT but also other sectors of the economy such as agriculture, forestry, mining, chemical and pharmaceutical industries. This will also involve a shift from fossil fuels to "green" or renewable energy sources including photovoltaics, hydrogen energy, and transitioning entire branches of industry to new sources of electrical energy. In addition to new digital technologies, the implementation of the presented concept requires the application of intelligent and energy-efficient electronic and photonic systems and autonomously operating circuits.

The Internet of Things (IoT) revolution and the fourth industrial revolution (Industry 4.0) are gradually becoming a reality. The obvious result of this revolution will be countless innovative products combining advanced integrated circuit solutions with sensors and MEMS-type elements that together form a smart sensor. Ensuring the participation of Polish entrepreneurs and engineers in the full value chain of these revolutionary transformations requires spread access paths to semiconductor components designed and manufactured in Poland. The observation of global changes and technological progress indicates that microelectronics and photonics will be present in every area of life, and so will be objects networked through IoT and the 5G networks and next generations of mobile technologies already emerging today will

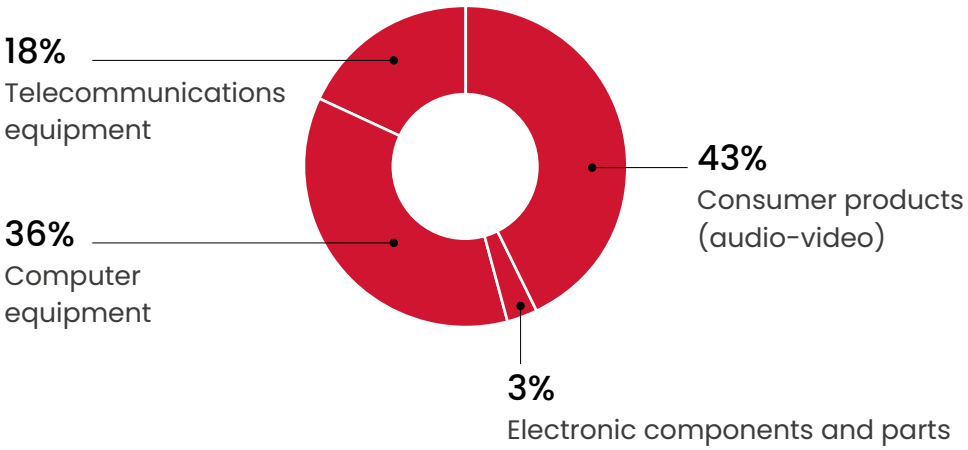
require new and reliable security technologies.
Professional electronics, microelectronics and photonics encompass advanced technologies for applications in environments requiring high reliability, precision, performance, and broad certification. The term also includes devices used in civilian and military critical infrastructure and combat equipment. The possibility of developing or manufacturing devices belonging to the field of professional electronics and photonics are inextricably linked to the availability of microelectronic and photonic technologies in the broadest sense. And this is not just about the availability of components employing these technologies - for these can be purchased on the open market - but strategically about the availability of domestic key technologies. The integration of key technologies within the country is essential for Poland to become a significant technological player. The main challenge is the production potential of major electronic components in Poland. Recent disruptions in the global semiconductor market have clearly demonstrated the need for a change and decisive action. Initiatives such as the ChipsAct programs in Europe and the US highlight a shared commitment to innovation and self-reliance. This is a moment of transformation in which market challenges are perceived as a catalyst for progress, resulting in technological development.
Pure assembly companies make a separate sector of the semiconductor industry - the simplest yet important. They cut processed substrate wafers into chips, assemble them into housings and test them. Now, advanced device integration of this kind will be successfully carried out near Wroclaw as a part of Intel's investments.

Professional electronics and microelectronics industry in Poland

According to the Polish Classification of Activities, the electronics sector is broadly defined as "Manufacture of computers, electronicand optical equipment." The term includes:

- telecommunications equipment,
- computer equipment,
- electronic components and parts,
- consumer products (audio-video),
- control and measurement equipment.

Exports 2021



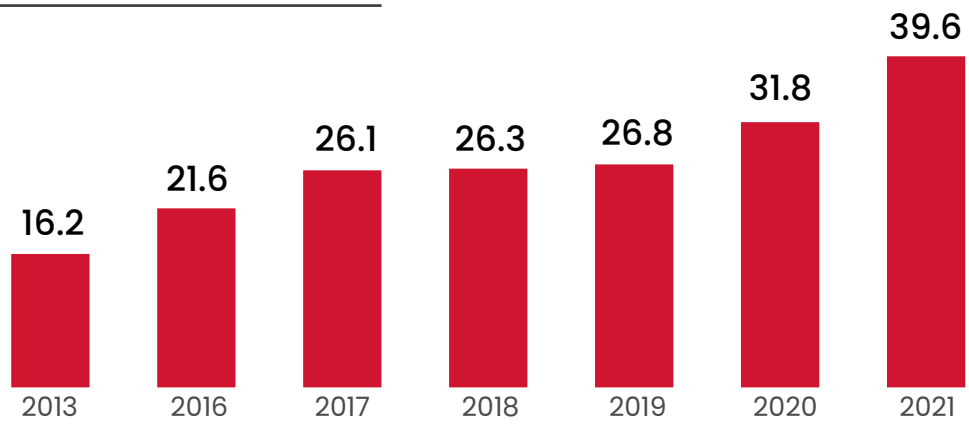
Source: Central Statistical Office of Poland (GUS) - Information society in Poland in 2022

In 2021, consumer products (audio-video) (43%) and computer equipment (36%) accounted for the largest share of exports, followed by telecommunications equipment (18%), with the smallest share being electronic components and parts (3%), whose production in Poland is minimal.

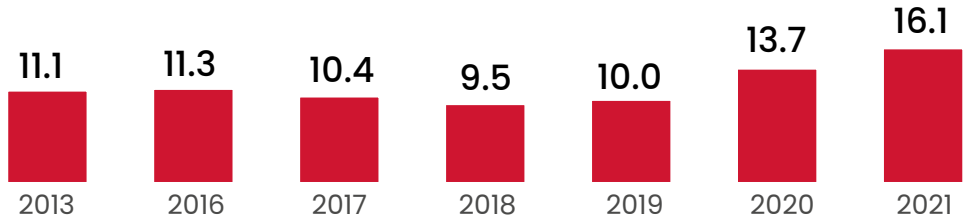
Export of the electronic sector (billion PLN)

Electronic components and parts

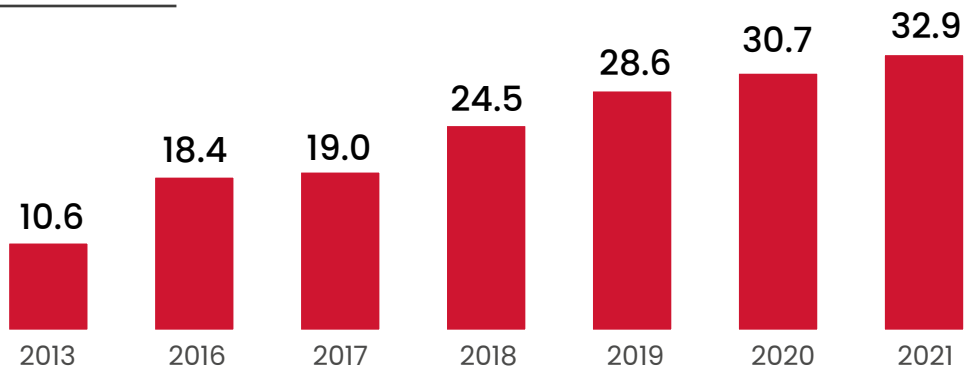
Consumer products (audio-video)



Telecommunications equipment



Computer equipment



Source: Central Statistical Office of Poland (GUS) - Information society in Poland in 2014-2022

Although due to product digitalization, the group of end products treated as electronic goods is constantly expanding, more and more electronic production is taking place outside the electronics sector classified as such (activity code PKD 26). Some of them are registered under codes from division 27 (manufacture of electrical equipment), division 29 (manufacture of motor vehicles), medical devices (PKD 32.5), etc.

New interdisciplinary areas of technical sciences are emerging, such as mechatronics, which combines the areas of mechanics, electronics, automation, and computer science.

According to the Central Statistical Office, the sold production amounted to PLN 51.73 billion (3.57% of all industrial production in Poland, export value amounting to PLN 91.63 million) in 2021.

After the political transformations, Poland became an area of interest and placement of large foreign investments in the electronics sector, which has recently become one of the fastest growing industries in Poland, presenting a high technical and technological level. The overwhelming majority of enterprises, especially large ones, are entities with foreign capital.

Poland boasts a robust electronics manufacturing sector, which, coupled with the right support strategies, can attract foreign semiconductor companies looking to expand into new markets. By aligning with initiatives such as the European Chip Act, Poland can position itself as an attractive destination for investment in semiconductor technology, fostering innovation and economic growth in the process.

EMS Industry in Poland (electronic manufacturing services)

The EMS industry plays a key role in providing end-to-end manufacturing solutions for companies in sectors ranging from telecommunications through automotive to medical.

The EMS industry refers to companies that specialize in outsourced electronics manufacturing services. They offer a wide range of services, from design through assembly to testing and delivery of finished products. EMS companies provide end-to-end manufacturing solutions, allowing their customers to focus on innovation, marketing and sales, without having to invest in their own manufacturing facilities. EMS companies are flexible and able to customize their services to meet individual customer needs, regardless of order size or product specifics. The EMS industry continually invests in the latest manufacturing technologies, enabling even the most advanced electronic projects.

In 2022, the EMS sector in Poland generated the revenue of approximately €4.5 billion, which is a 10% growth compared to the previous year. This expansion is supported by over 300 EMS companies operating in Poland, employing more than 50,000 people.

Major players in the Polish EMS market include Fideltronik, Assel, and Flex, which cater to a diverse range of industries and clients worldwide. These statistics highlight the critical role and robust growth of the EMS industry in Poland, showcasing its ability to deliver comprehensive manufacturing solutions across various high-tech sectors.

Applications and Product Examples

According to the Polish Classification of Activities, the electronics sector is broadly defined as "Manufacture of computers, electronic and optical equipment." The term includes:

Telecommunications: Manufacturing of modems, routers, network devices.
In 2022, the telecommunications segment accounted for 30% of the EMS market in Poland, with a total production value of around €1.35 billion.

Automotive: Electronic circuits for cars, engine controllers, multimedia systems.
The automotive segment saw a significant growth, contributing 25% to the EMS market, with a production value of approximately €1.125 billion.

Medical: Diagnostic equipment, medical devices, health monitoring.
The medical electronics sector accounted for 20% of the EMS market, with a production value of €900 million.

Source: Central Statistical Office of Poland (GUS), 2023, Polish Investment and Trade Agency (PAIH), 2023 Market Analysis Reports - EMS Industry in Poland, 2022

OEM Industry in Poland (original equipment manufacturer)

The OEM sector plays a key role in providing innovative electronic solutions, supporting the development of many sectors of the economy.

OEM is an electronics sector that specializes in designing, manufacturing, and supplying finished electronic components to other companies. The flexibility, innovation and high quality of products offered allow the OEM industry to remain competitive in the global market. The OEM sector for electronic components and semiconductors in Poland plays a significant role in the national and European markets. In the context of electronics and semiconductors, the industry encompasses a wide range of activities, from manufacturing integrated circuits and electronic components to advanced electronic systems.

