



# CBI Product Factsheet: for Electronic Components for RFID in the UK, Germany and the Netherlands

## *'Practical market insights on your product'*

RFID systems have a wide range of applications for industrial, commercial and consumer use. A wide range of passive and electromechanical components, embedded sub-assemblies and software among other electronic and electrical engineering products are used in RFID. The penetration of RFID is growing in smart manufacturing and supply chain management for process optimisation benefits. Since high-tech RFID is cost-intensive in Europe, OEMs are increasingly buying hardware or low-tech products from low-cost production countries.

Exporters from developing countries (DCs) have opportunities in supplying better-priced components for further integration with high-tech microchips in European OEMs. Co-design and co-innovation can also advance European sales of electronic components made by DC suppliers.

### **Product Definition**

RFID (radio-frequency identification) systems include RFID transponders (also known as tags), RFID readers, RFID cards, as well as software (embedded system or sub-system).

- RFID transponders contain a minimum of 2 parts: a microchip and an antenna. RFID transponders can be read-only (information stored can be recorded during manufacturing and cannot be modified) or read-write (a tag with which memory can be modified).
- An RFID reader communicates with the RFID transponder. The RFID reader broadcasts a radio signal, which is received by the tag, while the tag transmits its information back to the reader.
- The RFID system is supported by software. RFID-specific software translates the data received from the tag into information. For read-write tags, software controls data transmission and changes the tag's data.

RFID systems are currently used in retail (inventory tracking), healthcare (inventory control of medications, high-value supplies and other medical supplies, patient tracking and document and data file tracking), and sports

(results tracking and accuracy in sports, e.g., location of a ball on a football field). RFID is increasingly penetrating the supply chain and (smart) manufacturing.

The leading suppliers of RFID in Europe are ams, Fraunhofer, Laird Technologies, Mitsubishi Materials, Murata, Neosid, Smartrac, Barco, IDTronic, NXP. Brand names of RFID play an important role in Europe, especially for the high frequency RFID that is still in the development stage worldwide.

Photo example: RFID transponder



Source: Fotolia

Photo example: RFID reader with an RFID card



Source: Fotolia

## Product Specifications

**Quality:** European companies are typically looking for electronic components for RFID systems and RFID-specific software. All products must fulfil the specifications agreed between the supplier and the buyer and use up-to-date technology.

- An RFID transponder is characterised by radio frequencies, tag types, and methods of coupling. The RFID frequency band is a key criterion for the product quality and possible application areas.
- RFID readers are usually characterised by the read frequency and read range.
- With the increasing penetration of RFID systems into new application areas and with the introduction of RFID transponders with integrated sensors, the quality of RFID systems can be measured by the signal transmission range for the RFID sensor and the antenna used in the transponder. The transmission range is currently being developed and extended.
- Besides the signal transmission range, there are several ongoing projects investigating the materials that have a negative influence on the transponder antenna's range, and on the quality of data transmission (e.g. the EU-sponsored "SmartFiber" project managed by German Fraunhofer IIS).
- To assure durability and safety, all electronic products must comply with the relevant EU regulations and standards. The materials used and hazardous substances, in particular, have to comply with RoHS and must also meet REACH requirements (see Legislative Requirements in this report).

### Labelling:

- All electronic components for RFID are typically labelled with a description of the content, including the following information:
  - type of product,
  - model type,
  - quantity,
  - net and gross weight (in kilograms),
  - supplier/manufacturer name and location,
  - serial number.
- DC exporters have to familiarise themselves with the energy-related products directive Waste of Electrical and Electronic

Photo examples: Labelling



Equipment (WEEE) in order to formulate labels, indicate all product information and mark products accordingly (e.g. the symbol of the crossed-out wheelee-bin).

*Packaging:*

- Electronic components for RFID are typically packaged in plastic bags and cardboard boxes to protect them from damage.

Photo examples: *Packaging*



## Legislative Requirements

To assure durability and safety, products must comply with the relevant EU regulations and standards. Compliance with European legislative, as well as non-legislative requirements is a basic necessity for all exporters in the electronics and electrical engineering (E&EE) sector. Below you will find the main mandatory requirements for your products. Make sure you have familiarised yourself with legal requirements in terms of labelling, dangerous substances, product safety and liability. Your products must comply with all EU directives.

