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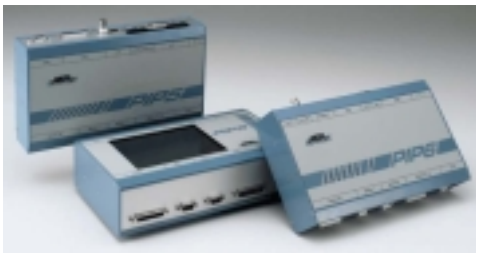
Breeding the industrial PC concept



For many years, industrial PCs consisted of 3U or 6U Eurocards assembled on backplanes. But under cost pressures, the trend for suppliers and integrators has been to include standard office PC and motherboards in their designs. The following article raises the issues of reliability and cost effectiveness in real-world industrial applications.

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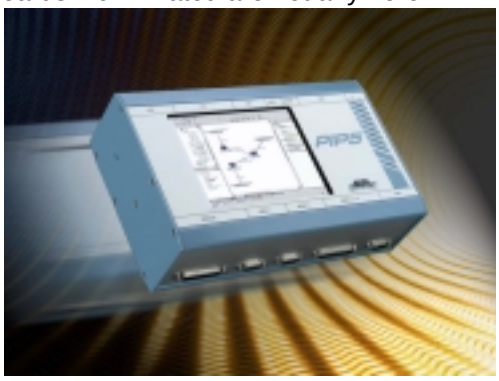
The misconceptions about industrial PCs

Moving away from the proven industrial standards and solutions to standard consumer PCs has some visible consequences on trying to meet the specifications and ruggedness required for industrial applications. Unfortunately the mislead user hardly sees the difference at the time of the purchase, as it generally only represents a small item of a complete equipment. Even more confusing is the fact that consumer PCs tend to feature the latest state-of-the-art processors, making them look very promising. Meanwhile in the real industrial world, a typical IPC is generally not equipped with the latest processor available, as those are not in the embedded program of the CPU manufacturers. Another advantage next to the marketing aspects of using low cost PCs is the components availability.

Cheap cost savings for cheap failures

But even though these PCs appear cost effective at first sight, such solutions are generally rather costly in maintenance as they are more prone to failure in an industrial environment. Typical failures involve connectors that get loose during operations due to vibrations, or fan and/or power supply failures due to harsh or heavy load operation. In most cases, the boards incriminated are not anymore repairable as the parts for it are no longer available, and they typically need to be replaced. Another contributing factor to a rather low MTBF of non industrial-specific PCs is their higher losses due to a fairly high CPU power.



Back to reality

Strong from 15 years experience in the design and manufacture of Industrial PCs, and well aware of their customers' need, MPL AG has come up with an IPC concept that supports the new requirements as well as the old ones. The goal was to keep the low cost for both integrators and users of IPC's whilst trying to reduce the cost of ownership. Cost reduction had to be achieved mainly in the conception rather than with the components or high volumes. This encompasses easy installation and support, reduced engineering for the integrators and yet flexibility to add value for upgrades and options. Last but not least in order to gain acceptance in the market, the new IPC had to be 100% PC compatible to support standard operating systems, offer long availability and allow for a modular repair concept.

To cater for all these needs, an industrial conformal design would implement wide input range DC supplies with as wide as possible standard temperature range and low power consumption.

The packaged industrial PC era

Combining all the above requirements in one rugged special constructed 162x270x62mm aluminum housing, MPL has made available the discussed specifications with the PIP (Packaged Industrial PC) family. Different versions are available for various processor types (5x86, low power Pentium, PowerPC).

As well as standard PC features, the units also include four serial, one parallel and two USB ports. All PIP are equipped with an opto-isolated CAN Interface. For servicing and monitoring, the modules come with several indicators as well as a local and an external reset. These IPCs support CRT but also LCD displays. An Ethernet and/or a SCSI-II interface can be fitted as an option, and the PIP5 version even integrates an LCD Display, with touchscreen capability.

The Remote MMI option allows a display to be connected at a distance of up to 15m, providing USB, RS232, keyboard and mouse interface. In terms of temperature, the PIP operates from 0 to +60C as standard, and optionally from -40 to +75C. With a special care for components selection and low possible losses, no fan or air vents are required to run the units. All externally required interfaces are available on the housing on standard PC connectors, yet EMI and RFI protected or filtered. The on-board power supply accepts inputs from 8 to 28Vdc. What's more, the compact housing still has enough space to fit a Flash disk or hard disk, a floppy or even some PC/104 extension. All units are designed, produced and tested in Switzerland, ISO 9001 certified, and comply with the CE norm.