Poland hosts numerous R&D centers working on innovative solutions in electronics and semiconductors. Companies like Intel, Samsung, and Nokia operate research centers in Poland. The country also boasts a well-developed manufacturing infrastructure, producing a variety of electronic components, from simple passive elements to advanced integrated circuits. Global corporations such as Intel, Samsung, LG, and Philips have established their branches in Poland, making significant investments in production and technology development. Alongside these giants, there are many local companies specializing in the production of electronic components, like Amica, Wilk Elektronik and APS Energia.

Poland is an important part of global supply chains, especially for the European market. Components manufactured in Poland are supplied to producers of consumer electronics, automobiles, and industrial equipment worldwide.
The sector faces challenges such as global market competition, the need for continuous investment in modern technologies, and infrastructure development. However, growth prospects are positive, driven by the increasing demand for advanced technologies and electronic components across various economy sectors.

An important aspect of Poland's competitiveness in the field is its well-educated engineering workforce, stemming from a strong tradition of technical education and industry collaboration with institutions of higher education. Technical universities and institutes, like the Warsaw University

of Technology, AGH University of Science and Technology in Krakow, and Wroclaw University of Technology, produce specialists for the electronics and semiconductor industry.
Examples of such ventures include Intel's significant investments in Polish research and production centers, LG's production of displays and other electronic components, and Nokia's development of telecommunications technologies, including 5G.
In summary, the OEM electronic components and semiconductor sector in Poland is a dynamically developing industry with substantial growth potential, supported by a strong educational foundation, foreign investments, and favorable business conditions.
The year 2022 was very good for Polish OEMs in terms of revenue, with some companies growing at an astronomical rate. In 2021, the turnover of most (76) companies increased. In the last year, the proportion of companies experiencing growth and decline was almost identical as in 2021: the revenues of 75 companies increased, while those of 25 decreased.

The total revenue of the TOP100 Polish OEMs in 2022 was PLN 12.243 billion– an 18.0% increase compared to 2021.

It is worth noting that in previous years, the growth in total revenue value was significantly lower, ranging from 0.8% to 13.0%. However, one must not forget about two extremely important factors: inflation and the rise in component prices, which often significantly exceeded the inflation rate. The table below presents the total turnover of the sector along with the nominal and real growth, i.e., adjusted for the inflation rate.

Export of the electronic sector (billion PLN)

	2018	2019	2020	2021	2022
Total turnover (thousand PLN)	8 608 349	9 116 211	9 185 950	10 378 835	12 242 920
Average annual inflation rate		2.3%	3.4%	5.1%	14.4%

Source: tek.info.pl - "2023 Report of a Polish OEM/ODM Company"

Electronic Components Industry in Poland

Electronic components are the basic building blocks of all kinds of electronic devices. Their development is crucial for further technological advances in various sectors of the economy and essential to the innovation and strategic insusceptibility of the national economy.

The availability of the full development of integrated electronic (from design to fabrication) conditions and qualifies the development potential of most modern devices, from simple radio receivers to sophisticated computers or smartphones.
Components like resistors, capacitors, inductors, resonators, transformers, transistors as well as high tech integrated devices incorporating microprocessors, memories, specialized analog readouts, drivers, communication modules are essential to the innovation and strategic insusceptibility of the national economy.
The challenges that the industry is facing are balanced by prospects for growth and innovation, making it an attractive area for investments and development.

Poland produced over 300 million electronic components in 2022. The export value reached approximately EUR 1.8 billion, marking a 15% increase compared to the previous year.

The main markets for these components include

 Germany

 United States

 China

with growing demand particularly in the automotive and consumer electronics sectors.

These figures illustrate the robust and expanding nature of the OEM sector in Poland, highlighting its importance to both the national and international markets. With ongoing investments and a strong emphasis on innovation, the OEM and electronic components industries in Poland are poised for continued growth and success.

Sources:
Central Statistical Office of Poland (GUS) (https://stat.gov.pl), 2023
Polish Investment and Trade Agency (PAIH) (https://www.paih.gov.pl)
Association of Electronic Components Manufacturers (ZVEI) (https://www.zvei.org)
European Semiconductor Industry Association (ESIA) (https://www.eusemiconductors.eu)

Photonics Industry in Poland

Polish photonics covers a broad spectrum of applications, from telecommunications and medical devices to precision instruments and advanced manufacturing technologies.

The industry benefits from substantial investment in research and development, supported by both governmental and private funding. This investment ensures that Polish photonics companies remain at the forefront of technological advancements, contributing significantly to global supply chains. The growth of the sector is also reflected in the increasing number of startups and small to medium-sized enterprises (SMEs) that are emerging within the photonics ecosystem. These new entrants bring fresh perspectives and innovative solutions, further driving the industry's expansion and diversification.

In the photonics industry, one cannot forget about VIGO Photonics pursuing to cover the full technology of infrared detector processing. The company has recently received substantial support from the Polish government and the European Commission within the IPCEI mechanism, which will finance a technological line for manufacturing integrated circuits for integrated photonics. VIGO Photonics closely collaborates on prototyping with Polish scientific institutions, including Łukasiewicz - Institute of Microelectronics and Photonics, Warsaw University of Technology, and Lodz University of Technology. VIGO is an excellent example of success based on knowledge and technology in the area of Polish semiconductor technology, which is of great importance to the Polish economy and defense. It is an instance of a company that over the years has consistently been strengthening its position in the field of III-V epitaxial structures used in advanced professional electronics utilizing semiconductor lasers, photodetectors, transistors, photovoltaic modules and in many other applications.

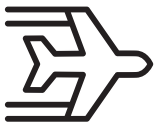
Overall, the photonics industry in Poland is characterized by strong export performance, robust research and development activities, and a dynamic industrial base. This positions Poland as the key player in the global photonics market, with a promising future ahead.

Source: https://stat.gov.pl/obszary-tematyczne/nauka-i-technika-spoleczenstwo-informacyjne/spoleczenstwo-informacyjne/spoleczenstwo-informacyjne-w-polsce-w-2023-roku,1,17.html, str.27

Applications of photonics in selected sectors of the economy

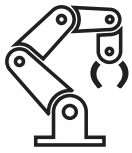
Photonics continues to drive innovation and transformation across diverse sectors of the economy, empowering industries to achieve new levels of performance, efficiency, and sustainability.

Medicine - Photonics plays a very important part in modern medicine, revolutionizing diagnostics, treatments, and surgical procedures. Laser technologies enable precise and minimally invasive surgeries, reducing patient discomfort and recovery times. Optical imaging techniques provide detailed insights into biological tissues and organs, facilitating early disease detection and personalized medicine. In all these applications semiconductor chips and optical elements are utilized.



Aviation - In aviation, photonics contributes significantly to safety, efficiency, and sustainability. Light detection and ranging (LiDAR) systems utilize semiconductor lasers (for example VCSELs) to precisely measure distances, aiding in terrain mapping and obstacle detection for aircraft navigation. Fiber optic sensors monitor structural health in real-time, ensuring safety and integrity of aircraft components.

Defense - Now, photonics is an integral part of defense systems, offering advanced sensing, imaging, and communication capabilities. These systems utilize, for example, quantum cascade lasers as a source of radiation. Infrared imaging systems (using semiconductor detectors) enable night vision, enhancing situational awareness for military operations. Semiconductor lasers are employed for target designation, missile defense, and countermeasures against threats such as drones and missiles.



Robotics - Photonics enhances robotics with precision sensing, imaging, and communication technologies. In all these systems semiconductor lasers and detectors serve as crucial elements. Light-based sensors, such as LiDAR and structured light cameras, enable robots to perceive and navigate their environment accurately. Optical fibers facilitate high-speed data transmission in robotic networks, improving coordination and efficiency in industrial automation and autonomous systems.

Automotive - In the automotive industry, photonics enhances safety, performance, and driver experience. LiDAR systems (with semiconductor lasers) enable autonomous vehicles to perceive their surroundings and navigate complex traffic environments. Light-based sensors monitor driver attention and fatigue, contributing to accident prevention and passenger safety. Semiconductor diodes are used as lights.

Space - Photonics play a critical role in space exploration and satellite communication systems. Optical communication systems involving semiconductor elements facilitate high-speed data transmission between the Earth and satellites, supporting remote sensing, navigation, and scientific missions in space.

Cosmetology - Photonics enables advanced skincare and cosmetic treatments, guaranteeing precision and efficacy. Laser-based technologies, such as intense pulsed light (IPL) and fractional laser resurfacing, address various dermatological concerns, including hair removal, skin rejuvenation, and scar reduction. Light-based imaging systems assess skin conditions and guide personalized treatment plans for optimal results.

Industry – photonics technologies, especially high-power lasers can be used for various industrial applications, such as for micromachining, cutting metals and fabrics, engraving, or marking codes for industrial traceability, welding metals as well as surface processing of various materials including glass, solar cells, wafers, semiconductors, ceramics, metals, polymers, and medical supplies. Industrial lasers can be also used for high precision dimension measurements.

Potential of the Polish professional electronics, microelectronics and photonics sector

As of today, the professional electronics sector, based on available market solutions, is doing very well in Poland. This is mainly due to high qualifications and experience of designers of both systems and software.

Next generations of products offered under many brands around the world are often developed in Poland. This is particularly true of both domestic (such as Amica) and international (such as Samsung) manufacturers of consumer electronics. In addition, solutions for complex systems with battlefield applications often comparable to those offered by global competitors are developed in the Polish Armaments Group (PGZ) companies. Poland has invested heavily in advanced technology centers oriented toward the implementation of advanced research, but not set up for production. Not infrequently, they acquire lucrative research projects like CEZAMAT, which became a part of the pilot line under the European Chips Act. The FAMES - FD-SOI Pilot Line for Applications with embedded non-volatile Memories, RF, 3D integration and PMIC to ensure European Sovereignty project aims to launch a pilot line and develop and advance the 10 nm and 7 nm FD-SOI technology. The project will result in a completely European technology. It will be a strategic line for the development of the semiconductor technology in Europe.

Considering the current state of microelectronics in Poland, nearly 40 years after the closure of the microprocessor factory, it is important to explore the need for an integrated circuit manufacturer and the potential benefits of such an endeavor. With the recent Intel investment near Wroclaw, there are clear opportunities for advancement in our microelectronics sector and broader economy. Intel investment could significantly enhance local expertise, drive innovation, and boost economic growth. Poland boasts high-class experts who are capable of meeting the demands of microelectronics technologies. Notably, Prof. Tomasz Skotnicki, a Polish expert, has played a key role in developing the foundational FD-SOI technologies that have become the specialty of companies like ST-Microelectronics, Global Foundries, and SAMSUNG. This expertise presents an opportunity to leverage local talent for advancing Poland's microelectronics capabilities.

The continuous development of technology worldwide highlights the importance and utility of producing integrated circuits, even in less advanced forms. These technologies can offer significant benefits, ensuring Poland's participation in the global technology landscape and meeting domestic demands efficiently.
In summary, Poland has the potential to become a key player in the microelectronics industry by leveraging local expertise, attracting strategic investments, and focusing on economically viable technologies. This positive outlook underscores the importance of a national strategy to guide and support the development of this critical industry.