- **Liability for defective products.** This liability applies to all products manufactured or imported into the European market. Typically the company that brings the product into the European market is responsible, but a claim can be passed onto the producer or exporter.
- **CE marking.** With a few exceptions, all electronic components or embedded systems sold to RFID system (transponders, readers) manufacturers must be marked with the CE mark. When electronic components are sold as a sub-system or part of a finished product, they do not legally require a CE mark, however, market requirements mean that nearly all customers will still demand the CE mark for most components, particularly if the components are critical to the application. The following directives may be relevant for exporters of electronic components for RFID systems:
  - Electromagnetic compatibility (EMC Directive 2004/108/EC).
  - Low voltage equipment (LVD 2006/95/EC)
  - Ecodesign for Energy related products (Directive 2009/125/EC)
  - Equipment for use in potentially explosive atmosphere (ATEX Directive 94/9/EC).
- **Waste of Electrical and Electronic Equipment (WEEE).** If you want to export electronic or electrical products to the EU, you have to take into account that your EU buyers

### Considerations for action

- Familiarise yourself with standards that specifically apply to your products. To ensure that your products are of high quality, review your quality assurance and testing procedure, e.g. through the implementation of an accredited quality management system (ISO 9001). Carefully formulate labels, instructions for use and disclaimers. Finally, make sure your insurance covers product liability. See the document EU legislation: [Liability for defective products](#) on CBI's Market intelligence platform.
- Apply for the CE mark, which is required by all customers, even if your product is a sub-system or part of a finished product and legally does not require the CE mark. If you are a manufacturer, you have to be familiar with the process of affixing the CE marking to your products. [The European Commission](#) has a very insightful website that illustrates the key steps from the start to trading the product. See the following documents for more information on EU legislation on CBI's Market intelligence platform:
  - [CE marking for Electromagnetic compatibility](#)
  - [CE marking for Low Voltage Devices](#)
  - [CE marking for Eco-design of energy related products](#)
  - [Directive 94/9/EC \(ATEX\)](#)
- Make sure your product design complies with WEEE and enables product recycling, recovery or dismantling. (Note that these requirements may differ per EU Member State.) Carefully

have obligations regarding the disposal of these products. EU producers are obliged to participate in product take-back schemes. Although, this does not directly affect exporters from developing countries, the requirements may have an impact in terms of EU buyers asking their suppliers to meet specific design requirements or provide certain information.

- **Labelling of energy-related products.** EU producers and exporters are obliged to indicate energy consumption on household appliances and other energy-related products (the list is being extended to include industrial products). Make sure you check when importing your products and discuss this with your European customers.
  - **REACH regulation** to manage the risks from chemicals and provide safety information on the substances concerned. This legislation restricts the use of certain hazardous chemicals. Furthermore, it sets some requirements regarding information on the used chemicals. Manufacturers are required to provide their buyers with information on the properties of chemical substances used.
  - **Restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS).** The directive bans the introduction into the EU market of electrical and electronic equipment that contains more than the agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl and polybrominated diphenyl ether flame retardants.
- Make sure you indicate all product details (including, energy class, performance, capacity, noise level, etc.) required by the EU. See the document on EU legislation: [EU legislation: Waste Electrical and Electronic Equipment \(WEEE\)](#) on CBI's Market intelligence platform.
  - Ask your buyer for their requirements regarding REACH. List all chemicals, including raw materials and additional materials, used in your production process. See the document [Chemicals REACH](#) on CBI's Market intelligence platform.
  - Make sure that none of the hazardous substances referred to in the RoHS Directive is used in your production process. Exporters of electronic components have to meet the requirements under both RoHS and REACH, since they are complementary. See the document [Substances in Electrical and Electronic Equipment \(RoHS\)](#) on CBI's Market intelligence platform.

## Non-Legislative Requirements



- **Quality management systems (QMS) – ISO 9001.** If you plan to export to Europe, all products must meet the buyers' quality demands. ISO 9001 is designed to make sure that the manufactured and/or exported products to Europe meet the needs of customers. This document provides information on the world's most widely used QMS.
  - For automotive application, components within an assembly, sub-assembly and finished product have to meet quality demands outlined in *ISO/TS 16949 QMS*.
- Apply for ISO 9001 as quickly as possible. Understand your target customers' requirements and if you plan to target the automotive industry, get ISO 16949.
  - See the document [Quality management systems](#) on CBI's Market intelligence platform.
  - See automotive application related requirements in terms of quality management systems [here](#).



