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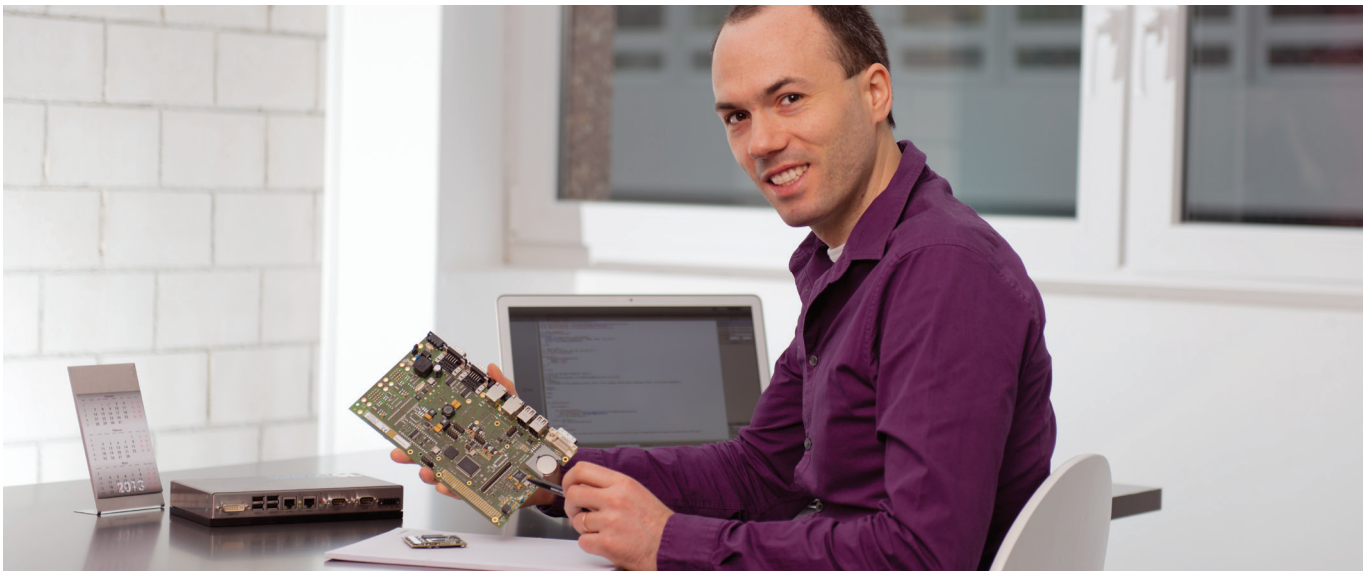

Syslogic White Paper

What distinguishes a true industrial computer?

1 Introduction

Industry and private users have fundamentally different requirements when it comes to computers. A long service life, resilience, and long-term availability are the most important requirements for industry use. But many computers advertised to be suitable for industry application fail to meet these requirements. The current White Paper highlights the distinctive features of true industrial computers.

2.1 Resilience

Dust, moisture, acid, heat, cold, impact, vibrations – computers face tough challenges in industry settings. It is therefore important that industrial computers be specifically designed for such conditions during their development phase. Survival in an industry requires that computers have not only a sturdy case, but that they also contain durable electronics that can withstand the above factors.

2.2 Long service life

We have long since got used to the low life spans of consumer devices – hardly anyone owns a PC that is older than five years. Things are different in the industrial sector. Electronic components that make up complex systems and machines should remain functional for as long as possible. This is the only way to ensure that expensive systems and machines remain amortized. Industrial computers that are used to operate machines frequently have life span requirements of ten years or more. This is not always guaranteed – especially because many manufacturers of industrial computers have in recent years been moving in the direction of the consumer market.

2.3 Availability

The above requirements for longevity equally apply to availability. With consumer PCs, it is commonplace for individual designs to disappear from the market within just one year. In an industry setting, the long-term availability of computers is a fundamental requirement for many customers. If an industrial computer is no longer available, customers frequently have to engage in time-consuming and costly re-qualification efforts. In the worst case, switching hardware may even require adjustments of the software used. This usually incurs unmanageable costs.

2.4 Support

Industrial enterprises need fast support in the case of technical problems. A support guarantee is therefore crucial for the purchase of industrial computers. A shared language and geographical proximity between manufacturer and user can constitute an equally important factor.