Creotech Instruments, a domestic manufacturer of satellite systems and components, is also active in the field of quantum electronic and advanced electronics for controlling quantum computer systems and other applications. The company is also working on the development of unmanned aerial systems by providing hardware and software for managing drone operations, among other things. The company operates its own electronics manufacturing facilities and small integration units for small satellites. Creotech Instruments S.A. completed projects for the space sector, including for the European Space Agency.

Gallium nitride (GaN) technology is widely used in Poland in all sorts of devices, like UV, violet, blue, and green LED lights as well as laser diodes and photodetectors. It is also perfect for power devices like diodes and transistors that can handle high voltages and frequencies and have low resistance. GaN LED lights play an extremely important part in energy saving and have replaced traditional light bulbs. The creators of this technology received the Nobel Prize in Physics in 2014 for inventing a super-efficient blue LED. But GaN is not just for lights—it is also used in radar systems or base stations for modern cell networks. Furthermore, GaN-based power transistors have made smartphones and laptops considerably smaller by miniaturizing their power supplies. It is all thanks to research that started back in the 80s by Prof. Sylwester Porowski and his team. They laid the groundwork for new GaN technologies that have become a specialty of the Polish Academy of Sciences and its spin-off company called TopGaN Ltd.

There is still a vast research and implementation potential in Poland related not only to photonics but also to power electronics. The TopGaN company has in its offer advanced visible and UV light emitters, operating in the in the spectral range 395-461 nm including tunable wavelength laser diodes semiconductor optical amplifiers, superluminescent diodes, etc. Today, the Institute of High Pressures of the Polish Academy of Sciences is the only European

manufacturer of GaN substrates, conducting small-series production and sale of 2" conductive and semi-insulating wafers, planning further expansion, and increasing the diameter of the produced substrates. At the same time, work on the technology of various GaN-based devices, mainly power transistors, was carried out at the Institute of Electronic Technology and the Institute of Electronic Materials Technology, merged in 2019 into the Łukasiewicz Research Network - Institute of Microelectronics and Photonics. The Institute of High Pressures of the Polish Academy of Sciences and the Łukasiewicz Research Network have recently become a part of the pilot line under the European Chips Act on Wide Band Gap Materials, being jointly responsible for developing the crystal growth technology, epitaxial structures, and the production technology for vertical power devices such as diodes or MOSFET transistors. A multinational WBM pilot line consortium including Poland, Finland, Sweden, Austria, France, and Germany, led by Italy partners will develop new technologies based on materials like silicon carbide (SiC), gallium and aluminum nitride (GaN, AlN) as well as gallium oxide (Ga2O3), which are the key components on the constantly growing automotive, industrial, renewable energy, consumer electronics and defense markets.

The above analysis and examples of business success as well as a well-thought-out strategy based on proprietary technological infrastructure to build market independence and product development, clearly demonstrate the significant dynamics of the domestic professional electronics market. These companies are the examples of success stories of the Polish professional electronics, microelectronics and photonics sector, in which there are still many other domestic firms with an attractive innovative range of products and services, contributing to building its increasingly strong position in the international market.

Export potential of the sector - competitive advantages, opportunities for cooperation

Technologies based on gallium nitride may become one of the key export elements of the broadly understood Polish microelectronics industry.

Decades of research and development, unique knowledge in the field of physics, materials engineering, crystal growth and the design and production of GaN-based semiconductor devices create a significant advantage for further development and implementation of new commercial solutions in both photonics and power electronics.

This includes not only niche applications (e.g., solutions for quantum sensing, optical atomic clocks, precision metrology, and quantum computing) but also global cooperation in the emerging market of vertical GaN power devices, the success of which depends mainly on the development and implementation of high-quality, large diameter and cheap GaN substrates, semiconductor structure growth technology and device manufacturing - which are becoming the specialty of the Polish microelectronics sector.

Semiconductor detectors, semiconductor lasers and photonics integrated circuits are becoming the key export goods of the broadly understood Polish photonics industry.

Another significant export potential lies in fiber optic companies located in Poland, which closely collaborating with domestic research institutions. Moreover, innovative fiber lasers such as femtosecond lasers, with broad application in biophotonics, medicine, science or industry have also great export potential, offering cost-effective, solid and stable solutions, resistant to industrial conditions, ensuring high reliability and long service life.

These data indicate a strong export potential for the Polish microelectronics and photonics sectors, supported by advanced research and development infrastructure and innovative technologies. Poland's microelectronics and photonics industries continue to grow dynamically, contributing to the increasing export of high-tech products to international markets.

Development prospects, trends and innovations in the professional electronics, microelectronics and photonics sector

The professional electronics, microelectronics and photonics sectors are evolving into a dynamic area of innovation that is shaping the technological future.

The development of these areas is the key to advances in areas such as communications, industry, medicine, and energy. Below is an outlook on the development of these sectors, including trends and innovations for the future. The most important trends are:

1. Miniaturization and Integration of Technology - integrated circuits with increasing integration density enable the production of more efficient and energy-saving electronic and/or photonic devices.

2. Development of the Internet of Things (IoT) opens new opportunities for the professional electronics microelectronics and photonics sectors. Connecting devices via the Internet requires advanced sensors, communication modules, and powerful data processing systems.

3. Artificial Intelligence and Machine Learning will allow for the development of intelligent systems, automation of processes and improvement of product functionality, which contributes to increased productivity and competitiveness. Electronic and/or photonics elements are used to build hardware for this application.

4. Quantum computers, as well as related technologies are currently in the early stages of development, nevertheless, all serious global players in the electronics and photonics market are increasing their investments in this area every year. This is due to the conviction that the leaders of quantum technology will gain access to unprecedented computing capabilities, which may prove groundbreaking in many areas of life and the economy - it will be possible to solve problems that have not even been attempted so far due to technical limitations of supercomputers.

5. Efficient Power Electronics:
One of the challenges for future development will also be to ensure broadly understood security of production, supply chain and

to prevent threats related to ongoing globalization. New digital technologies require the use of intelligent and energy-saving electronic systems and circuits. Therefore, it will be necessary to change or adapt current solutions to more demanding environmental conditions, such as operation at elevated temperatures and/or corrosive conditions, as well as higher exposure to electromagnetic interference. The above challenges may addressed by modern and innovative electronic devices based on wide and ultrawide-bandgap semiconductors such as silicon carbide, gallium nitride or gallium oxide.

6. Innovations in photonics: lasers are used in many industrial applications such as telecom transmission, marking and engraving, and biosensing, usually as a standalone solution. However, new trends are arising, combining lasers with optics and sensors, creating integrated solutions with a much wider field of application. Traditional laser technologies such as solid-state or carbon dioxide are responsible today for 50% of market share, but in recent years, the number of patents granted for other laser technologies has significantly increased, mainly for fiber lasers, diode lasers and quantum cascade lasers, which indicates that their adoption will gradually increase in new applications.

25 years of innovation

The success story of Digital Core Design

Celebrating a quarter-century of innovation, Digital Core Design (DCD) has been at the forefront of designing customized processors with optimized architectures for more than 20 years, catering to the unique needs of its clients.

Jacek Hanke, the Founder and President of DCD, proudly reflects on the company's journey, highlighting its integral role in over 1 billion electronic devices globally. These devices span diverse sectors, including Industry 4.0, IoT, medical devices, consumer electronics, military applications, and the automotive industry.

'DCD ingenuity is exemplified by the widespread adoption of our IP cores, with thousands of licenses sold to over 1000 clients worldwide, including renowned brands such as ABB, Sony, Honeywell, Toyota, and Siemens. Notably, 99 percent of our customers hail from international markets, with our products exported to major electronic design hubs like Japan, the USA, China, Taiwan, Germany, India, and Brazil', Jacek Hanke explains.

The company's inception traces back to addressing the specific needs of a German client seeking a faster and more efficient processor. Since then, DCD has continued to provide tailored solutions, earning repeat business and loyalty from its growing clientele.

With a diverse portfolio featuring over a hundred different architectures, DCD stands out with innovations like DQ80251, the world's fastest processor in the 8051 family, boasting over 75 times the speed of the Intel standard. Additionally, the company introduced the first Polish commercial 32-bit D32PRO processor, competing effectively with industry giants like ARM MO-M3. DCD's versatility extends to addressing the challenge of replacing obsolete electronic circuits. The company excels in reproducing 1:1 systems, often enhancing functionality by incorporating additional interfaces and/or features.

Its recent offerings include the CryptOne cryptographic system, leveraging the computing power of the D32PRO processor and the expertise of Polish cryptologists. Adhering to NIST recommendations, CryptOne ensures unparalleled security and finds applications in various electronic devices,

including e-evidence, electronic documents, servers, payment terminals, and transmission networks.

DCD's commitment to open standards is evident through its involvement with RISC-V International, contributing to the development of Polish RISC-V 32-bit and 64-bit CPUs. These architectures, open and royalty-free, empower companies to innovate their electronic designs.

The CAN ALL IP Core, another recent innovation from DCD, revolutionizes the automotive industry by offering a comprehensive solution with CAN FD, CAN Full, CAN XL, or LIN technologies. Project-specific tailoring, along with optional Functional Safety functions (ISO26262), positions this core as a transformative force in modern automotive design.

From Ireland to Vanuatu

The success story of GOODRAM

‘Our products can be found in more than 40 countries worldwide. For customers, we are synonymous with European quality, supplying high-end reliable products’, says Wiesław Wilk, the founder and CEO of Wilk Elektronik SA, the only European manufacturer of computer memory modules. The company owns the GOODRAM and IRDM brands, whose products, such as DRAM memory modules, SSD drives, memory cards, and USBs, are available and very well known in the gaming, industrial and advertising markets.

Wiesław Wilk took his first steps in the world of technology as a student, speeding up and servicing Atari and Commodore computers. Then, in 1991, he founded a company distributing memory modules for computers.
5 years sufficed for Wilk Elektronik to become the largest memory distributor in Poland, gaining 60% of the market.

‘When in mid-‘90s Wilk Elektronik had a majority market share in the memory module distribution, it became clear to me that we need to create our own product to grow beyond Poland’, explains the CEO.

‘2003 was a landmark year – a factory with state-of-the-art automated production processes was built and the GOODRAM brand was launched. As a manufacturer, we could fully control the production and testing process to ensure highest quality to our customers’.

In Poland, GOODRAM is unquestionably the No 1 player outperforming global brands from Asia and the USA. The company had a market share of over 30% in DRAM memory modules, and over 20% in the SSD category, with 50% of the total production sold abroad. Currently, GOODRAM is present in 47 countries across Europe, Africa, and Asia.

Polish memory products are good not only for home or corporate applications. The GOODRAM Industrial brand offers sophisticated solutions for the industry. ‘Highly specialized products are used in home automation, POS, industrial computing and automation, public transport, the automotive sector, etc. Industrial products are built from special components suitable for work in extreme conditions and are subject to a special technological regime during production and are tested in special climate chambers’, Wiesław Wilk explains.