- **Functional Safety in accordance with ISO 26262.** ISO 26262 focuses on the functional safety of electrical and electronic systems in vehicles.



- **Occupational health and safety in the electronic components sector.** Occupational health and safety (OHS) issues are all aspects related to labour conditions and are very often part of the EU buyers' social requirements for their suppliers.



- **Electronic Industry Citizenship Coalition (EICC) Initiative.** The most important sustainability initiative in the Electronics Sector, in Europe and internationally, focuses on social, ethical, health and safety and environmental issues. Members are required to comply with the Code requirements. Some industry buyers can require their suppliers to follow the EICC code of conduct. This is particularly relevant for first tier suppliers.

- Apply for ISO 26262. Even though these requirements are not mandatory, they will definitely give you an advantage over other DC exporters. See the ISO webpage for more information on the guidelines [ISO 26262](#).

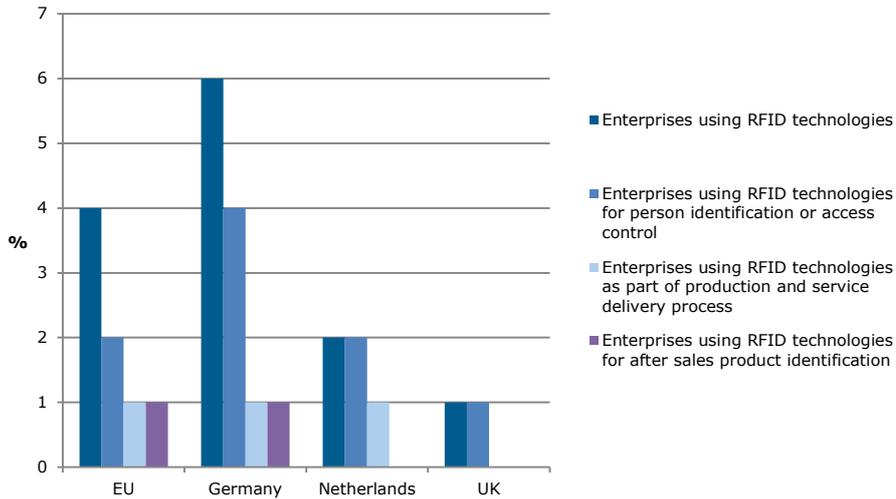
- Consider implementing a management system on OHS (e.g. OHSAS 18000). European buyers are becoming increasingly sensitive and need transparency in the supply chain and labour conditions at all levels. Even though these requirements are not mandatory, they will definitely give you a competitive advantage over other DC exporters if you can comply with them. See the document [Occupational health and safety in the electronic components sector](#) on CBI's Market intelligence platform.

- Find out what buyers (read industry) may require regarding the EICC code of conduct. Try to implement this policy; this will give you an advantage over other exporters. Explain your steps in this area on your website and in other company literature. See [EICC](#) webpage for more information on the sustainability initiative.

## Trade and Macro-Economic Statistics Use of RFID Technologies in Europe

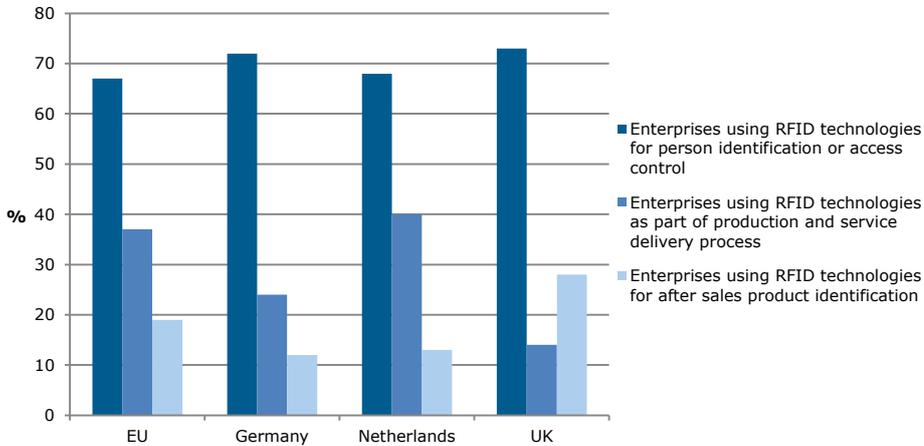
*RFID technology is forecast to grow significantly, in particular in supply chain and smart manufacturing applications, where continuous development is taking place. DC exporters have opportunities to enter Germany, the UK and the Netherlands with low-tech components for RFID systems, including the full range of passive and electromechanical components, embedded sub-assemblies and software. Co-design and co-innovation can also advance sales of electronic components made by DC exporters in Europe.*

