The Ultra Rugged Embedded Computer

Rugged Computer: the one for the rough stuff

The Rugged Computer RPC Compact 71 pushes the Embedded Specialist Syslogic into entirely new business spheres. This Rugged Computer is protected to category IP67; it has a fully enclosed housing, as well as the matching M12 plug connectors. The RPC Compact 71, in combination with its robust electronics, is almost indestructible.

Text: Patrik Hellmüller Pictures: Syslogic, Cactus Technologies

Salt carrying air, oil or dust, extreme temperature fluctuations, vibrations and/or shocks – these kinds of environmental factors usually mean devastation for electronics and especially for a computer system. Even rugged industrial computers usually have to surrender in their fight against such environmental conditions.

Early system failures can mean all kinds of hassles

The possible causes can be manifold. Salt containing air for instance can mean corrosion inside the device, which may then very well lead to later malfunctions. Should dust ingress into the industrial unit because of a leak in the housing, it could cause sudden failure. Another reason for industrial failure for systems which are exposed to constant environmental vibrations, can be improper connectors or storage media. In addition, extreme temperatures create difficult operating conditions for the average device - like difficulties starting when it is cold, or even permanent electronics damage under sustained high heat conditions. In short, the traditional industrial computer is only suitable to a limited extent under extreme conditions.

The consequences of an early failure can be devastating. Depending on the application, such production downtimes or unscheduled maintenance events will cause losses to the bottom line and a great deal of frustration. In worst case scenarios these failures can even become a danger to people, especially in cases where these computers have been integrated into vehicles.

There are a number of applications that demand using an industrial computer, which is able to run reliably even under the most extreme of conditions. This includes their incorporation into construction equipment, special-purpose vehicles, mining and railway applications, as well as their use in the maritime environment.

When they really need to be able to take it: The Syslogic Rugged Series

The market offering of suitable equipment is rather limited. The Embedding Specialist Syslogic has recognized this need and developed a brand new device, which is setting new standards in stability. A device that can really take it.

Raphael Binder, Product Manager for Syslogic explains: «We didn't just plug an already existing board into a robust housing, we started our design from scratch.» Ultra rugged and no compromises, were the specifications issued by Syslogic, as explained by Binder. This resulted in a device that was truly unique to the market.

Closed Rugged Housing – completely dust and waterproof

The main features of the RPC Compact 71 are its enclosed aluminum housing with IP67-protection rating and the M12 interfaces. This makes the RPC Compact 71 resistant to moisture and dust laden environments. In order to achieve a uniform pressure load in spite of the completely enclosed housing, the Rugged Box Computer features a Goretex valve is mounted to its sidewall.

The new Ultra Lock series M12 connectors by Molex withstand the constant vibrations and are also certified to common industry standards. Syslogic does not only value a robust design, but also the best possible user comfort and an uncomplicated commissioning. The M12 plugs have a practical Bayonet closure for quick and simple peripheral connections. In addition, Syslogic furnishes the M12 cables with conventional counterplugs with its test equipment.

The M12 plugs come equipped with standard USB, Ethernet, RS232, RS422/485, CAN and VGA. Product Manager Raphael Binder informs that the electronics layout is arranged so that modifications to the interface configuration can be done quickly and cost effectively. There is also an integrated wireless model available, which features GSM/GPRS/UMTS, as well as W-LAN and GPS.

Our Computer-on-Module proves just how seriously the engineering team took our requests But not only the M12 plugs are extremely robust, Syslogic takes it a step further with the RPC Compact 71. Even the Computer-on-Module (COM), the real heart piece of the computer, has been developed by Syslogic themselves. This shows how dedicated the engineers were to this ultra-rugged approach. The robust CoreExpress pluggable cord connectors, as well as its protective paint are important features of the Syslogic COM boards. The CoreExpress connector technology is qualified for harsh industrial environments, in contrast to some other COM standards, and has already been proven in various automotive applications. Raphael Binder explains further: «Our engineers weren't satisfied with requirements for COM standards as they are on the market today.» So, instead of compromising, Syslogic decided to develop its own model. Syslogic now manufactures the COM board in their own state-of-the-art production, along with the rest of the device.

This same uncompromising attitude was pursued by Syslogic for their line of industrial processors. The COM boards are equipped with the Atom-E processor by Intel. They are

Syslogic is one of the few companies in the embedded branch that develops and assembles all of its embedded computers itself.

designed exclusively for demanding industrial applications. Producing very little waste heat, because of low power consumption, it will have a positive effect on MTBF values and ultimately on the life cycle of the entire Rugged Computer. In addition, all of the COM board components, as well as the rest of the Rugged Computer components are designed for an extended temperature range of -40 to +85 degrees Celsius (-40 to +185 degrees Fahrenheit). Syslogic does not depend on just the screening method for determining the temperature range, as is the industry standard, but defines which loads the components will have to withstand already in the development stages.

Galvanic isolation protects electronics

Another characteristic of our robust electronics is the galvanic isolation of their interfaces. This protects electronic components from damage, even in case of massive potential differences, caused by long cables for example. Another must mention feature is the SSD (Solid State Drive) memory, which has been incorporated into the Syslogic Rugged Computers design as well. In contrast to conventional hard disks, the SSD operates in a static state. This design is substantially longer lived than conventional hard disks that fail under vibration and shock conditions at a much earlier stage, because of their mechanical recording heads. In the selection of this memory Syslogic is able to benefit from the know-how of its sister company Systronics, which specializes in the distribution of industrial flash players. Syslogic Embedded Computer uses the SSD memory designed by Cactus Technologies, a specialist in the industry. Thanks to their SLC (single level cell) flash components and intelligent controllers, Cactus memory is able to guarantee a 24/7 lifetime operation for up to 25 years.

Protection similar to military devices – but at a much lower cost

RPC Compact 71 has proven its virtual indestructibility not just on paper, but with numerous continuous real-life operations for railway, automotive, construction and wind energy applications. Some of the endurance tests passed include vibration testing for frequency ranges of 5 to 2000 Hertz (EN 60068-2-64) or shock testing (EN 60068-2-27). RPC Compact 71, like all Syslogic devices, complies with EMC regulations. Additional testing has shown that the devices even meet Russian GOST standards. That means a cold start is expected to be possible at temperatures of –50 degrees Celsius (-57 degrees Fahrenheit). The Rugged housing with its clever Goretex module makes the RPC Compact 71 also suitable for potentially explosive environments.

As Florian Egger, Sales Manager for Syslogic, says: You will have a hard time finding a device more robust than the Syslogic Rugged Computer. Furthermore, he states: «This protection category is usually only represented in military devices, and at a price that is almost tenfold.» Our customers, which will be using these devices are therefore rather enthusiastic about them. The RPC Compact 71 is the right system for all customers which cannot afford a system outage despite having to operate under extreme conditions.

Syslogic ist weltweiter Anbieter von Industrie PC, Embedded Box PC, Single Board Computer und Touch Panel PC für anspruchsvolle Anwendungen in Bereichen wie Maschinen- und Fahrzeugbau sowie Verkehrs- und Bahntechnik. Sämtliche Embedded-Produkte werden komplett in Europa entwickelt und gefertigt. Dadurch steht Syslogic seit über 25 Jahren für maßgeschneiderte, robuste und langzeitverfügbare Embedded-Systeme. Neben dem klassischen Produktsupport bietet das Unternehmen seinen Kunden eine kompetente, technische Projektbegleitung.

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