Moreover, in 2017 Wilk Elektronik successfully launched IRDM – a new brand with high-performance products designed for professionals and gamers in mind. To facilitate the next phase of growth, last year Wilk Elektronik SA completed its largest investment to date, the expansion of the Łaziska Górne facility in Poland. 'This has doubled the production area, while the warehouse can now hold six times more products as before. In the world of IoT and AI memory will become the essential facilitator of the next industrial revolution, and we at Wilk Elektronik are ready to support our customers in that next phase of digital transformation with the highest quality products' , the CEO of Wilk Elektronik proudly admits.

The world leaders in photonics

The success story of VIGO Photonics

'Photonics is the future', says Emil Batorowicz, marketing director at Vigo Photonics. The development of a unique technology and continuous R&D investment paved this Polish company the way to become a world leader in the production of uncooled infrared detectors. Its products are used by NASA, renowned research centers, and corporate clients from around the world. Currently, the company is working on downsizing the mid-infrared detector integrated circuits to the level of a chip, which will open completely new market opportunities for all industry sectors.

More than 90 percent of VIGO Photonics production is exported, and their infrared detectors are sold on all continents, including such markets as the United States, China, Japan, and the European Union. During its mission on Mars, the NASA Curiosity rover equipped with VIGO's sensors detected methane, and most renowned research centers around the world use its products either, including Princeton University, the Fraunhofer Institute, the European Space Agency, and MIT.

'Our detectors are the very heart of many devices and find applications in numerous industries. They are used for measuring gas concentration, laser calibration, mid- and far-infrared spectroscopy, or analyzing air and water quality. Security services use them to detect trace amounts of drugs and explosives. In medicine, they can be used to non-invasively test the composition of glucose levels in the blood and analyze disease markers in human breath. In transport, at the same time, our measuring devices are used to control the temperature of axles, wheels and brake discs in trains traveling at a speed of 350 km/h. They can also be used in exhaust gas composition or fuel quality analyzers', explains the company's marketing director.

As a response to the constantly growing global demand for photonic technologies, the company invests in innovation and focuses on business development. Between 2014 and 2021, VIGO participated in as many as five scientific and research projects within the European Commission's Horizon 2020 grant scheme. It developed, among the others, a technology for the production of detectors based on the mercury-free InAsSb material and devices, contributing to the safety and the health of people around the world.

At the same time, the company employed another 40 people and completed a new production facility, expanding its production capacity 10-fold – to the level of approximately 100,000 pieces a year! VIGO Photonics has a complete independent production line allowing for manufacturing complete devices. And, last but not least, all the company's solutions have been developed in-house with unique and very own proprietary know-how.

'Products in our portfolio are literally developed from scratch. Our engineers arrange individual atoms to controllably create a crystal (epitaxial layer) with the appropriate doping of elements. At further stages, the entire epi-wafers go through complicated processes (etching, photolithography, evaporation of the titanium/gold layer, etc.) to finally create semiconductor structures (chips) which are the very heart of our detectors. After the assembly, the detector is furnished with a signal preamplifier and becomes a complete detection module. As one of very few companies in Europe, we also offer a wide range of high-quality epitaxial wafers, which we can deliver in both large and small batches', he adds.

The latest innovation offered by VIGO Photonics is a new generation of INTIR detection modules with broadband electronics encapsulated in hermitized and miniaturized housings, based completely on the company's proprietary technology. They can be used on a large-scale by manufacturers of end devices, e.g., various types of gas sensors and volatile substance composition analyzers.

Currently, the company is at the forefront of the industry upheaval which will open a completely new business and technological opportunities for numerous sectors. At the beginning of 2024, VIGO Photonics published information on receiving over EUR 100 million from the European Union under the IPCEI program for the development and implementation of integrated photonic circuits technology intended for mid-infrared detection.

At present, such devices are expensive and large, which makes them unsuitable for mass production. The downsizing and miniaturization is the key trend that will shape the industry in years to come, allowing for mass-scale use of integrated photonic circuits.

'We aim at miniaturization and integration of the entire system down to the level of a chip. Such integration and the possibility of producing chips on a mass scale, resulting in cost reduction of the entire system, will create huge potential for use in all industry sectors and in devices such as smartphones, household appliances and smartwatches. We also see huge

potential for applications in the biomedical, environmental protection and automotive sector. Information about the chemical composition, distance, and temperature of physical objects collected with such sensors will be an excellent source of data for AI to process, taking it to the next level', Emil Batorowicz concludes.

Polish companies and business support organizations active in the sector – catalog

Aerobits

www.aerobits.com; info@aerobits.com

Areas of activity

Microelectronics, Electronic components

Aerobits is a Polish technology company that has been operating on the global market since 2017. We specialize in miniaturization of avionic systems, such as aviation transponders. All solutions are based on a patented technology that allows for processing radio signals on very small surfaces. This concept is at the core of our OEM modules (low-level assembly function modules) which are the basic building block of miniaturized avionics.

Airoptic

AIROPTIC™
REAL TIME GAS ANALYZERS

www.airoptic.pl; info@airoptic.pl

Areas of activity

Optoelectronics, Optical gas analyzers

Airoptic Sp. z o.o. is an ISO 9001:2015 certified high-tech company founded in Poznan, Poland. Airoptic manufactures high performance tunable laser analyzers (TDL) for industrial process control, emission monitoring as well as safety and security applications. Airoptic provides in-situ, extractive and open path systems analyzer configurations which can be tailored to match specific customer needs. Thanks to unique in-house sensing technology Airoptic has pioneered the in-situ multi-gas detection technology utilizing multiple semiconductor lasers to overcome limitations of traditional single laser TDL systems.

AIUT

www.aiut.com; info@aiut.com

Areas of activity

Microelectronics

We are one of the leading providers of advanced robotics and automation systems for global industrial and public utility markets. By combining engineering know-how with intelligent automation technologies, AIUT solutions optimize production and intralogistics processes, enabling our clients to achieve even more benefits. We specialize in optimizing production, warehousing, and intralogistics processes. We provide the latest solutions in the field of robotics, automation, and mechatronics, developed in our design offices, production halls, and laboratories. Competencies that we have been building up over the years enable us to create innovative solutions tailored to customers' needs.

Amitech Pro

www.amitechpro.pl; amitechpro@amitechpro.pl

Areas of activity

Optoelectronics, Laser and fiber optic technologies/waveguides, Equipment/materials

We are a family-owned company that has built its core business on supplying fiber optic components to small and medium-sized companies in the Polish market. Currently, we have expanded our offer to include special materials for fiber optic manufacturing, such as tubes, rods, and machinery necessary for producing fiber optic preforms. We strive for a comprehensive approach to address our customers' new needs. If you have any unusual inquiries related to photonics or materials for optoelectronics, do not hesitate to contact us.

ANDRA

www.andra.com.pl; office@andra.com.pl

Areas of activity

Embedded systems

ANDRA has been helping clients to maximally harness the potential offered by new technologies for 35 years. The company supports the growth of smart power grids by developing and producing solutions for wireless data transmission and managing distributed populations of devices. Over 500,000 commander devices are in operation for electricity distribution network providers in Poland and Europe.

AROBS Polska

www.arobs.pl; info@arobs.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components

AROBS Polska delivers space electronics hardware, firmware & software for the European Space Agency and companies from the European space sector. Our main technical competence is the development of robust on-board analogue and digital electronics, equipment for applications such as instrument and mechanism control electronics, optical and quantum communication, on-board memory storage, payload computers and data processing units, electrical ground support equipment. We are experienced in FPGA-based systems design, embedded software, as well as electronics system level engineering. We have participated in flight equipment design e.g. FLORIS Instrument Control Unit for the FLEX mission.

Assel

www.asselems.com; info@assel.pl

Areas of activity

EMS

Assel is a contract electronics manufacturing service provider with a primary focus on high mix, high complexity projects that require strong and proactive engineering contribution, sophisticated supply chain modeling, and extensive technical capabilities in electronic assembly services and electro-mechanical integration.

Atest Gaz

www.atestgaz.pl; contact@atestgaz.pl

Areas of activity

Optoelectronics

Atest Gaz is a Polish company that focuses on the measurement of gas composition, monitoring and detection of hazardous concentrations. We specialize in innovative Gas Detection & Safety Systems providing reliable information on gas hazards or their absence, in other words, systems which ensure the sense of safety when everything goes well and effectively warn in case of hazard. Our mission is to provide our customers and users with comfort resulting from the sense of human life and health safety, protection of property and the environment from hazards posed by dangerous gases.

ATMSolutions

www.atmsolutions.pl; info@atmsolutions.pl

Areas of activity

Laser and fiber optic technologies/waveguides

ATMSolutions is a Polish manufacturing company operating in the numerically controlled machinery market. We offer CNC routers, FIBER laser cutting machines, waterjet cutting machines and industrial machining centers. We rely on modern technologies to create precise, high-performance machine tools. What distinguishes us in the CNC machinery market is our individual approach to each customer. By designing machines from scratch, we are able to tailor the configuration to individual needs. We create innovative solutions, such as modular milling plotters with a globally unique design.

Bilberry

www.bilberry.pl/; k.dobrynin@bilberry.pl

Areas of activity

Grow LED lighting production

The desire to innovate, environmental stewardship and development of high-quality products that will serve for years are the main factors that drive progress at Bilberry. We are a Polish manufacturer of LED lighting technologies for plant cultivation. Our solutions are dedicated to the research sector, commercial plant production and to hobby growers. In our work, we place great emphasis on the development of light fixtures and photobiological research. We understand that the amount of light does not always go hand in hand with quality, and lights spectral composition has a significant impact on plant growth and development.

Candela Foundation

www.candela.org.pl; hello@candela.org.pl

Areas of activity

3rd sector - NGOs

Established in February 2021, the Candela Foundation is dedicated to advancing optics and photonics in Poland, with a special emphasis on people. Originating from a crowdfunding effort, the Foundation seeks to nurture emerging talent within these fields. It champions values such as transparency and inclusiveness, with a keen focus on empowering young researchers and promoting a culture of innovation. The Foundation's key initiatives include the organization of conferences and workshops, granting scholarships (the Resonators program), and the publication of the Polish Newsletter on Optics and Photonics. Additionally, it serves as a central hub for the community, facilitating interaction and collaborations.

CEZAMAT PW

www.cezamat.pw.edu.pl; sekretariat.cezamat@pw.edu.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components,
Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics,
Microscopy/Spectroscopy and spectrometry

The CEZAMAT PW business profile focuses on microelectronics, photonics and biotechnology. The company provides services and products like diffractive optical elements, microlenses, photonic integrated circuits and sensors, microelectronic devices, as well as process development, design and fabrication of microelectronic and photonic devices. The company is open to various forms of cooperation, like commercial services, R&D cooperation and joint projects. It is located in the Centre for Advanced Materials and Technologies CEZAMAT, of the Warsaw University of Technology and is owned by the University. The Centre offers access to a semiconductor technology line capable of processing 200 mm wafers.

ChipCraft

www.chipcraft-ic.com; office@chipcraft-ic.com

Areas of activity

Microelectronics, Electronic components

ChipCraft is a private fabless semiconductor manufacturer that specializes in the GNSS technology. The company provides fully integrated, multi-frequency, multi-constellation GNSS receivers of high precision and reliability. The NaviSoC receiver is offered as a chip and as a module, and is dedicated to consumer, industrial and automotive markets. ChipCraft also offers custom silicon design and development services for ASIC and FPGA, as well as silicon-proven IP blocks and IP cores, for multimarket sectors. The company is headquartered in Warsaw, Poland and supports customers worldwide.