**Figure 1: Share of enterprises using Radio Frequency Identification (RFID) technologies in 2011, %**



Source: Eurostat (2013)

**Figure 2: Use of RFID technologies by purpose of enterprises using RFID technologies in 2011, %**



Source: Eurostat (2013)

**Analysis and interpretation**

- RFID is an increasingly attractive application for electronic components. The market size of RFID technologies used in Europe nearly doubled in 2007-2012, and it is expected to grow by CAGR 39% in 2012-2022. The fastest growing industries where RFID systems are used include retail & consumer goods, pharmaceutical & healthcare and logistics. (Source: JRC, European Commission)
- Germany holds one of the leading positions in RFID technology development in Europe. In Germany, the RFID industry saw a 53%

**Considerations for action**

- Electronic component (including the full range of passive and electromechanical components and embedded sub-assemblies) producers have opportunities in supplying European RFID (transponder and reader) manufacturers with low-cost hardware for RFID systems (for example with antennae for RFID transponders).
- Depending on your know-how, consider differentiating your electronic component offering and entering RFID system application

growth in 2005-2010, but sales of RFID systems almost doubled. RFID is forecast to further penetrate the supply chain and manufacturing industries to fulfil process optimisation and product tracking needs. (Source: Federal Ministry of Economics and Technology). Germany has a number of best practices for RFID implementation (e.g. Metro Group is the largest company in retail RFID implementation). The country is leading in RFID R&D projects in Europe, e.g. Siemens is the top German RFID patenting company (Source: JRC, European Commission). The implementation of RFID systems in Germany is expected to rise, driven by the trend of bar-code replacement in all countries.

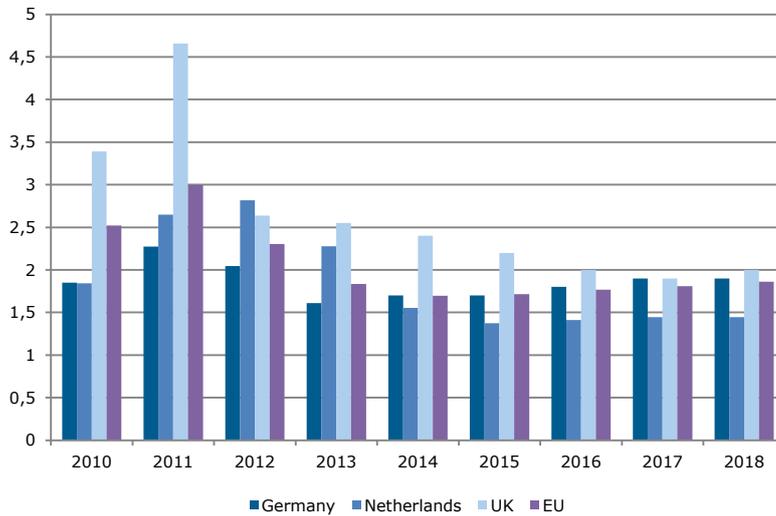
- The Netherlands is strong in RFID implementation in the production and service delivery process, where mainly ultra-high frequency RFID technology is used. NXP Netherlands and Philips are the top RFID system patenting companies in the country. Schuitema is a case study in RFID implementation for distribution and supply cycle monitoring. (Source: e-Business Watch by European Commission) RFID is expected to further penetrate the supply chain and manufacturing industries and will see significant growth in the Netherlands. Bar-code replacement will also have a positive impact on the growth of RFID system implementation.
- RFID R&D is well developed in the UK, being the second leading country in Europe in terms of R&D projects (after Germany). The UK is strong in RFID system implementation for after sales-product identification. Land Rover (vehicle tracking and management system) and New Look (product logistics) are some of the case studies in the UK (Source: e-Business Watch by European Commission). Logistics and consumer retail are expected to undergo significant growth in RFID system use. The implementation of RFID technologies is expected to grow, driven by the trend of bar-code replacement in all countries.

in Germany. Do your homework and find out who your potential customers are; these could be chip manufacturers (e.g., NXP Hamburg), RFID software - Middleware (SAP), or any other integration service provider. Consider participation in RFID projects in Germany, e.g. in RFID use in logistics, traffic, and production.