3 Market situation for industrial computers

Over the past years, a number of trends from the consumer market have influenced the industrial sector. Due to the high cost pressure, many industrial enterprises started prioritizing low prices over all other factors. Overall operating costs were increasingly neglected.

In the industrial sector, this tendency had dramatic consequences. Premature breakdowns caused a lot of trouble and frequently resulted in time-consuming re-qualification measures, as the industrial computers that had been used were already off the market after just a few years.

The industry has learned from its mistakes now, and serious enterprises are once again increasingly taking long-term costs into consideration. But industrial computers that are genuinely developed and manufactured for industrial application are difficult to find. The following factors are important when it comes to the procurement of industrial computers.

4.1 What devices can withstand vibrations and impacts?

Industrial computers are used in tough environments. Many areas of application inevitably involve constant vibration, impact and blows. Industrial computers must therefore not have any moving parts such as fans, which are particularly susceptible to faults. True industrial computers have passive cooling systems, which improve MBTF (Mean Time Between Failures) values.

Instead of rotating storage elements (hard drives), industrial solid state drives (SSDs) are used. While hard drives tend to fail prematurely due to their mechanical read heads, which cannot cope with the constant vibration and blows, industrial SSDs offer better durability. Unlike mechanical hard drives, SSD options function on a static, rather than optic, basis. Flash controllers directly address data to so-called NAND gates using a matrix.

Sturdy plugs are equally important for applications involving constant vibration. Screw-fitted M12 plugs are particularly durable. Industry certifications can provide additional information about the suitability of an industrial computer for applications involving impacts and vibration. The international railway standard EN50155, for instance, includes impact and vibration tests.

4.2 Is the processor platform suitable for industrial purposes?

The processor platform constitutes another important point to indicate whether a computer was truly designed for industrial purposes. Low power consumption is a main priority for processors. It is the only way to allow for passive cooling.

The Intel Bay Trail series (Atom E3800) is particularly well-suited for industrial purposes. It offers both single and multi-core CPUs. All versions strike a suitable balance between low power consumption and solid performance. This gives them sufficient reserve capacities without sacrificing durability.

Another important aspect: processors should be listed on an embedded road map. By offering this, processor manufacturers guarantee that the processors will be available for ten years or longer.

4.3 For what temperature range are industrial computers certified?

Industrial computers are frequently exposed to extreme temperatures, e.g. in industrial plants, machines or vehicles. True industrial computers are certified for the extended temperature range from -40 to +85 °C. The type of certification plays a significant role, however, as many manufacturers solely rely on a screening procedure. Only few manufacturers already specify a temperature range during the developmental stage in order to select parts accordingly. But this is the only way for manufacturers to ensure long-term reliability in extreme temperatures.

4.4 What security features do industrial computers offer?

In addition to their sturdy design, modern industrial computers come with sophisticated surveillance systems. The embedded manufacturer Syslogic offers a surveillance system with an intelligent power management function, a temperature monitoring system and a watchdog. The intelligent power management system features an additional micro-controller that monitors startup and shutdown patterns, allowing for the defined shutdown management of the industrial computer – even when a system or machine is switched off. The watchdog simultaneously ensures that the system will be restored automatically in the case of a fault. The temperature monitoring system controls the heat level inside the system and facilitates intervention if necessary.

4.5 How about long-term availability?

Availability is generally an important criterion for industrial computers. The main requirement is that all components that have been incorporated into the system are available for a long time. The product portfolios of manufacturers of industrial computers often provide information about availability. It is worth checking whether old series are still available.

If a manufacturer offers retrofit computers, this is a further indication of their focus on long-term availability. Retrofit computers are devices with backwards compatibility that can run even old software such as MS Dos. Retrofit computers are used in cases where the original devices are no longer available.

4.6 What protection does the casing offer?

In addition to the industrial design of the electronics, a sturdy case is particularly important. Cases are assigned IP (Ingress Protection) categories. The following table illustrates the IP categories.
http://www.syslogic.com/files/ip_schutztabelle.pdf

5 Conclusion

The industrial computer market has become too vital to be overlooked. Many computers advertised to be suitable for industry application truly meet all the corresponding requirements. If the points discussed in chapter 4 are taken into consideration, unpleasant surprises can be avoided. It is generally a good idea to visit the manufacturer in person when evaluating the suitability of an industrial computer. It is frequently the only way of clarifying beyond a shadow of a doubt whether the provider can keep their promises.