Creotech Instruments

www.creotech.pl; kontakt@creotech.pl

Areas of activity

Electronic components, Big Science/White Rabbit

Creotech Instruments is Poland's leading manufacturer of satellite systems and components, as well as advanced electronics for quantum computer control systems and other applications. The company operates its own electronics manufacturing plants and small satellite integration facilities. Creotech delivers proprietary solutions to the world's most distinguished research institutions such as the European Space Agency (ESA), the European Organization for Nuclear Research (CERN) in Geneva, the GSI Centre for Heavy Ion Research and the DESY Research Centre in Germany. In 2022, Creotech Instruments debuted on the Warsaw Stock Exchange as the first Polish space tech company.

Digital Core Design

www.dcd.pl; info@dcd.pl

Areas of activity

Microelectronics, IP Core, System-on-Chip

Digital Core Design (DCD) stands at the forefront of IP Core provision and System-on-Chip (SoC) design, heralding from Poland with a legacy tracing back to its establishment in 1999. Over the course of the past 25 years, DCD has honed its expertise across a diverse spectrum of architectures, culminating in the creation of over 100 meticulously crafted designs. Among its notable achievements are groundbreaking innovations such as the World's Fastest 8051 CPU, a pioneering feat that underscores DCD's commitment to pushing the boundaries of speed and efficiency. DCD has demonstrated its forward-thinking approach by developing a 100% cryptographic system ready for challenges posed by the pq.

EDS CONTROLLERS®

www.edscontrollers.com; info@edscontrollers.com

Areas of activity

Modular PLCs | I/O Modules

Manufacturer of I/O modules for PLC systems. The offer includes analog, digital temperature and relay modules, that communicate with commercially available PLC controllers and devices via the Modbus RTU protocol. Most modules are fully customizable. Examples of possible combinations of input and output channels include analog and digital inputs, digital outputs (each of the 8 or 12 channels can be set as a different channel type), analog inputs and outputs - temperature inputs, analog outputs (an ideal solution for regulation, with an input for a temperature sensor and an analog output for controlling the heating element), relay, digital and analog outputs.

ELPROMA

www.elpromaelectronics.com; sales@elpromaelectronics.com

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics, Time Sync.&Telemetry

Elproma is a Polish company that has been present on the market for 30 years. The company offers state-of-the-art technology in areas such as telemetry, time synchronization, industrial wireless technology and the IoT. Extensive experience, flexibility in adapting solutions to market needs positions the company as one of the industry leaders in Europe. Elproma owns a proprietary technology to set the trend for cyber security in the time synchronization market. Devices manufactured by Elproma find application in such industries as energy, telemedicine, mining and telecommunications. The Elproma Time systems can be found in most banks, power grids, financial and public institutions worldwide.

Ensemble3

www.ensemble3.eu; contact@ensemble3.eu

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics, Eutectic composites

ENSEMBLE3 is a Centre of Excellence in nanophotonics, advanced materials and technologies based on crystal growth. The Centre works on the development of new material technologies and advanced materials with exceptional electromagnetic properties that can be applied in areas such as photonics, optoelectronics, telecommunications, solar energy conversion, hydrogen production, medicine, aeronautics, security and defense. We specialize in R&D projects on eutectic composites and in the production of semiconductor materials such as AIIIBV single crystals: GaAs, InAs, GaP, InP, GaSb; oxide and laser crystals: doped-YAG, LuAP, NGO, GdCOB, YVO, TSAG; and other materials (SiC, Bi2Te3, Bi2Se3).

Etronika

www.etronika.pl; office@etronika.pl

Areas of activity

Optoelectronics, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics, Defense, Thermovision

Etronika Sp. z o.o. is a Polish private company that designs, manufactures, and trades electronic, optoelectronic, and optical devices and systems for military and law enforcement purposes. We have been on the market since 2002 and specialize in thermovision and its applications. Our main products include thermal cameras and modules, thermal firearms sights, laser rangefinders, multisensor optoelectronic sights, fire control systems, area observation systems, and many others.

Every European Digital Poland

www.iota-devices.com; inquiries@iota-devices.com

Areas of activity

Industrial electronics

IOTA, a brand of industrial sensors with ultra-low-power radio connectivity, is proudly manufactured by Every European Digital Poland. Designed for effortless integration and operation, IOTA sensors are engineered to deliver seamless functionality with minimal maintenance requirements. These sensors find primary applications in utilities, facility management, and enterprises boasting large and dispersed asset bases.

Faraday Solutions

www.faradaysolutions.pl; office@faradaysolutions.pl

Areas of activity

Optoelectronics, Electronic components,
Laser and fiber optic technologies/waveguides, Security

We provide an ultra-secure photonic authentication and authorization platform designed to support accessible security systems (electronic locks, IoT locks, biometric locks, etc.) that resist disarming by any known method thieves may attempt. We implement our solutions in smart homes, critical infrastructure, data centers, and banking. We also support and sell optoelectronic, photonic, and IoT components for the security sector.

Fibrain

www.fibrain.com; photonics@fibrain.pl

Areas of activity

Optoelectronics, Laser and fiber optic technologies/waveguides,
Microscopy/Spectroscopy and spectrometry

Fibrain is a vertically integrated company specializing in fiber optics and photonics. Our capabilities are unique on the European scale - we produce optical preforms and fibers (for both specialty and telecom applications), optical cables of all types (also with specialty fibers and customized), hybrid and monolithic passive fiber devices (like splitters, couplers, filters, end-face lenses and endcaps, filters, gratings, etc.), or optical connectivity and sensing products (also for SHM).
With strong R&D teams, we are happy to undertake non-standard projects and to develop customized solutions. We address both the telecom and specialty photonics markets (i.e. biomedicine, sensing, spectroscopy).

Flint Systems

www.flint.systems; office@flint.systems

Areas of activity

VR/XR

Flint Systems is a Polish manufacturer of globally unique training simulators utilizing virtual reality (VR), which make unparalleled training tools for operators of specialized machinery. Training takes place at a dedicated station comprising VR goggles, a chair, and often includes a motion platform and joysticks. VR goggles transport the trainee to a different reality, a construction crane or a port crane, for example. Each machine that the trainee "steps into" via VR faithfully replicates the real machine and includes all its functionalities.

Fluence Technology

www.fluence.technology; sales@fluence.technology

Areas of activity

Laser and fiber optic technologies/waveguides

Fluence Technology is a manufacturer of femtosecond laser solutions with unique all-fiber technology. The company offers robust and stable industrial-grade femtosecond lasers that are immune to misalignment and feature a novel all-fiber oscillator for a dependable and reliable package. Fluence is devoted to providing the highest quality standards and product reliability, offering a product lifetime that extends well over the warranty period.

GECO

www.geco.pl; biuro@geco.pl

Areas of activity

Electronic controllers

For 30 years we have been providing substantive support to newly emerging projects, enabling their implementation. We offer devices that control a wide range of processes such as refrigeration thermostats and heating controllers, specialized controllers for the medical and laboratory industry, as well as other reliable instances of automation inside our customers' end products. Our construction departments design high-class industrial forms and produce mechanical components indispensable in advanced automation. In addition to drivers, we provide our customers with integrated web and mobile applications that enable remote monitoring and control of devices.

G-Group.dev

www.g-group.dev; hello@g-group.dev

Areas of activity

AI

We can revolutionize your business with cutting-edge solutions. Our team is dedicated to supporting your brand and bringing you the latest innovations. For over 15 years we have been creating tailor-made software products based on advanced technologies, with end customers in mind. Partner with us today and discover how we can take your company to the next level.

GL Optic

www.gloptic.com; office@gloptic.com

Areas of activity

Optoelectronics, Optics/Opto-mechanics,
Microscopy/Spectroscopy and spectrometry

GL Optic has been designing and manufacturing complete systems and software for light measurement for over a decade. From the beginning it has been supporting companies in easier and faster development of lighting products, harnessing innovative technologies as well as the knowledge and experience of our team of engineers. GL Optic offers precise and intuitive-to-use lighting measurement instruments. “Plug and measure” is a concept that has been consistently important to the company for years. We design instruments and measurement systems to make everyday work easier for engineers.

GZT TELKOM-TELMOR

www.telmor.pl; sekretariat@telmor.pl

Areas of activity

Electronic components, Laser and fiber optic technologies/waveguides,
Optics/Opto-mechanics

Our company was founded in 1954 and since its beginnings has been setting the highest standards in solutions created for the world of signals and technology. Many years of experience, insightful analysis of market needs and keeping track of the changing trends and technology allow us to enjoy the reputation of experts in the teletechnical industry. Our objective is to ensure highest quality and integration of solutions in signal processing. We are a European company, hence we respect all applicable EU laws when collaborating with foreign clients. Furthermore, in our business we always follow the highest standards of integrity and business ethics. Such honest approach to business has allowed us to acquire numerous testimonials from our customers and recommendations from our contractors.

INFRAMET

• INFRAMET

www.inframet.com; info@inframet.com

Areas of activity

Optoelectronics, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics, Microscopy/Spectroscopy and spectrometry, Test stations for EOS systems

INFRAMET is a manufacturer of hi-tech equipment for testing electro-optical surveillance systems (thermal imagers, night vision devices, VIS-NIR cameras, SWIR imagers, laser range finders, laser designators, multi-sensors systems, fused systems, UV cameras, optical sights) and main blocks for such systems (image intensifier tubes, IR FPA/CCD/CMOS imaging sensors, optical objectives). Test equipment is needed for quality control, design optimization for manufacturing, and maintenance of EO surveillance systems.

Insoptics

INSOPTICS

www.insoptics.com; info@insoptics.com

Areas of activity

Microelectronics, Microscopy/Spectroscopy and spectrometry

Insoptics is a cutting-edge company that specializes in the development and manufacturing of top-of-the-line optical systems for various applications. Our primary focus is on devices designed for the optical, semiconductor, and display industries. Insoptics products are designed to meet the highest standards of precision and accuracy. Insoptics equipment for monitoring optical and physical thickness of thin-film coatings is one of most reliable solutions on the market and has won widespread recognition.

Institute of High Pressure Physics of the Polish Academy of Sciences

www.unipress.waw.pl; dyrekcja@unipress.waw.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Substrates and epitaxy

IHPP PAS conducts fundamental, application, and implementation research in the field of physics and technology of such nitrides as GaN, InN, AlN, and their alloys. These are wide-bandgap semiconductors that enable the construction of light emitters across the entire visible and ultraviolet spectrum. These materials are also suitable for constructing high-power, high-voltage, and high-frequency transistors. They constitute an ideal material for applications in power electronics. IHPP research spans from growing GaN crystals and the production of substrates, obtaining epitaxial layers and quantum structures of InGaN/GaN and GaN/AlGaN to the processing of electronic and optoelectronic devices.