- Find out who are the potential customers in the Netherlands. Consider supplying components to RFID chip manufacturers in the Netherlands (e.g. NXP Semiconductors) or to IT service providers who are engaged in RFID service integration (e.g. Capgemini).
- Consider participating in RFID projects in the UK, in particular in high-tech RFID technology with a wide signal transmission range that is currently under development. Find out who are your potential customers in the UK. Consider supplying components to RFID chip manufacturers, Middleware or integration services providers.

## Macro-Economic Statistics

**Figure 3: Inflation in Germany, the Netherlands, and the UK (end of year change), %**



Source: EconomyWatch, International Monetary Fund (IMF), (2013)

### Analysis and interpretation

- Inflation in the UK will exceed the European level; in Germany inflation is expected to be at the European level; in the Netherlands it is expected to be below the European level. The growing level of annual inflation (especially in the UK) will have an impact on the market value growth of all goods manufactured and sold on the market, including electronic components for RFID and RFID systems as finished goods. The expected market growth for RFID systems will be influenced by the in-country inflation.

### Considerations for action

- Inflation in the UK, Germany and the Netherlands will not have a significant influence on production costs in developing countries. Nevertheless, take inflation levels into account when analysing the future demand in the countries, i.e. production/demand for RFID systems in volume terms may develop more slowly.

## Market Trends

### Analysis and interpretation

- *Product separation by the level of technological advancement:* European OEMs separate high-tech and low-tech, or high-price and low-price electronic product parts. For example, low-tech parts for RFID transponders and readers for consumer industry applications are mainly sourced overseas, while high-tech, wide-range signal transmission solutions are mainly produced by European OEMs.
- *Improvement of RFID technology:* Development of high-tech RFID is growing in Europe. RFID with sensors are beginning to penetrate logistics processes and smart factories, where the key benefits include more

### Considerations for action

- Create a product portfolio on a modular basis, enabling low-tech electronic parts to be ordered separately (e.g., RFID antenna without a microchip) or in combination with high-tech electronics (a complete RFID solution). European OEMs will be able to make the decision based on their needs, intellectual property rights and the product quality.
- Consider investing in RFID R&D or in co-designing through virtual cooperation with European peers. Learn about ongoing and upcoming projects in Europe and actively search for cooperation opportunities. If you

efficient logistics operations, recycling, and the identification of original products vs. copies. The future potential of RFID includes tracking consumer purchasing habits, the extension of RFID sensor networks and signal transmission range and connectivity of RFID technology with smartphones. There are also numerous possibilities in the use of RFID that are still in the research phase. The main challenge remains the high price and the lack of know-how for transmission range extension.

- *Miniaturisation of RFID solutions* is an ongoing trend. However, unlike in other industries, smaller RFID technology is not cheaper. It is, in fact, more cost-intensive in Europe.
- *Minimisation of the total cost of ownership:* With the growing role of international cooperation, European companies will be increasingly facing various risks that need to be measured and managed in order to keep the total cost of ownership (TCO) at a reasonable level. Both smaller and larger companies will increasingly look for the most reliable suppliers and will try to eliminate risk through supplier contracts and cost management.