INVENTIA

www.inventia.online; inventia@inventia.pl

Areas of activity

Professional electronics

Inventia is a global vendor of telemetry and tracking devices utilizing the LTE/LPWAN and GNSS technologies. Founded in 2001 in Poland, it has become one of the leaders in professional telemetry and control. The scope of the offer includes not only automation telemetry and localization modules, but also open architecture solutions based on proven industrial standards. Inventia delivers easy-to-use configuration and system integration tools, providing open connectivity to customer SCADA systems, databases, and data management systems. We are an experienced provider of Industrial Internet of Things (IIoT) components, offering our visualization and reporting platform in a secure cloud-based environment.

IPG Photonics

www.ipgphotonics.com; sales.poland@ipgphotonics.com

Areas of activity

Optoelectronics, Laser and fiber optic technologies/waveguides

IPG Photonics is the leading developer and manufacturer of high-performance fiber lasers and amplifiers for diverse applications in numerous markets. IPG products are available globally for OEMs, system integrators and end users across a wide range of industries. IPG Photonics Sp. z o.o. is headquartered in Gliwice, Poland and it is highly developed manufacturing facility, producing fiber optical components, providing sales and service support in Central and Eastern Europe, and enabling technological laser technology tests for material processing in an application laboratory.

KOMAX

www.komax.net.pl; jacek.kosiorek@komax.net.pl

Areas of activity

Microelectronics, Optoelectronics,
Laser and fiber optic technologies/waveguides

We specialize in data transmission through open optical networks and related technologies based on light resonance and more.

Lars Lighting

www.larslighting.com; office@larslighting.com

Areas of activity

Optoelectronics, Electronic components, Sensors

Lars Lighting is a technology company operating in the field of advanced photonics and microelectronics techniques with 10 years of experience in the implementation of new electronic solutions based on components from world leaders. Lars Lighting has its own team of engineers specialized in creating advanced lighting control algorithms. It develops its highly advanced products in collaboration with the largest research institutes in Europe. The company has created an integrated system aimed at reducing the costs of electricity consumption, consisting of sensors, aggregation systems, software platforms and a management application, allowing our customers to reduce energy consumption up to 93%.

LightHouse

www.linkedin.com/company/lighthouse-pic; lighthouse@lighthouse.net.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Photonics Integrated Circuits

LightHouse is a design house for application-specific photonic integrated circuits (ASPICs). We provide support at every stage of ASPIC development – from the design to a market-ready product. The company is a spin-off of Warsaw University of Technology (WUT), benefiting from over 10 years of experience of the Eastern Europe Design Hub at WUT.

Liralighting

www.liralighting.pl; info@liralighting.pl

Areas of activity

Manufacturer of lighting fixtures

Liralighting has been manufacturing lighting fixtures for more than 40 years. Our high-tech machining machines enable us to create high-quality lighting fixtures with precision and efficiency. In addition, we have our own powder coating plant, which allows us to maintain control over every step of the production process. Not only does it guarantee excellent quality, but it also enables us to customize finishes to individual customers' needs. We have our own photometric laboratory where we can conduct precise tests and analyses, providing our customers with products of unparalleled performance and energy efficiency.

Łukasiewicz Research Network - Institute of Microelectronics and Photonic

www.imif.lukasiewicz.gov.pl; sekretariat@imif.lukasiewicz.gov.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Laser and fiber optic technologies/waveguides, Microscopy/Spectroscopy and spectrometry

Łukasiewicz Research Network - Institute of Microelectronics and Photonics specializes in advanced photonics research, a pivotal technology of the 21st century, essential for innovative solutions in today's society. Its portfolio includes the development of photonic integrated circuits (PICs) in the infrared range, fiber optics, micro-optics, lasers, and radiation detectors. We also develop new materials such as silicon carbide, graphene and advanced ceramics, and conduct property tests for industrial applications. Additionally, we standardize and certify electronic devices, with research organized across various technology lines, including optoelectronic and silicon subassemblies, wide-bandgap semiconductors and LTCCs.

Łukasiewicz Research Network – Port Polish Center for Technology Development

www.port.lukasiewicz.gov.pl; biuro@port.lukasiewicz.gov.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics, Microscopy/Spectroscopy and spectrometry

Łukasiewicz Research Network – PORT Polish Center for Technology Development develops new technologies for industry. The research activity of the center focuses on materials science and biotechnology. The institute consists of three research centers, including Materials Science & Engineering Center, comprised of the Clean Room Laboratory (ISO5 and ISO6 cleanliness classes), where production and characterization processes are carried out, including the production of thin films (including MBE, MOCVD, PVD, PECVD), photolithography (classic and maskless), and full characterization of the produced structures. We can produce photonic devices such as biosensors.

Łukasiewicz Research Network - Tele and Radio Research Institute

www.itr.lukasiewicz.gov.pl/en; itr@itr.lukasiewicz.gov.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Optics/Opto-mechanics, Microscopy/Spectroscopy and spectrometry, Electronic design

For more than 60 years we have been conducting research, development and implementation work in the area of PCB and related technologies. We employ an advanced technology to produce various types of boards, e.g., multi-layer, including HDI boards for BGA circuits, as well as flexible, rigid-flex boards and aluminum core boards. We also assemble electronic components, i.e., CSP-type active components, open flip chip semiconductor units and passive components with sizes up to 0201. We specialize in lab tests of components for the assembly and disassembly of electronic units, working out new applications integrating various technologies and carrying out electronic assembly validation tests.

Masters

www.masters.com.pl/en; masters@masters.com.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics, Microscopy/Spectroscopy and spectrometry

Masters Sp. z o.o. is a company with over 25 years of experience in the electronics industry. We are one of the largest and most frequently selected distributors of electronic components in Poland. We combine comprehensive service with latest technologies and customer-orientation. We are highly flexible and offer tailor-made solutions. Our history started in 1996, with the opening of our first department in Gdańsk. Since then, we have been constantly focusing on development, and have become an expert in the electronics industry. Today, we are headquartered in Straszyn, and have regional offices in Warsaw, Cracow, Katowice, Radom, and Rzeszów.

---

microEPC - Microelectronics, Electronics and Photonics Cluster

www.pptf.pl/klaster-mikroelektroniki-elektroniki-i-fotoniki; info@pptf.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics, Microscopy/Spectroscopy and spectrometry, Optical methodology

A cluster of Polish photonics and microelectronics industry, coordinated by PPTF – Polish Technological Platform on Photonics. Integrating and stimulating cooperation along value chains.

Mode-Locked Technology

www.mode-locked.com; www.mode-locked.com

Areas of activity

Optoelectronics, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics

Mode-Locked Technology manufactures robust and lasting stable laser systems. Our products are maintenance-free and ensure stable, long-time operation without any output power degradation. Our product portfolio includes femtosecond fiber lasers using the original SESAM-free technology (1060 and 1550 nm), mid-infrared sources (>3000 nm), high-power femtosecond sources at 1060 nm, multi-wavelength femtosecond laser systems, widely tunable lasers (1600 - 2100 nm), supercontinuum sources, narrow-linewidth, low-noise CW lasers (1550 nm), low-noise electronics for frequency stabilization, low-noise laser diode drivers, and other custom products tailored to your needs!

Noctiluca

www.noctiluca.eu; sales@noctiluca.eu

Areas of activity

Organic chemistry for OLEDs

Noctiluca is a technology company, listed on the Warsaw Stock Exchange (NewConnect market), that develops the next-generation OLED emitter materials – chemical compounds that form the fundamental basis of OLED displays (monitors, TVs, smartphones, wearables or VR devices) and light sources. In addition to developing proprietary technology, Noctiluca offers a wide range of chemical materials for the photonics market and acts as a Chemical Contract Research Organization, carrying out R&D projects for its customers. Our scientific team undertakes projects in the chemical industry to develop cutting-edge solutions, primarily focusing on high-performance materials (HPMs).

NODER

www.noder.pl; info@noder.pl

Areas of activity

Electronic components, Access Control Systems

NODER S.A. is a Polish company based in Kraków, specializing in the design and production of networked and integrated access control systems that are fast and secure thanks to AES256 encryption, OSDP and the MIFARE DESFire card standard. Our solutions comply with all grades of the IEC 60839-11-1 standard. We are committed to creating secure and efficient systems for our customers in Europe and Asia.

Novatronik

www.novatronik.com/en; novatronik@novatronik.com

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Optics/Opto-mechanics

For over 25 years, we have been specializing in design and assembly services for electronic devices with a wide range of applications. We have handled thousands of orders and have served numerous customers in Poland and abroad. Our business partners value our versatility, safety, low production costs, on-time implementation, stable position on the market, wide network of component suppliers, and focus on customer satisfaction. Grow your business with our experience. We support mass production of electronics for the medical, transport, industrial, automotive and security industries (protection of persons and property, fire protection systems, anti-burglary systems).

NSG 4L

www.idoelectronics.eu; contact@idoelectronics.eu

Areas of activity

Microelectronics, Optoelectronics, Optics/Opto-mechanics, R&D Services

IDO Electronics is a leading technology company specializing in the design, development, and manufacturing of high-quality electronic devices as well as complete solutions incorporating advanced cloud systems. With a focus on innovation, we serve diverse industries, from consumer electronics to industrial applications. Our experienced team leverages the latest technology to deliver reliable and efficient products tailored to our clients' unique needs. Committed to quality and customer satisfaction, IDO Electronics sets the standard for excellence in the electronics industry. Choose us for your electronic, IoT, and cloud solutions and experience the difference that our expertise makes.

OEM Tech

www.oem-tech.pl; info@oem-tech.pl

Areas of activity

Optoelectronics, Electronic components

The main field of OEM Tech expertise is the development and manufacturing of specialized power supplies for different types of laser systems. We offer solutions for flashlamp pumped solid-state lasers, for CW and QCW diode pumped solid-state lasers, for IPLs, direct diodes and electrooptical switches. Our customer base ranges from industrial to scientific clients. Most of our products are certified for use in medical devices. Nowadays, we supply power electronics ranging from simple to advanced, standard and customized, selling thousands of items worldwide every year.

Perspectiva Solutions

www.perspectivasolutions.com; info@perspectivasolutions.com

Areas of activity

Microelectronics, Optoelectronics, Electronic components,
Laser and fiber optic technologies/waveguides

Our company specializes in contract production of highest quality electronic and photonic devices and the production of custom cable harnesses. We offer highest production standards in Poland, from prototyping, through production outsourcing, to professional machine and electronics assembly services. Our second branch of operations is our own AI-based system for the predictive maintenance of lasers comprising advanced Huaris Lasers Cloud software and optoelectronic hardware.

Phonemic

www.phonemic.pl; info@phonemic.pl

Areas of activity

Microelectronics, Electronic components, Semiconductors, Chip, FPGAs

You can finish your project faster with our Design Services for FPGA and ASIC! An experienced team of 8 engineers is just around the corner! You can get IP Core development- FPGAs bring up, integration, RTL design and verification, DSP (audio, radio), cryptography, e.g., 4G or LTE. 100% of our customers are happy and satisfied with our solutions!

Photin (Photonics Innovation)

www.photin.eu; kk@photin.eu

Areas of activity

Optoelectronics, Epitaxy, Wafers, Infrared

MOCVD growth of compound semiconductor custom epitaxial layers on substrates (GaAs, InP, GaSb, InAs, InSb, Si).

Plastrol

www.plastrol.pl; info@plastrol.pl

Areas of activity

Electronic components, Reel extension cords, Sockets

Plastrol is a family company established in 1983. We have been operating on the market for 40 years now. Plastrol has been transformed from a small local company to the leader in the processing of plastics and manufacturing of electrical installation products. Technologically advanced injection machines, robots, automated production lines, tool depots have considerable impact on optimizing manufacturing costs and times, dictating production precision and quality. Plastrol is the manufacturer of reel extensions cords, single socket extension cords, plugs and sockets, bells and switches, installation boxes, connection cables, splitters, and surge protectors.

PPTF - Polish Technological Platform on Photonics

www.pptf.pl; info@pptf.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics, Microscopy/Spectroscopy and spectrometry, Photonics materials

Established in 2013, PPTF is a cluster organization of Polish photonics and microelectronics. It brings together companies, universities and research institutions. PPTF organizes the ecosystem by integrating stakeholders, providing flow of information, inspiring cooperation and representing the industry in Poland, and in the EU. Its main activities include organization of webinars, conferences and joint trade show pavilions as well as the publication of the Polish Newsletter on Optics Photonics. PPTF is an active member of Photonics21, ECCP, ENDR, and other EU cooperation initiatives. Since 2023, PPTF has been serving as the microEPC coordinator - the Microelectronics, Electronics and Photonics Cluster.

Precision Systems Engineering

www.pse-pl.com; info@pse-pl.com

Areas of activity

Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics, Production lines design

The company is a production equipment integrator focusing on precise industries like electronics, medical devices and optoelectronics, specializing in custom-made solutions. PSE integrates such laser processes as precise welding, laser drilling or ablation into a production line for industries mentioned above. The company also engages in R&D works in the field of fiber array assembly. Together with its parent company, PSE works on various photonic developments.

Proxima

www.proxima.pl; sprzedaz@proxima.pl

Areas of activity

Electronic components

Proxima Electronics provides innovative solutions to gate automatic machines. We manufacture gate drives, controllers, photocells, remote controls, control panels and other necessary accessories. Additionally, along with satisfying our customers' hardware needs, we have been working for years on solutions that improve the comfort, safety and functionality of gate automation.

QNA Technology

www.qnatechnology.com/en; info@qnatechnology.com

Areas of activity

Microelectronics, Optoelectronics, Electronic components

QNA Technology is a pioneer in the synthesis of quantum blue light-emitting dots, free from heavy metals, serving as an innovative semiconductor material primarily developed by the company for the display industry. QNA has developed, continues to develop, and commercializes the technology for producing quantum dots (QNA. dots) and quantum inks (QNA.ink), enabling the printing of semiconductors on a wide range of substrates by means of various printing techniques. QNA solutions are secured through the construction of a patent cloud - QNA already holds two granted patents and has filed three additional patent applications. The company is also listed on the Warsaw Stock Exchange.

QWERTY

www.qwerty.com.pl; qwerty@qwerty.com.pl

Areas of activity

Electronic components, Membrane keyboards

QWERTY ltd. designs and manufactures customized membrane keyboards, front panels, glass panels and labels. Our company has been operating for 35 years on both the Polish and global market. Export accounts for over 20% of our turnover. The entire technological process for manufacturing all our products is located in one place, which means that we have a full range of machinery, own laboratory and research equipment needed. It enables us to search for new solutions, to constantly improve our technology, and to offer top quality products manufactured for various industries. These are chiefly components of operator panels featured in the human-machine interface (HMI).

REC ELEKTRONIKA PROFESJONALNA

www.recelektronika.pl; office@recelektronika.pl

Areas of activity

Industrial electronics repair

The REC ELEKTRONIKA PROFESJONALNA company has been on the market since 1997, operating in the industrial automation industry. From the beginning of our activity, we have been repairing unconventional electronic systems, designing and producing short prototype series of electronic devices.

SDS Optic

www.sdsoptic.pl; press@sdsoptic.pl

Areas of activity

Optoelectronics, Laser and fiber optic technologies/waveguides, Fiber optic medical devices

SDS Optic is a European based cutting-edge medical deep tech firm connecting molecular biology with novel photonics technologies, chemistry & biomedical engineering to create solutions that can revolutionize healthcare worldwide, including the first ever In Vivo Photonics Immunoassays inPROBE® platform technology. Our mission is focused on revolutionizing the diagnostic process in the areas of oncology, retina disorders, infectious and fungal diseases, and drug delivery monitoring by introducing precise and fast detection methods that can significantly improve treatment outcomes for patients worldwide. SDS Optic is listed on the Warsaw Stock Exchange (NewConnect: SDS) and plans to expand into global markets.

Sequre Quantum

www.sequre-quantum.com; marcin.pawlowski@sequre-quantum.com

Areas of activity

Optoelectronics

Sequre Quantum offers quantum technology solutions to ensure digital progress. SeQRNG is a hardware-based quantum random number generator with active self-testing and cyber threat detection. It offers certified private random numbers with unrivaled security and can be easily integrated into any platform via API. SeQRNG has been available for over two years and is already used in lotteries and cybersecurity markets, including integration with Thales solutions.

SHEMECK

www.shemeck.pl; shemeck@shemeck.pl

Areas of activity

Electronic components

SHEMECK was established in 2010. From the beginning, the company has been involved in the broadly understood sector of automation and industrial IT.
The main fields of company expertise include the selection of devices for industrial automation tasks, delivery and assembly of equipment for production machines, programming of industrial automation devices, delivery of IT equipment, building applications for production, production of proprietary electronics solutions.
Knowledge in the field of electronics and production programing of electronic components allowed us to start working on our own modules in 2017. Noticing the shortage of components on the automation market, SHEMECK started working on modules used directly with PLCs.

SHM System | Nerve-Sensors

www.nerve-sensors.com; contact@nerve-sensors.com

Areas of activity

Laser and fiber optic technologies/waveguides

Nerve-Sensors is a SHM System brand. We are the producer of the world's first composite DFOS Distributed Fiber Optic Sensors, designed for geotechnics and civil engineering applications. We support universities and R&D departments of construction companies. Our Nerve-Sensors are dedicated to geometrically continuous measurements of strains, temperature, and displacement. Many years of experience in building optical fiber monitoring systems allow us to tailor our services to your needs. We are ready to provide appropriate measurement systems for your projects and assistance in both static and dynamic measurements.

Silesian Nano ClusterSilesian

www.nanonet.pl; www.nanoslask.pl; fundacja@nanonet.pl

Areas of activity

Microelectronics, Electronic components,
Laser and fiber optic technologies/waveguides

Silesian Nano Cluster was established in 2013. Its mission is to create a platform for cooperation between entrepreneurs, scientific institutions, public administration and business support organizations to increase the importance of nanotechnology in shaping the future economic and innovative dimension of the region.
The Cluster currently brings together over 100 organizations specializing in nanotechnology and advanced materials from all over Poland. The Cluster creates a multi-level platform for cooperation that facilitates effective interaction and helps leverage the potential of entities associated within it for the promotion and development of nanotechnology in Poland.

SMARTTECH3D

www.smarttech3d.com; office@smarttech3d.com

Areas of activity

Microelectronics, Optoelectronics, Optical 3D scanners

SMARTTECH3D is a world-renowned Polish manufacturer of optical 3D scanners, founded in 2000. The company's offer includes a full range of professional contactless measuring systems dedicated to industrial applications such as quality control or reverse engineering as well as precise digitalization of national heritage for preservation. SMARTTECH3D provides design and implementation services for advanced optical measuring systems and 3D measurement services around the world. Our satisfied customers include NASA, Boeing, Lufthansa, Orlen, Military Police, KRONES, Central Office of Measures as well as many educational units.

Solaris Optics

www.solarisoptics.eu; info@solarisoptics.eu

Areas of activity

Optics/Opto-mechanics

Solaris Optics S.A. is a precision optics manufacturing company with over 30 years of experience in the field. We offer highly customized solutions – from feasibility studies, optical design through lapping, grinding and polishing, centering, thin-film coating deposition, bonding up to assembling and high-standard quality control. We provide a diverse portfolio of products including plane and spherical optics - lenses, mirrors, windows and wedges, filters and polarizes, prisms, beam-splitters, optical assemblies, laser, imaging and infrared optics, and diffusers. We support various industries globally, including Aerospace & Defence, Semiconductor, Telecommunications, Bio-Medical, Research.

SPECTROPOL

www.spectropol.pl; www.isymulacje.pl; biuro@spectropol.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics, Microscopy/Spectroscopy and spectrometry, Design and simulation software

Spectropol is a European supplier of value-added test and measurement systems, electro-optical components, and design-simulation software. The company specializes in measurement fields such as scientific and machine vision imaging, spectroscopy, microscopy, lasers, light sources, micro and macro positioning, and photonics accessories, offering a broad range of optical components, photonic detectors, and thermal infrared sensors. Spectropol provides software tools for the design and simulation of components, links, systems, and networks in photonic applications as well as optical and illumination systems, delivering high-quality solutions, including equipment integration and custom-built machines for scientific and industrial manufacturing.

SYGLASS

www.syglass.pl; info@syglass.pl

Areas of activity

Laser and fiber optic technologies/waveguides

SYGLASS, based in Warsaw, Poland, is a startup comprised of renowned professors, photonic experts, entrepreneurs, and engineers. We are dedicated to advancing our proprietary glass 3D printing technology, automating the production of custom photonic elements. We design and manufacture nanostructured components such as fibers, lenses, and matrices of lenses, addressing technological challenges to provide advanced, customizable solutions for our clients. Our continuous research and development efforts ensure that our products meet the highest standards for applications in skin treatment, satellite communication, optical endoscopy, and more.

TECHBIT

www.techbit.com.pl; zaczynajmy@techbit.com.pl

Areas of activity

Microelectronics, Electronic components, Electronic Manufacturing

TECHBIT is an EMS manufacturer producing PCBAs and electronic devices. Our company offers a full scope of services starting from the production of PCB, components, and PCBA (SMT and THT), programming and testing of devices, washing and coating of PCBA, assembling final devices with cables, plastic elements, screens, labeling, packaging, etc. We can supply from a single sample to 100000 items or more, to fit into our customers' schedules and forecasts.

Technokabel

www.technokabel.com.pl; sprzedaz@technokabel.com.pl

Areas of activity

Electronic components

The company produces LiYY, LiYCY, control cables for control and measurement circuits, signal, monitoring and data processing systems, digital data transmission and electronic applications. The outer sheath of the cable is oil resistant. LiHH and LiHCH cables are intended for use in control, signaling and monitoring systems, computer systems, measurement technology and data transmission. Halogen-free cables are used where greater safety in fire conditions is needed. In the event of a fire, they do not spread the flame, their smoke emission is low, while the released gases are not corrosive. The cable design allows for high flexibility and small dimensions without compromising on mechanical strength.

Technolutions

www.technolutions.pl; kontakt@technolutions.pl

Areas of activity

Microelectronics, Optoelectronics, Electronic components, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics, Microscopy/Spectroscopy and spectrometry

Technolutions Sp. z o.o. is a supplier of advanced technological and analytical systems dedicated for both R&D and industrial applications. We focus on thin film deposition, surface modification, microscopy and profilometry and mechanical tests. We are also launching a coating factory and will offer professional PVD and PECVD decorative coating services. To meet customers' expectations and expand the scope of our services, we have started our own calibration laboratory accredited by the Polish Center for Accreditation with a certificate No AP 207, in accordance with ISO 17025. Through R&D cooperation, we propose the development of new products as well as long-term research projects.