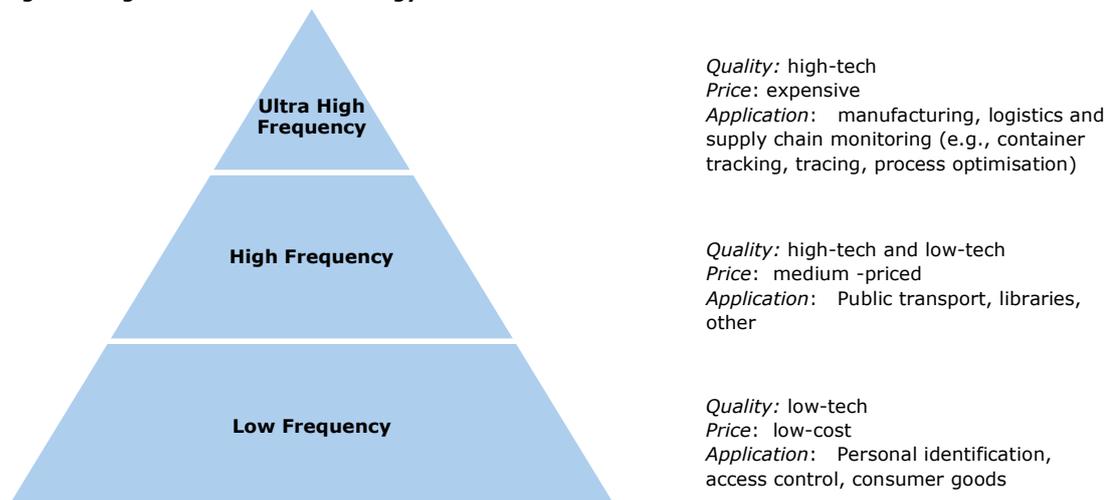
have know-how in RFID technology, share your knowledge with European peers at open innovation forums and peer group meetings. Look for cost-efficient sensor solutions and other components for RFID to meet the European demand for cheaper high-tech products.

- Consider specialising in electronic components for miniature RFID solutions. DC exporters will gain benefits by supplying European countries with value-for-money solutions.
- European SMEs present better opportunities as potential customers for DC exporters, but larger companies may also contact you as a potential supplier. That is why visibility on the market is crucial. Develop your sales and marketing strategy:
  - Work on well-structured and up-to-date content in your company's website;
  - Attend trade shows several years in a row; start preparations for the trade show far in advance (see a list of trade shows in Useful Sources);
  - Work on your *Unique Buying Proposition*, i.e. why should European OEMs buy your product;
  - Work on the product pricing.

For more information on entering the European market, please refer to CBI Trendmapping for Electronics and Electrical Engineering.

## Market Segments

Figure 3 Segments for RFID technology



### **Analysis and interpretation**

- RFID technology can be segmented according to the application industry. A certain frequency band is required for specific RFID application solutions, while the product price and quality depends on the frequency band. Thus, RFID for personal identification and access control is low-tech and relatively low-cost, while RFID solutions for supply chain and manufacturing are high-tech and quite cost-intensive and require in-depth know-how and even additional research.

### **Considerations for action**

- DC exporters have opportunities to supply European countries with electronic components for low-tech RFID solutions. Depending on your know-how, there is also a potential to offer customised high-tech components, but consider a modular product setup. Organise the manufacturing process so that you can integrate low-tech and high-tech in a quick and efficient way.

*For more information on entering the supply chain, please refer to CBI Channels and Segments for Electronics for Electronics and Electrical Engineering.*

### **Market Competitiveness**

*See CBI Market Competitiveness for Electronics and Electrical Engineering, because competitiveness of electronic components for RFID does not differ significantly from this general overview.*

### **Main Sources**

- Eurostat, URL: <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/home>
- Eurostat Prodcom, URL: <http://epp.eurostat.ec.europa.eu/portal/page/portal/prodcom/introduction>
- Distributors of electronics in all countries, URL: <http://www.list-of-companies.org>
- Online magazine for high-tech RFID: <https://www.rfidjournal.com>
- Joint Research Centre, European Commission: <http://is.jrc.ec.europa.eu/pages/Homepage.html>
- RFID publications: <http://www.rfidtoday.co.uk/>

#### *Trade shows in Europe*

- Electronica ([www.electronica.de](http://www.electronica.de))
- CeBIT ([www.cebit.de](http://www.cebit.de))
- Hannover Messe ([www.hannovermesse.de](http://www.hannovermesse.de))
- EFA ([www.efa-messe.com](http://www.efa-messe.com))
- belektro ([www.belektro.de](http://www.belektro.de))
- PCIM ([www.pcim.com](http://www.pcim.com))
- Embedded World ([www.embedded-world.de](http://www.embedded-world.de))
- sps ipc drives ([www.mesago.de/en/SPS/home.htm](http://www.mesago.de/en/SPS/home.htm))

#### **More information**

CBI market information:

- CBI Tradewatch for Electronics and Electrical Engineering;
- CBI Trendmapping for Electronics and Electrical Engineering;
- CBI Market Channels and Segments for Electronics and Electrical Engineering;
- CBI Market Competitiveness for Electronics and Electrical Engineering.

This survey was compiled for CBI by Global Intelligence Alliance in collaboration with CBI sector expert Günther P.Fandrich

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