Technosystem

www.technosystem.pl/en; office@technosystem.pl

Areas of activity

EMS and R&D for Quantum Tech.

Technosystem is Polish company providing EMS (Electronics Manufacturing Services), specialized in scientific instrumentation and FPGA based systems. We offer high-quality electronic device assembly services with comprehensive support at every stage of the production process, from design, through mechanical prototyping, to assembly and post-production quality control. Many years of experience gained from research and development (R&D) activities and production of electronic devices, combined with high professionalism of our engineers, allow us to provide products, EMS and design services of highest quality and reliability, in line with current standards and trends.

Tomorrow Telco

www.telcolab.pl; office@ttelco.pl

Areas of activity

Microelectronics, Electronic components, Laser and fiber optic technologies/ waveguides, Microscopy/Spectroscopy and spectrometry

Tomorrow Telco is a group of specialized engineers and testers working in the field of telecommunications, electronics and IT. We provide services in such areas as mobile terminal validation, certification, inspections and audits. We also run our own TELCOLAB laboratory.

Tomorrow's System

www.optlasers.com; info@optlasers.com

Areas of activity

Optoelectronics, Laser and fiber optic technologies/waveguides, Optics/Opto-mechanics

Opt Lasers founded in 2014 under Tomorrow's System Sp. z o.o., specializes in engraving and cutting laser heads for CNC and 3D printers. We have expanded our range to include agricultural blue lasers for laser weeding. We offer high-quality lasers, modules, drivers and TEC controllers. Our OEM services include scalable laser solutions for varied applications. Our clients range from industrial integrators to end users. Our blue laser heads revolutionize industries with high light absorption and efficiency, all in a compact design.

TRANSMISJA Łukasz Studencki

www.transmisja.info; biuro@transmisja.info

Areas of activity

Microelectronics, Electronic components, Broadcast Radio&Television

TRANSMISJA provides professional services to radio and television broadcasters. We supply necessary technical solutions and professional services. The company specializes in setting up transmission links via cable, radio and satellite. We also provide comprehensive radio broadcasts of sports and religious ceremonies, ensuring all necessary equipment and trained personnel.

TRUMPF Huettinger

www.trumpf.com; tple_info@pl.trumpf.com

Areas of activity

Microelectronics, Electronic components,
Laser and fiber optic technologies/waveguides

TRUMPF Huettinger is the competence center for the plasma technology. The company's operations are based on three stable pillars - the production of power supplies, electronics, and control cabinets enabling manufacturers of smartphones, TVs, cars and other industries to create and improve their products. Every day we cooperate with companies from all over the world, including from the United States, Asia and Europe, and our long-term clients are the leaders of the consumer and industrial electronics market, listed in the prestigious Fortune500 ranking. Our company is constantly developing, ensuring stability and exciting prospects for our employees.

VECTOR BLUE HUB

www.vectorbluehub.com; sales@vectorbluehub.com

Areas of activity

Microelectronics

VECTOR BLUE HUB is an EMS (Electronics Manufacturing Services) company seated in Gdynia, Poland, representing the Under One Roof concept, keeping the design and manufacturing services in one place to accelerate the time to market (TTM) for your electronic products. Harnessing our extensive knowledge, we adjust our services to business challenges in industries such as telecommunications, IIoT, communication technologies, etc. You can safely focus on your core business – a group of designers experienced in hardware, software, mechanics as well as PCBA/BOX BUILD engineers will take care of everything.

VIGO Photonics

www.vigophotonics.com; info@vigophotonics.com

Areas of activity

Microelectronics, Optoelectronics,
Microscopy/Spectroscopy and spectrometry

VIGO Photonics is a European manufacturer of epitaxial wafers and instruments for photonics and microelectronics, specializing in MWIR and LWIR detectors and modules, produced with the use of internally-developed technology. The mission of VIGO Photonics is to provide fast, convenient, and easy to use IR detectors at any wavelength from 2 to 16 µm, reaching fundamental BLIP limits without cryocooling. Modules are available with different spectral response ranges, time response characteristics and gains.

Wilk Elektronik

www.goodram.com; info@goodram.com

Areas of activity

Microelectronics, Electronic components, Hardware, Semiconductor

Wilk Elektronik SA is a Polish manufacturer of computer memories under the GOODRAM and IRDM brands. Founded in 1991 as a distributor, the company rapidly became a leading computer memory supplier in Poland. In 2003, the company opened a memory module factory. Today Wilk Elektronik is the only manufacturer of DRAM in Europe and provides memory solutions for consumers, the gaming market, and industrial applications. In Poland, Wilk Elektronik SA is the leader in the DRAM and SSD product groups. The company has also successfully expanded its global presence. Memory modules, SSDs and Flash memories under the Goodram and IRDM brands are now available in 47 markets worldwide.

WiRan

www.wiran.pl; info@wiran.pl

Areas of activity

Microelectronics, R&DaaS, IoT, Space components

WiRan is a hardware and firmware design office, offering R&DaaS. We create individual hardware solutions tailored to the project. Our experience includes the production of electronic parts, fast prototyping, feasibility studies. We offer a wide range of EMC (electromagnetic compatibility) tests and pre-certification ("WiRan ELAB"), rent the so-called clean room, compliant with ISO 7 ("WiRan CleanRoom"). We also produce antennas, diplexers, splitters, couplers for L, S, X bands for small and medium size satellites for the space industry. Our aerospace products have achieved the Technology Readiness Level (TRL) of 9 ("flight proven").

Wireless Instruments

www.quwireless.com; sales@quwireless.com

Areas of activity

Microelectronics, Electronic components

The company designs and produces telecommunication antennas, in particular 5G/LTE, IoT, Wi-Fi, and military antennas (that can, for instance, increase the range of drones or to neutralize them). We specialize in external antennas that can have radio electronics (routers, gateways, modems) mounted inside their housing. We also design and produce PoE splitters, injectors and converters with built-in surge protection systems allowing for powering devices via PoE that are not factory-adapted for this purpose. We have a special department responsible for custom projects, tailored to individual technical requirements of a given client. We also support OEM and ODM.

WizzDev

www.wizzdev.com; info@wizzdev.pl

Areas of activity

Microelectronics, IoT - embedded systems

WizzDev stands at the forefront of the embedded software and hardware development, offering unparalleled expertise in IoT solutions. As an AWS Hardware and Software Partner, we make sure that your product is ready for the market and stands out on the shelf. Our proficiency extends beyond simple development; we excel in bringing complex hardware to life, crafting smart, efficient solutions that pave the way for technological advancements. Our offerings are not limited to software development; we also provide extensive electronics design, firmware development, and PCB prototyping expertise. This versatility enables us to meet various needs, from instrument control software to cutting-edge IoT devices.

XTPL

www.xtpl.com; info@xtpl.com

Areas of activity

Microelectronics

XTPL is a leading provider of dispensing technology and high-performance materials for microelectronics. The company offers the patented Ultra-Precise Dispensing (UPD) technology for printing conductive or insulative structures on various surfaces. Our Delta Printing System for prototyping and low scale production and UPD SYSTEM for industrial integration ensure scalability, cost-effectiveness, and precision in the range of 0.50-10 micrometers. XTPL also offers a line of silver-based conductive inks and pastes, including both off-shelf products and tailor-made solutions. Primarily serving the OLED, MicroLED, and semiconductor industries, XTPL supports innovation and advanced component manufacturing.

ZAHO

www.zaho.pl; info@zaho.pl

Areas of activity

Lighting fixture manufacturer

Zaho lighting is a manufacturer of lighting fixtures. It was founded with sustainable design in mind, combining fascination with light, knowledge of design, materials, and latest generation technology with focus on people and their needs. Light fixtures designed by us are characterized primarily by high quality light, which has significant impact on human well-being. Many years of experience in the investment market allows us to support investors, contractors and architects in their projects from the selection of luminaires, through calculations, to supervising concept implementation.

ZEUP POZYTON

www.pozyton.com.pl; pozyton@pozyton.com.pl

Areas of activity

Electricity meters

A Polish producer of electricity meters with 35 years of experience, boasting a highly qualified staff and operating its own research and development (R&D) units along with accredited metrology laboratories. Our product range includes electricity meters, communication devices, and IT systems for managing energy and other industrial utilities. In addition, we offer a variety of services such as legalization, calibration, and expertise of electricity meters, installation of metering systems, and operational support and maintenance. Contact us and learn more about our offer on www.pozyton.com.pl. Our experts will help you select solutions tailored to your company's needs.

Infographics Poland in figures (2023)
Source: Statistics Poland, World Bank, Eurostat

//Data from the infographics are presented in the tables.//

Population		**37.6 million**
Foreign trade turnover	Import EUR	**340.5 bn EUR** (7.0% decrease, yoy)
	Export EUR	**351.0 bn EUR** (1.4% increase, yoy)
Unemployment rate		**2.8%** (as of November 2023) The 3rd lowest in the EU
GDP	Total – USD	**808.6 bn**
	per capita USD	**20 681**

World Economy Rank by 21st (2022) The 6th largest economy in the EU	
2021	**5.9%**
2022	**5.1%**
2023	**0.2%**
2024 (predicted)	**2.8%**
2025 (predicted)	**3.4%**

Back to the text

Chart Exports 2021
Source: Central Statistical Office of Poland (GUS) - Information society in Poland in 2022

//Data from the chart are presented in the table.//

Consumer products (audio-video)	43%
Consumer equipment	36%
Telecommunications equipment	18%
Electronic componenets and parts	3%

Back to the text

Chart Export of the electronic sector (billion PLN)
Source: Central Statistical Office of Poland (GUS) - Information society in Poland in 2014-2022

//Data from the chart are presented in the table.//

Electronic components and parts	
2013	1.7
2016	4.6
2017	3.7
2018	3.3
2019	2.6
2020	2.3
2021	3.1

Back to the text

Chart Export of the electronic sector (billion PLN)
Source: Central Statistical Office of Poland (GUS) - Information society in Poland in 2014-2022

//Data from the chart are presented in the table.//

Consumer products (audio-video)	
2013	16.2
2016	21.6
2017	26.1
2018	26.3
2019	26.8
2020	31.8
2021	39.6

Back to the text

Chart Export of the electronic sector (billion PLN)
Source: Central Statistical Office of Poland (GUS) - Information society in Poland in 2014-2022

//Data from the chart are presented in the table.//

Telecommunications equipment	
2013	11.1
2016	11.3
2017	10.4
2018	9.5
2019	10.0
2020	13.7
2021	16.1

Back to the text

Chart Export of the electronic sector (billion PLN)
Source: Central Statistical Office of Poland (GUS) - Information society in Poland in 2014-2022

//Data from the chart are presented in the table.//

Computer equipment	
2013	10.6
2016	18.4
2017	19.0
2018	24.5
2019	28.6
2020	30.7
2021	32.9

Back to the text

ISBN 978-83-7633-596-4

European Funds for Smart Economy
Republic of Poland
Co-funded by the European Union
Ministry of Economic Development and Technology
Republic of Poland